Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
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 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	182.119	268.858	309.778	-	309.778	-	-	-	-	-	-
613: *MORTAR SYSTEMS*	-	5.554	1.358	-	-	-	-	-	-	-	-	-
BQ3: *155mm Artillery Propulsion XM654*	-	-	-	34.461	-	34.461	-	-	-	-	-	-
BY1: *Next Generation Combat Vehicle Ammunition*	-	-	22.176	33.867	-	33.867	-	-	-	-	-	-
CE3: *Precision Munition (Sniper)*	-	-	-	9.275	-	9.275	-	-	-	-	-	-
EC4: *Non-Standard Simulator Munitions*	-	2.536	2.154	2.116	-	2.116	-	-	-	-	-	-
ED7: *Advanced Multipurpose (AMP) Cartridge*	-	13.520	-	-	-	-	-	-	-	-	-	-
EL9: *Ammunitions Logistics Prototyping*	-	2.233	1.639	0.696	-	0.696	-	-	-	-	-	-
EP2: *Shoulder-Launched Munitions*	-	3.931	10.011	0.987	-	0.987	-	-	-	-	-	-
EP3: *Reduced Range Ammunition - Small Caliber*	-	6.000	13.816	14.000	-	14.000	-	-	-	-	-	-
EP4: *One-Way Luminescence for Small Caliber Ammo*	-	8.195	13.467	6.896	-	6.896	-	-	-	-	-	-
EP7: *Aviation Airborne Expendable Countermeasures*	-	4.717	4.313	7.526	-	7.526	-	-	-	-	-	-
EU4: *40mm HV Improved High Explosive Dual Purpose*	-	12.517	8.046	2.111	-	2.111	-	-	-	-	-	-
EU5: *.50 Caliber All-Purpose Tactical cartridge (APTC)*	-	-	3.931	-	-	-	-	-	-	-	-	-
EU6: *155mm HE Rocket Assist Project Extended Range*	-	18.804	51.095	27.655	-	27.655	-	-	-	-	-	-

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EU7: *Enhanced Lethality Cannon Munitions*	-	8.362	-	-	-	-	-	-	-	-	-	-
EU8: *Improved Multi-Option Fuze*	-	9.589	7.700	4.562	-	4.562	-	-	-	-	-	-
EW1: *40mm Low Velocity Ammunition*	-	13.454	21.659	3.640	-	3.640	-	-	-	-	-	-
FA6: *30mm Lethality*	-	26.030	19.358	8.939	-	8.939	-	-	-	-	-	-
FJ4: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	-	26.593	89.138	-	89.138	-	-	-	-	-	-
FL4: *Small Caliber Ammo for Next Gen Squad Weapons*	-	17.432	26.483	28.372	-	28.372	-	-	-	-	-	-
S36: *Precision Guidance Kit*	-	29.245	32.147	35.537	-	35.537	-	-	-	-	-	-
XT2: *40mm Door Breach*	-	-	2.912	-	-	-	-	-	-	-	-	-

Note

Transitions: In Fiscal Year (FY) 2022, Project BQ3, 155mm Artillery Propulsion, will transition from Budget Activity (BA) 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. Project BQ3 is not a FY 2022 new start.

Project XT2, 40mm Door Breach transitioned to procurement. There is no FY 2022 budget request.

New Start: Project CE3, Precision Munition (Sniper) is a new start in FY 2022.

Elimination: Project 613, Mortar Systems is complete. There is no FY 2022 budget request.

Project EU5, .50 Caliber All-Purpose Tactical cartridge (APTC) is complete. There is no FY 2022 budget request.

A. Mission Description and Budget Item Justification

PE 0604802A Weapons and Munitions - Eng Dev funds multiple efforts for the engineering development of weapons and munitions systems.

Project 613, Mortar Systems: This Project supports Mortar System & Fire Control Modernization (MS&FCM) activities. The Mortar System and Fire Control Modernization Project funds engineering development and demonstration of new technologies that will support modernized mortar weapon and mortar fire control systems. This includes capabilities that provide commonality between current and future weapon and fire control systems to help mitigate technology shortfalls and critical capability gaps. Future mortar systems that address these gaps include (but are not limited to) remote mortar turrets for mounted mortar systems, high-pressure

capable cannons/components, and composite/lightweight components for dismounted systems. Mortar Fire Control Systems capabilities include lightweight inertial measurement and navigation (IMU/INU) units for weapon pointing, simplified Ethernet/wireless-based digital communications interfaces, development of updated fire control software to enable commonality, integration with existing/future platform interfaces, and support for commercial off-the-shelf (COTS)/modified commercial off-the-shelf (MCOTS) fire control components. In Fiscal Year (FY) 2022, this Project does not have a Research Development Test and Evaluation (RDT&E) budget request.

Project BQ3, 155mm Artillery Propulsion: Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the XM1299 Increased Range (formerly Increment 1C) and XM1299A1 Increased Rate of Fire (formerly Increment 2) Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). It will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case (foamed celluloid or felted fiber technology), integral metal Stub Case, electrically initiated primer, and advanced artillery propellant. Fiscal Year (FY) 2022 funding will support efforts for aforementioned two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of XM1299 ERCA Increased Range that will perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF. These efforts directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

Project BY1, Next Generation Combat Vehicle Ammunition: 50x228 millimeter (mm) family of ammunition is a critical technology development in response to the Next Generation Combat Vehicle (NGCV) Abbreviated Capability Development Document for weapon qualification, platform integration, and fielding of the Optionally Manned Fighting Vehicle (OMFV) primary weapon system (XM913). This effort includes the development of three capabilities: The XM1202 Target Practice with Trace (TP-T); the XM1203 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T); and the XM1204 High Explosive Airburst with Trace (HEAB-T). The training cartridge will allow the Warfighter to train in a cost effective manner and the tactical cartridges will provide enhanced lethality at increased ranges when engaging personnel threats in the open, defilade, and under the cover of urban structures, Anti-Tank Guided Missiles (ATGM) teams, and current and projected future peer armored materiel threats. This effort is operating under Middle Tier Acquisition authority for rapid prototyping to qualify the three munitions in order to support the NGCV Cross Functional Team (CFT) timeline for First Unit Equipped (FUE). Fiscal Year (FY) 2022 funding will support Design Engineering Tests (DET) to confirm TP-T and APFSDS-T safety, performance, and ruggedness as well as the assessment of HEAB-T fuze safety and function.

Project CE3, The Precision Munition (Sniper) project is a critical technology development in response to the Precision Munition Capabilities Development Documents (CDD) for the ammunition required to support the Precision Sniper Rifle (PSR) / sniper weapons systems. The objective is to transfer the latest lethality technology into the suite of ammunition used by snipers. The Precision Munition improvement is split into three capability areas: Anti-Materiel (AM), Improved Performance Round (IPR), and Subsonic. The AM and IPR capabilities will enhance lethal effects at greater distances. The Subsonic capability will increase soldier survivability at close range by providing a low-sound signature munition that is undetectable to the enemy. Fiscal Year (FY) 2022 funding supports rapid development of the AM munitions and evaluation of ammunition prototypes/concepts. FY 2022 also supports rapid development of the IPR munitions by manufacturing and maturing prototype designs. Also, FY 2022 supports evaluating and maturing industry Subsonic munitions solutions and conducting safety testing.

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Project EC4, Non-Standard Simulator Munitions 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 or material released and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/ simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Mini Blast 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) simulators 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 simulator to replicate indirect fire; simulator to replicate a STINGER firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems and mitigate environmental concerns and safety risks associated with realistic scenario based training. FY 2022 funding will support the development of Yellow Smoke, RPG on a wire, Mini Blast, Tracer, HiOBE, and Micro pyrotechnic simulators.

Project ED7, Advanced Multipurpose (AMP) Cartridge: The XM1147 Advanced Multi Purpose (AMP) program is a direct fire line of sight 120 millimeter (mm) 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 50 Meter (m) 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 2022, this Project does not have a RDT&E budget request.

Project EL9, Ammunition Logistics Prototyping: This Project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2022 funding will be focused on integrating commercial off the shelf and/or relatively mature technologies into ammunition resupply enablers required by the Long Range Precision Fire (LRPF) Cross Functional Team (CFT). They will be focused on ensuring that a low risk resupply process solution exists to support the success of the Extended Range Canon Artillery (ERCA).

Project EP2, Shoulder-Launched Munitions: The XM919 Individual Assault Munition (IAM) will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. As the next generation SLM, the solution will fit within the Soldier Lethality Modernization Priority, by reducing Soldier load, while providing tactical innovation capable of

extending overmatch against near-peer adversaries in a joint, multi-domain, high-intensity conflict. The XM919 IAM will allow Soldiers to conduct Urban Operations and will allow Soldiers to defeat adversaries protected by field expedient structures and light armored vehicles while providing behind the wall lethality effects. This solution will be effective day or night with the ability to safely engage targets from within enclosures, increasing Soldier survivability. This solution will combine the capabilities of the existing Bunker Defeat Munition (BDM) and the AT4 Confined Space - Reduced Sensitivity (AT4CS-RS), which will reduce the logistics burden of having to maintain and train multiple systems. The Individual Assault Munition Capabilities Development Document (CDD) was approved on 11 March 2016. FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.

Project EP3, Reduced Range Ammunition - Small Caliber: The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62 millimeter (mm) 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. Fiscal Year (FY) 2022 funding supports completing Engineering and Manufacturing Development (EMD) efforts, conducting Production Qualification Testing (PQT), and performing activities to prepare for ammunition production transition to the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) on the 7.62mm variant. FY 2022 also includes continuing the EMD effort, conducting safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and performing PQT on the 50 caliber variant.

Project EP4, One-Way Luminescence for Small Caliber Ammo: The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62 millimeter (mm) 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 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, and increasing lethality by incorporating Enhanced Performance Round (EPR) technology into the new tracer ammunition. 7.62mm and 5.56mm are the immediate focus; later followed by .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. Fiscal Year (FY) 2022 funding will support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), conducting a Critical Design review (CDR), conducting a Limited User Evaluation (LUE), and performing preparation activities for manufacturing at the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) for the 7.62mm variant. FY 2022 funding will also support EMD efforts, a Preliminary Design Review (PDR), Pre-Production Qualification Testing (PPQT), and a Soldier Touch Point STP / User Evaluation for the 5.56mm variant. FY 2022 also supports assessing OWL technologies for the potential to adapt the technology into other small caliber ammunition variants.

Project EP7, Aviation Airborne Expendable Countermeasures (AAECM) will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on expendable countermeasure flares and decoys to include the XM215 Infrared (IR) countermeasure Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical

enabler for enduring aircraft and the Future Vertical Lift (FVL) - Aircraft Survivability Equipment (ASE) Cross Functional Team (CFT) within Army's Top modernization priorities.

These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and proliferated current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, 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 RF expendables). FY 2022 will support the final prototype build, development testing, and operational testing of the XM215 design as well as operational test and evaluation for the XM20 design.

Project EU4, 40mm High Velocity (HV) High Explosive Dual Purpose: 40 millimeter (mm) 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. Fiscal Year (FY) 2022 funding supports the completion of Developmental Test & Evaluation (DT&E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award.

Project EU5, .50 Caliber All-Purpose Tactical cartridge (APTC): The APTC project is a critical technology development in response to the .50 caliber Munitions Capabilities Development Documents (CDD). The overall objective of All-Purpose Tactical Cartridge is to deliver Ball and Tracer ammunition that replaces and improves current legacy .50 caliber ammunition. The All-Purpose Tactical Cartridge will be compatible with all Army .50 caliber weapons but specifically optimized to work in the M2 Machine Guns. There is no Fiscal Year (FY) 2022 request.

Project EU6, 155mm HE Rocket Assist Project Extended Range: The 155mm High Explosive (HE) Rocket Assisted Projectile, Extended Range Project supports projectile development efforts to achieve ranges of 40km in current 39 caliber artillery weapon systems and longer ranges in future 58 caliber Extended Range Cannon Artillery (ERCA) weapon systems to achieve the Army's requirement of extended range lethality by FY 2023. The Project is executing an evolutionary approach consisting of two parallel efforts to meet the objectives of extended range and precision. The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113E1 will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA in FY 2023. These efforts will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. FY 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113E1 development and qualification activities to support the Army's modernization priorities.

Project EU7, Enhanced Lethality Cannon Munitions: 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 in support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). This Project also accelerates the qualification of the 155mm XM1128 High Explosive Projectile, which will replace the M795 Critical Munition once qualified. Engineering efforts are ongoing and 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. In FY 2022, this Project does not have a RDT&E budget request.

Project EU8, Improved Multi-Option Fuze: The Improved Multi-Option Fuze Project 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 fuze 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 Project 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 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.

Project EW1, 40mm Low Velocity Ammunition: The 40 millimeter (mm) 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 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 resulting in increased soldier survivability. FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3).

Project FA6, 30mm Lethality: The 30 millimeter (mm) Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes a XM1182 High Explosive Airburst with Trace (HEAB-T) cartridge for increased anti-personnel effects, XM1170 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) cartridge for anti-materiel, and ballistically matched training cartridges; XM1173 Target Practice with Trace (TP-T) cartridge and XM1172 Target Practice Discarding Sabot with Trace (TPDS-T) cartridge. 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 APFSDS-T cartridge will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging light-to-medium armored vehicles. The HEAB-T cartridge will provide the Warfighter with increased lethality against troops in the open, counter defilade, Anti-Tank Guided Missile (ATGM) teams, and troops behind urban structures. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This project is a follow-on of the earlier efforts in support of the United States Army Europe (USAREUR) Operational Needs Statement (ONS) #15-20590 Stryker Increased Lethality for the 2nd Cavalry Regiment (2CR). Fiscal Year (FY) 2022 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include Developmental Test & Evaluation (DT&E) and preparation for Milestone C decision.

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Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM): The Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide U.S. ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155mm Dual Purpose Improved Conventional Munitions (DPICM) with DoD policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel to support the Army's modernization priorities. C-DAEM Armor will destroy moved and moving infantry fighting vehicles, self-propelled howitzers and tanks. C-DAEM DPICM Replacement will destroy personnel to soft-skinned vehicles. FY 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR) in FY 2023, engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s) and will support testing and qualification activities for C-DAEM DPICM Replacement solution(s) to ensure safety, performance and DoD policy compliance verification.

Project FL4, Small Caliber Ammo for Next Gen Squad Weapons: 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 the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding. The objective is to develop and Full Materiel Release (FMR) the new ammunition in parallel with the NGSW rifle and automatic rifle. The NGSW ammunition is split into multiple ammunition variants, the General Purpose (GP), the Special Purpose (SP), the Reduced Range Ammunition (RRA), Tracer Ammunition, Blank Ammunition, the Close Combat Mission Capability Kit (CCMCK) training ammunition, Drill Dummy Inert (DDI) cartridge, and High Pressure Test (HPT) cartridge. Fiscal Year (FY) 2022 funding supports completing the GP rapid prototyping/development effort and starting the GP optimization effort. FY 2022 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for safety testing, and conducting safety testing. FY 2022 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, conducting a Critical Design Review (CDR), and manufacturing prototype ammunition required for safety testing. FY 2022 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, conducting a Preliminary Design Review (PDR), building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2022 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2022 also supports the start of rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluating competing CCMCK training ammunition designs/concepts, down-selecting to a CCMCK design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results. FY 2022 also initiates the refined development of the DDI and HPT cartridges. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy.

Project S36, Precision Guidance Kit: The Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development effort will qualify state of the art technologies for a course correcting fuze that provides precision accuracy at extended ranges for current and future 155 millimeter (mm) 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. LR-PGK will support projectile operation in Global Positioning System (GPS) degraded environments and compatibility with Army Modernization objectives under the Long Range Precision Fires Cross Functional Team's (LRPF CFT) new long range cannon, Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). The ERCA and its new long range projectiles require the LR-PGK to meet lethality requirements. Fiscal Year (FY) 2022 funding supports the fabrication of LR-PGK qualification test hardware and completion of guided flight testing with the XM1113ER projectile, XM655E1 Supercharge propellant and the ERCA weapon platform and accomplishes a system Critical Design Review (CDR) in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604802A *I Weapons and Munitions - Eng Dev*

Project XT2, 40mm Door Breach: 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 DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. In FY 2022, this Project does not have a RDT&E budget request.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	186.323	265.811	252.058	-	252.058
Current President's Budget	182.119	268.858	309.778	-	309.778
Total Adjustments	-4.204	3.047	57.720	-	57.720
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-8.250			
• Congressional Rescissions	-	-			
• Congressional Adds	-	21.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.053	-			
• SBIR/STTR Transfer	-7.257	-9.703			
• Adjustments to Budget Years	-	-	57.720	-	57.720

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: EU6: *155mm HE Rocket Assist Project Extended Range*		
Congressional Add: *Precision Guidance Aft*	10.000	21.000
Congressional Add Subtotals for Project: EU6	10.000	21.000
Congressional Add Totals for all Projects	10.000	21.000

Change Summary Explanation

FY 2022 Program Element (PE) 0604802A increase is largely attributed to Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM), due to transition of C-DAEM Armor efforts from Budget Activity 04, PE 0603639A, Project FG1, Cannon-Delivered Area Effects Munitions. In FY 2022, C-DAEM Armor transitions from competitive demonstration phase and risk reduction activities to initiation of development and qualification efforts for selected solution(s) to support Urgent Materiel Release.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604802A *I Weapons and Munitions - Eng Dev*

The FY 2022 PE increase is also attributed to Project BQ3, 155mm Artillery Propulsion, FY 2022 transition from Budget Activity 04, PE 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. FY 2022 supports multiple, high quantity test events to qualify Bag Supercharge with XM1299 ERCA Increased Range, and to continue concurrent development of Cased Supercharge for future fielding with ERCA Increased Rate of Fire.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
613: *MORTAR SYSTEMS*	-	5.554	1.358	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Elimination: Project 613, Mortar Systems is complete. There is no FY 2022 budget request.

A. Mission Description and Budget Item Justification

The Mortar System and Fire Control Modernization Project funds engineering development and demonstration of new technologies that will support modernized mortar weapon and mortar fire control systems. This includes capabilities that provide commonality between current and future weapon and fire control systems to help mitigate technology shortfalls and critical capability gaps. Future mortar systems that address these gaps include (but are not limited to) remote mortar turrets for mounted mortar systems, high-pressure capable cannons/components, and composite/lightweight components for dismounted systems. Mortar Fire Control Systems capabilities include lightweight inertial measurement and navigation (IMU/INU) units for weapon pointing, simplified Ethernet/wireless-based digital communications interfaces, development of updated fire control software to enable commonality, integration with existing/future platform interfaces, and support for commercial off-the-shelf (COTS)/modified commercial off-the-shelf (MCOTS) fire control components. There is no FY 2022 budget request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Mortar System & Fire Control Modernization	5.554	1.358	-
Description: Mortar Systems and Fire Control Modernization initiatives include development and demonstration of new technologies to validate production potential for future mortar systems; including remote turrets and new weapon system components, modernized lightweight pointing device, updated Line Replaceable Units (LRUs), streamlined digital communications, and updated mortar fire control software. ***FY 2021 Plans:*** FY 2021 funds continue the support development and prototyping of new mortar weapon system and mortar fire control system technologies. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease in funding from FY 2021 to FY 2022 due to the completion of Mortar System & Fire Control Modernization efforts.			
Accomplishments/Planned Programs Subtotals	5.554	1.358	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• AD9300: *Mortar Fire Control Systems Modifications*	10.000	7.292	2.830	-	2.830	-	-	-	-	-	-
• K99200: *Computer Ballistics: LHMBC XM32*	4.474	7.789	2.811	-	2.811	-	-	-	-	-	-
• K99300: *Mortar Fire Control System*	28.538	17.472	17.236	-	17.236	-	-	-	-	-	-
• G02200: *Mortar Systems*	33.026	20.748	37.485	-	37.485	-	-	-	-	-	-
• G02100: *Mortar Modification*	1.693	1.689	-	-	-	-	-	-	-	-	-

Remarks

Other Procurement, Army (OPA) Funding / Procurement of Weapons & Tracked Combat Vehicle (W&TCV)

D. Acquisition Strategy

The Mortar System and Fire Control Modernization strategy is using the Department of Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives for hardware and software development during Engineering Manufacturing Design Phase. A new Federal Acquisition Regulation (FAR) based contract will be awarded to complete full rate production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization - Project Manager Office Support	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.178	0.034	Nov 2019	0.050	Nov 2020	-		-		-	0.000	0.262	-
		Subtotal	0.178	0.034		0.050		-		-		-	0.000	0.262	N/A

Remarks

Program management includes travel and documentation support.

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization - Fire Control Common Pointing	MIPR	DoD Ordnance Technology Consortium (DOTC) - Inertial Labs : Paeonian Springs, VA	2.194	2.033	Jun 2020	-		-		-		-	0.000	4.227	-
Mortar System & Fire Control Modernization - Fire Control Common Pointing	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : TBD	-	-		1.183	Mar 2021	-		-		-	0.000	1.183	-
		Subtotal	2.194	2.033		1.183		-		-		-	0.000	5.410	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization - Fire Control Eng Support	MIPR	Combat Capabilities Development Command	1.793	0.677	Sep 2020	-		-		-		-	0.000	2.470	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Armaments Center (CCDC AC) : Picatinny Arsenal, NJ													
Mortar System & Fire Control Modernization - Turreted Mortar Eng Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	-	0.739	Mar 2020	0.125	Nov 2020	-		-		-	0.000	0.864	-
Mortar System & Fire Control Modernization - Turreted Mortar Eng Support	MIPR	Combat Capabilities Development Command Ground Vehicle Systems Center (CCDC GVSC) : Warren, MI	-	0.160	May 2020	-		-		-		-	0.000	0.160	-
Mortar System & Fire Control Modernization - Turreted Mortar FCT Compatibility	MIPR	United States Army Capabilities Integration Center (ARCIC) - Manuever Battle Lab : Fort Eustis, VA	-	1.000	Aug 2020	-		-		-		-	0.000	1.000	-
		Subtotal	1.793	2.576		0.125		-		-		-	0.000	4.494	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization - Turreted Mortar FCT Compatibility	TBD	Yuma Proving Ground : Yuma, AZ	-	0.911	May 2020	-		-		-		-	0.000	0.911	-
		Subtotal	-	0.911		-		-		-		-	0.000	0.911	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) 613 / *MORTAR SYSTEMS*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.165	5.554		1.358		-		-		-	0.000	11.077	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

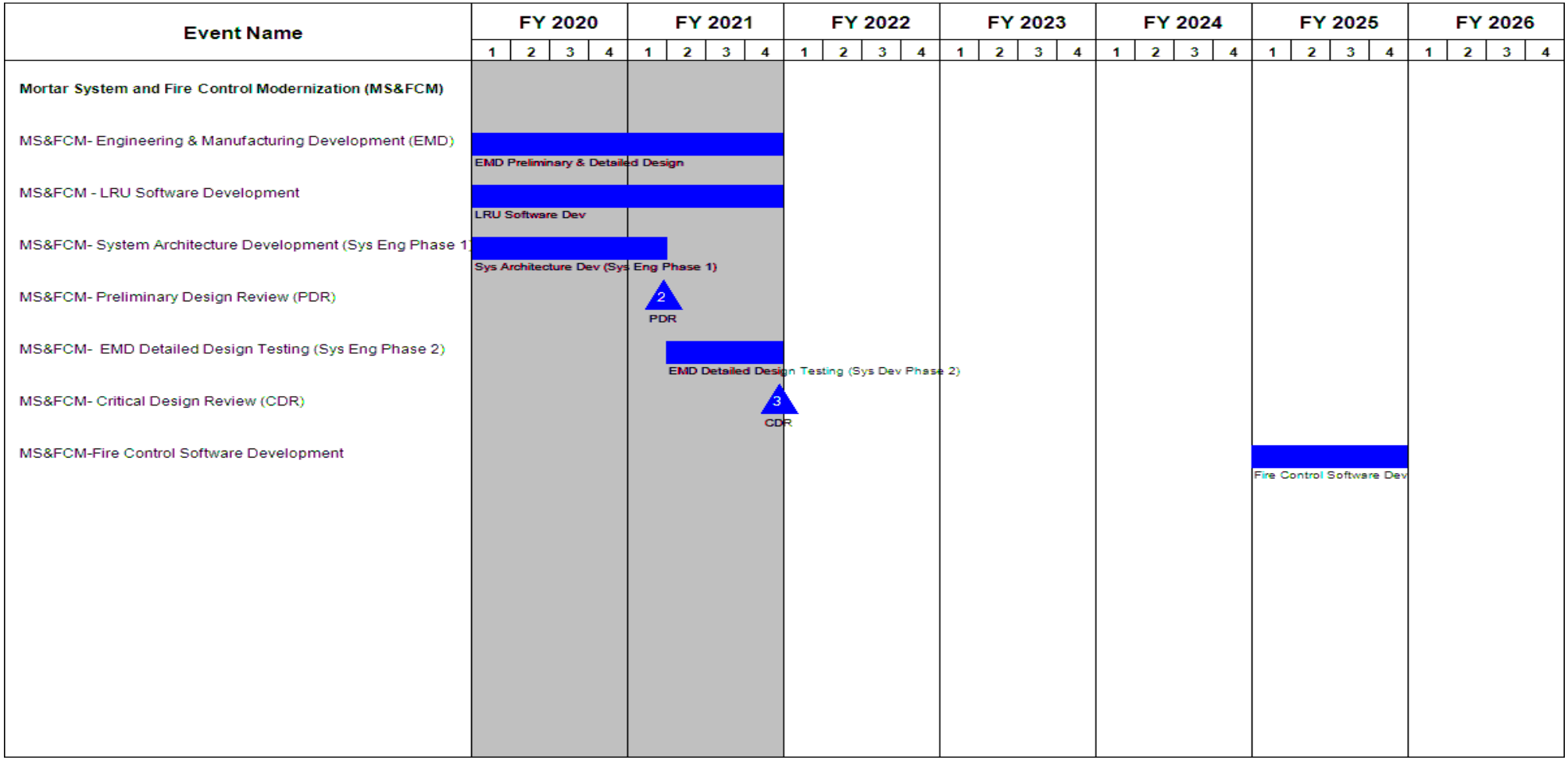


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mortar System and Fire Control Modernization (MS&FCM)	1	2020	1	2020
MS&FCM- Engineering & Manufacturing Development (EMD)	1	2020	4	2021
MS&FCM - LRU Software Development	1	2020	4	2021
MS&FCM- System Architecture Development (Sys Eng Phase 1)	1	2020	1	2021
MS&FCM- Preliminary Design Review (PDR)	1	2021	1	2021
MS&FCM- EMD Detailed Design Testing (Sys Eng Phase 2)	2	2021	4	2021
MS&FCM- Critical Design Review (CDR)	4	2021	4	2021
MS&FCM-Fire Control Software Development	1	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
BQ3: *155mm Artillery Propulsion XM654*	-	-	-	34.461	-	34.461	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.
This Project is not a New Start.

A. Mission Description and Budget Item Justification

Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the XM1299 Increased Range (formerly Increment 1C) and XM1299A1 Increased Rate of Fire (formerly Increment 2) Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). It will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case (foamed celluloid or felted fiber technology), integral metal Stub Case, electrically initiated primer, and advanced artillery propellant. Fiscal Year (FY) 2022 funding will support efforts for aforementioned two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of XM1299 ERCA Increased Range to perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF. These efforts directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 155mm Artillery Propulsion Supercharge	-	-	34.461
Description: Unitary top-zone propelling charge for XM907E2 Extended Range Cannon with Slide-block breech for use with Extended Range Cannon Artillery (ERCA) Increased Range and ERCA Increased Rate of Fire to gain range overmatch for 155mm artillery.			
FY 2022 Plans: Fiscal Year (FY) 2022 funding will support efforts for two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA IR to			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 transition from Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. FY 2022 increase required to support multiple, high quantity test events to qualify Bag Supercharge for ERCA IR, and continue concurrent development of Cased Supercharge for future fielding with ERCA IRF.			
Accomplishments/Planned Programs Subtotals	-	-	34.461

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• BQ4: *155mm Artillery Propulsion XM654*	6.904	15.131	-	-	-	-	-	-	-	-	-
• E99350: *155mm Artillery Supercharge XM654*	-	-	3.151	-	3.151	-	-	-	-	-	-

Remarks

In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.

A Procurement of Ammunition, Army (PAA) budget line item, Standard Study Number (SSN) E99350, will resource procurement of the Bag Supercharge variant to deliver Safety Release quantities for First Unit Issued (FUI) to support Extended Range Cannon Artillery (ERCA) Increased Range (IR) Operational Assessment as well as future Urgent Materiel Release (UMR) and Full Materiel Release (FMR) quantities. This SSN will also resource future procurement of the Cased Supercharge.

D. Acquisition Strategy

The Supercharge Project will consist of critical technology prototyping, testing, and demonstration of two variants: (1) the Supercharge 2-piece Bag configuration, to support the acceleration of the XM1299 Extended Range Cannon Artillery (ERCA) Increased Range (IR) to achieve lethality at 70km and greater with precision accuracy in FY 2023, and (2) the Supercharge Cased to support ERCA Increased Rate of Fire (IRF) with added automated loading system based on the outcome of ERCA IRF prototyping efforts. The Project will utilize the Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) for the integration of components such as propellant, combustible case, igniter and stub case.

In FY 2022, the Supercharge 2-piece Bag variant will initiate qualification testing and transition to procurement of quantities required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA IR that will perform Operational Assessment . Federal Acquisition Regulation (FAR) based production contract(s) will be awarded for Urgent Materiel Release (UMR) and Full Materiel Release (FMR).

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

The Cased Supercharge will require additional technology maturation, system integration, developmental testing and qualification for UMR to support ERCA IRF. FAR based production contract(s) will be awarded for FMR.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	-		-		0.143	Oct 2021	-		0.143	0.000	0.143	-
		Subtotal	-	-		-		0.143		-		0.143	0.000	0.143	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combustible Case Components	MIPR	DoD Ordnance Technology Consortium (DOTC): Armtec : Coachella, CA	-	-		-		10.250	Nov 2021	-		10.250	0.000	10.250	-
Main Charge Propellants	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Valleyfield : Salaberry-de-Valleyfield, Quebec, Canada	-	-		-		4.700	Nov 2021	-		4.700	0.000	4.700	-
Main Load Assemble & Pack	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Marion, IL : Marion, IL	-	-		-		1.850	Nov 2021	-		1.850	0.000	1.850	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Foamed Celluloid Case	MIPR	DoD Ordnance Technology Consortium (DOTC): TBS : TBS	-	-		-		3.500	Mar 2022	-		3.500	0.000	3.500	-
Projectile and Fuze Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC): TBS : TBS	-	-		-		5.390	Nov 2021	-		5.390	0.000	5.390	-
		Subtotal	-	-		-		25.690		-		25.690	0.000	25.690	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	US Army Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		-		5.828	Nov 2021	-		5.828	0.000	5.828	-
		Subtotal	-	-		-		5.828		-		5.828	0.000	5.828	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bag Supercharge Qualification	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		-		1.800	Nov 2021	-		1.800	0.000	1.800	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cased Supercharge Qualification	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		-		1.000	May 2022	-		1.000	0.000	1.000	-
		Subtotal	-	-		-		2.800		-		2.800	0.000	2.800	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		34.461		-		34.461	0.000	34.461	N/A

Remarks

Project funding increases in FY 2022 since Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

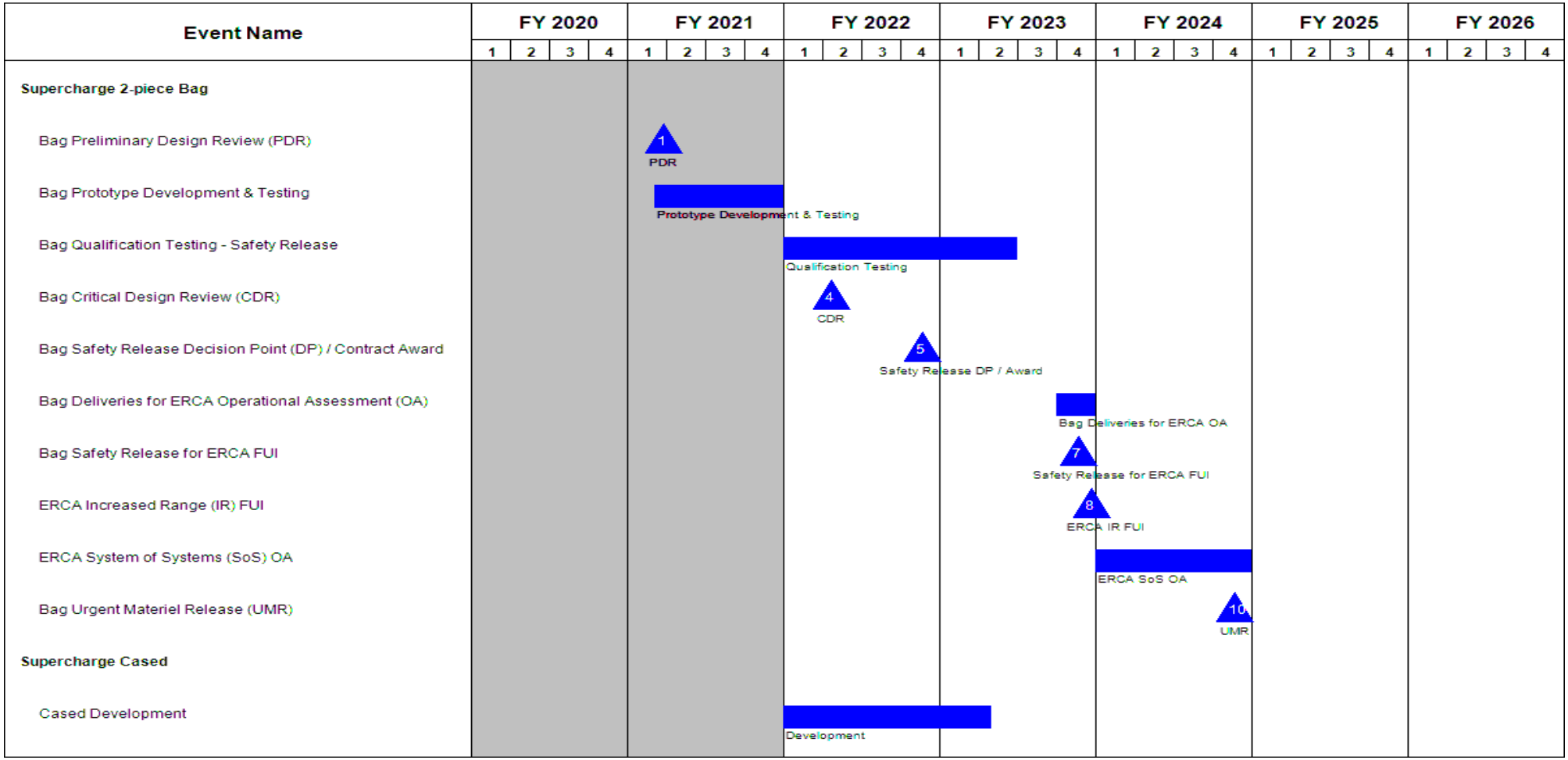
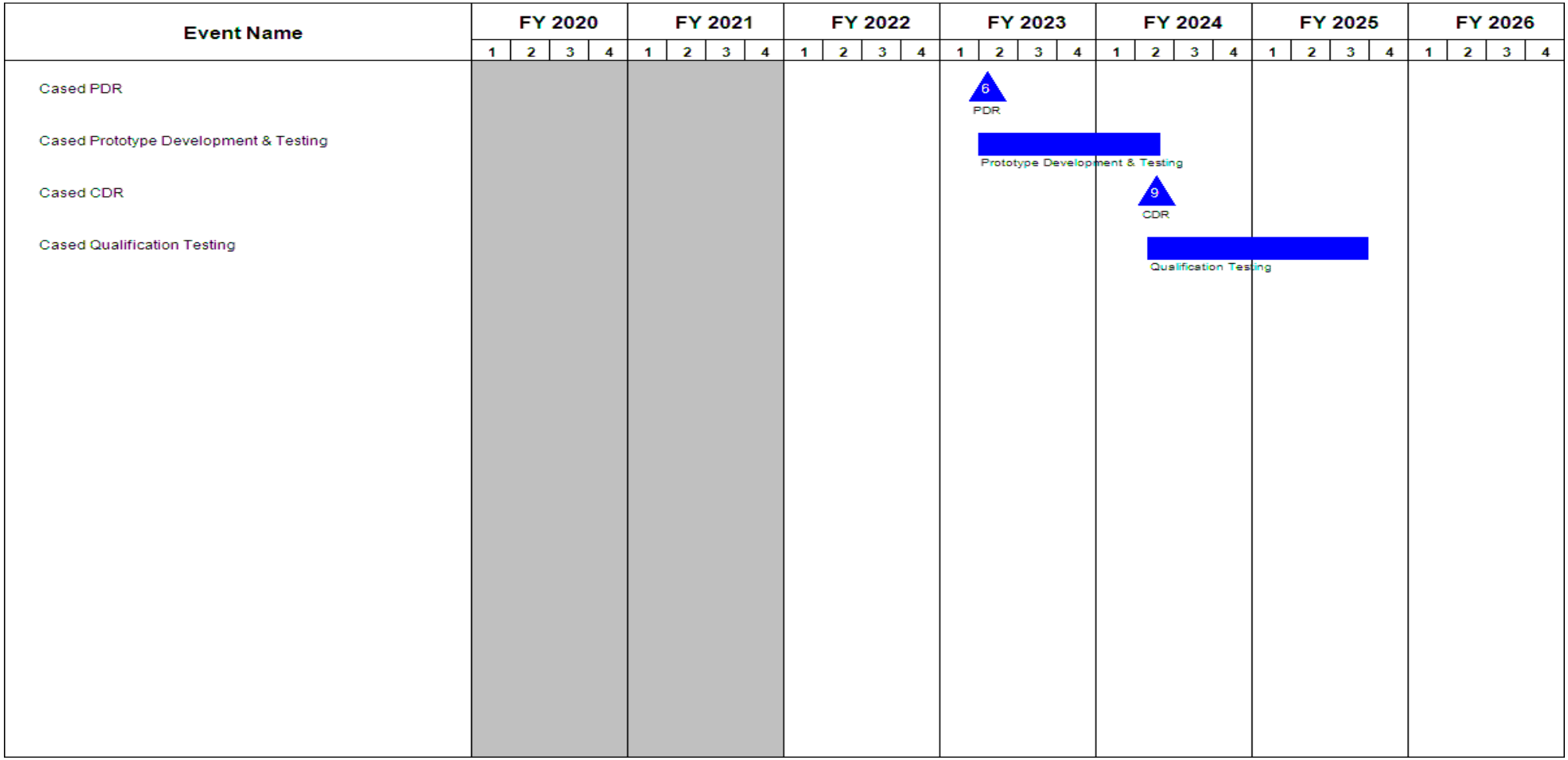


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*



Note

In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, where concurrent design risk reduction and prototype maturation efforts were completed.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

Schedule reflects Engineering and Manufacturing Development (EMD) efforts for two parallel Supercharge variants (2-piece bag and cased) required to support the concurrent development of the Extended Range Cannon Artillery (ERCA) Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with added automated loading system.

Bag Supercharge is pursuing a Safety Release to support ERCA IR System of Systems Operational Assessment. Follow-on Urgent Materiel Release(s) and Full Materiel Release (FMR) of the Bag Supercharge will be fielded to support the ERCA weapon system and projectiles. All Safety Release, UMR and FMR quantities will be procured with the associated Procurement of Ammunition, Army (PAA) funding.

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Supercharge 2-piece Bag	1	2022	1	2022
Bag Preliminary Design Review (PDR)	1	2021	1	2021
Bag Prototype Development & Testing	1	2021	4	2021
Bag Qualification Testing - Safety Release	1	2022	2	2023
Bag Critical Design Review (CDR)	2	2022	2	2022
Bag Safety Release Decision Point (DP) / Contract Award	4	2022	4	2022
Bag Deliveries for ERCA Operational Assessment (OA)	4	2023	4	2023
Bag Safety Release for ERCA FUI	4	2023	4	2023
ERCA Increased Range (IR) FUI	4	2023	4	2023
ERCA System of Systems (SoS) OA	1	2024	4	2024
Bag Urgent Materiel Release (UMR)	4	2024	4	2024
Supercharge Cased	1	2022	1	2022
Cased Development	1	2022	2	2023
Cased PDR	2	2023	2	2023
Cased Prototype Development & Testing	2	2023	2	2024
Cased CDR	2	2024	2	2024
Cased Qualification Testing	2	2024	3	2025

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
BY1: *Next Generation Combat Vehicle Ammunition*	-	-	22.176	33.867	-	33.867	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

50x228 millimeter (mm) family of ammunition is a critical technology development in response to the Next Generation Combat Vehicle (NGCV) Abbreviated Capability Development Document for weapon qualification, platform integration, and fielding of the Optionally Manned Fighting Vehicle (OMFV) primary weapon system (XM913). This effort includes the development of three capabilities: The XM1202 Target Practice with Trace (TP-T); the XM1203 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T); and the XM1204 High Explosive Airburst with Trace (HEAB-T). The training cartridge will allow the Warfighter to train in a cost effective manner and the tactical cartridges will provide enhanced lethality at increased ranges when engaging personnel threats in the open, defilade, and under the cover of urban structures, Anti-Tank Guided Missiles (ATGM) teams, and current and projected future peer armored materiel threats. This effort is operating under Middle Tier Acquisition authority for rapid prototyping to qualify the three munitions in order to support the NGCV Cross Functional Team (CFT) timeline for First Unit Equipped (FUE). Fiscal Year (FY) 2022 funding will support Design Engineering Tests (DET) to confirm TP-T and APFSDS-T safety, performance, and ruggedness as well as the assessment of HEAB-T fuze safety and function.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 50x228mm Ammunition Development	-	22.176	33.867
Description: Qualify 50mm Target Practice with Trace (TP-T), Armor Piercing Fin-Stabilized Discarding Sabot with Trace (APFSDS-T), and High Explosive Airburst with Trace (HEAB-T) ammunition through the rapid prototyping phase.			
FY 2021 Plans: Funding will be used to support the continued development of TP-T, APFSDS-T, and HEAB-T ammunition. In addition, the funding will also be used to support Design Engineering Testing (DET) and hardware build for Developmental Test & Evaluation (DT&E) for each of the three 50mm cartridges.			
FY 2022 Plans: Funding will support DET for all three cartridge types and subsequent design optimization. The TP-T and APFSDS-T cartridges will undergo Critical Design Review (CDR) and subsequent component procurement and cartridge assembly for Developmental Test & Evaluation (DT&E). HEAB-T fuze testing will lead to design maturation and components procurement for follow-on tests.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2022 funding increased to support design optimization efforts, three Design Engineering Tests, DT&E hardware materials procurement and cartridge assembly.			
Accomplishments/Planned Programs Subtotals	-	22.176	33.867

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E80011: *Next Generation Combat Vehicle Ammunition*	-	-	-	-	-	-	-	-	-		

Remarks

D. Acquisition Strategy

Department of Defense Ordnance and Technology Consortium (DOTC) Other Transaction Agreements (OTAs) will be used for rapid prototyping on the three 50 x 228mm ammunition variants: TP-T, APFSDS-T, and HEAB-T. This will consist of Design Engineering Testing (DET), technical reviews, and Developmental Test and Evaluation (DT&E). For APFSDS-T, one contractor is awarded and will complete the rapid prototyping process. For TP-T two contractors are awarded and will complete rapid prototyping process. For HEAB-T, two contractors are awarded rapid prototyping agreements and a down selection decision will be made in FY 2023; then one HEAB-T contractor will complete the rapid prototyping process. The DOTC agreements will conclude upon achieving Milestone C for each cartridge: TP-T and APFSDS-T in FY 2024; and HEAB-T in FY 2025.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
50x228mm APFSDS-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems (GDOTS) : Marion, Illinois	-	-		2.000	Mar 2021	5.658	May 2022	-		5.658	Continuing	Continuing	Continuing
50x228mm TP-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems : Marion, Illinois	-	-		1.000	Mar 2021	2.194	Mar 2022	-		2.194	Continuing	Continuing	Continuing
50x228mm TP-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	-	-		1.000	Mar 2021	2.194	Mar 2022	-		2.194	Continuing	Continuing	Continuing
50x228mm HEAB-T Ammunition Design Engineering Test Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems : Marion, Illinois	-	-		5.989	Mar 2021	9.621	Jan 2022	-		9.621	Continuing	Continuing	Continuing
50x228mm HEAB-T Ammunition Design Engineering Test Hardware Contract	C/CPFF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	-	-		5.989	Mar 2021	9.621	Jan 2022	-		9.621	Continuing	Continuing	Continuing
		Subtotal	-	-		15.978		29.288		-		29.288	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
50x228mm Ammo Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny, NJ	-	-		2.498	Dec 2020	3.080	Dec 2021	-		3.080	Continuing	Continuing	Continuing
		Subtotal	-	-		2.498		3.080		-		3.080	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
50x228mm Design Engineering Testing	MIPR	Aberdeen Proving Ground (APG) : Aberdeen, MD	-	-		3.700	Jan 2021	1.499	Dec 2021	-		1.499	Continuing	Continuing	Continuing
		Subtotal	-	-		3.700		1.499		-		1.499	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		22.176		33.867		-		33.867	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

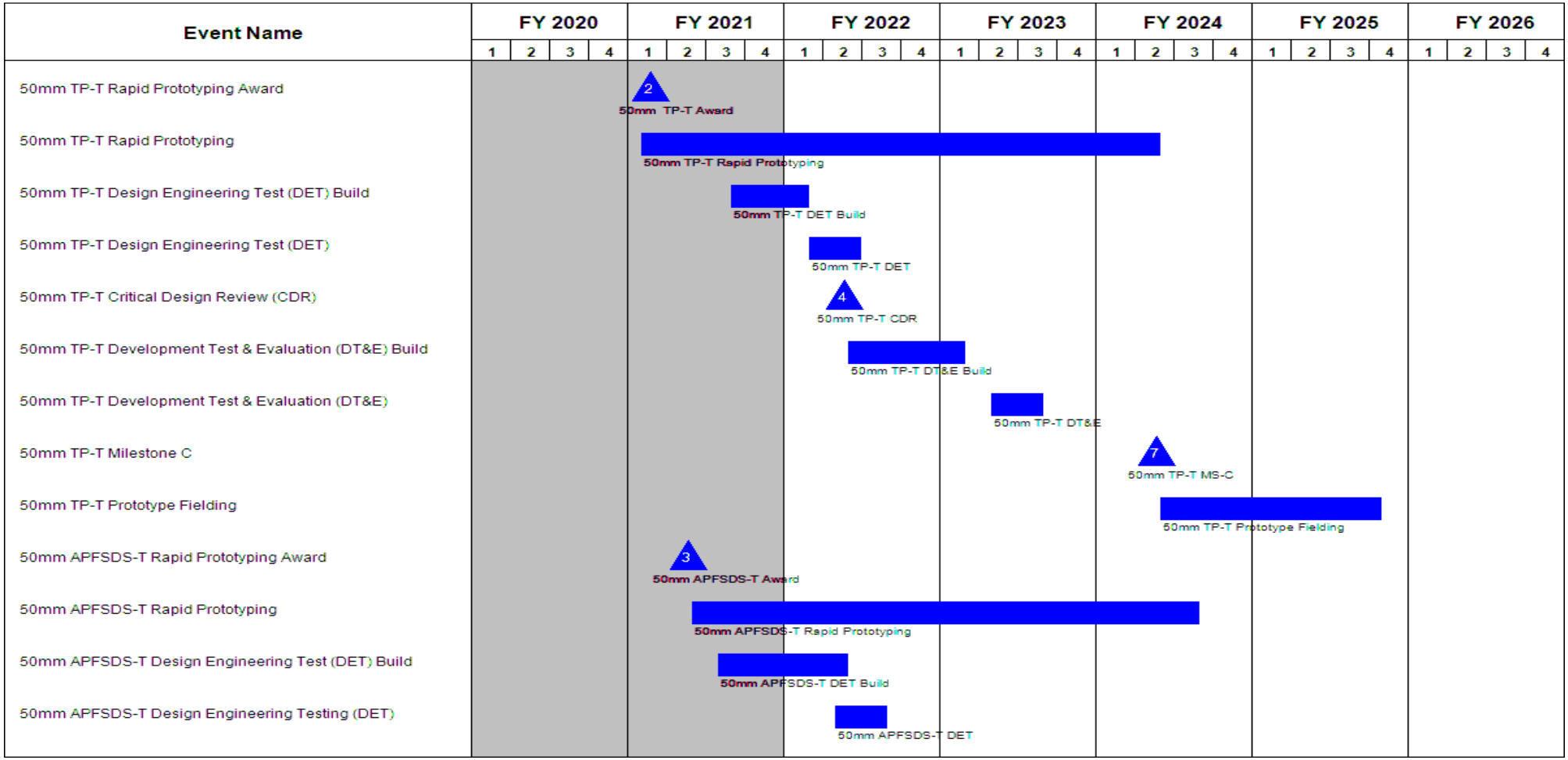


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

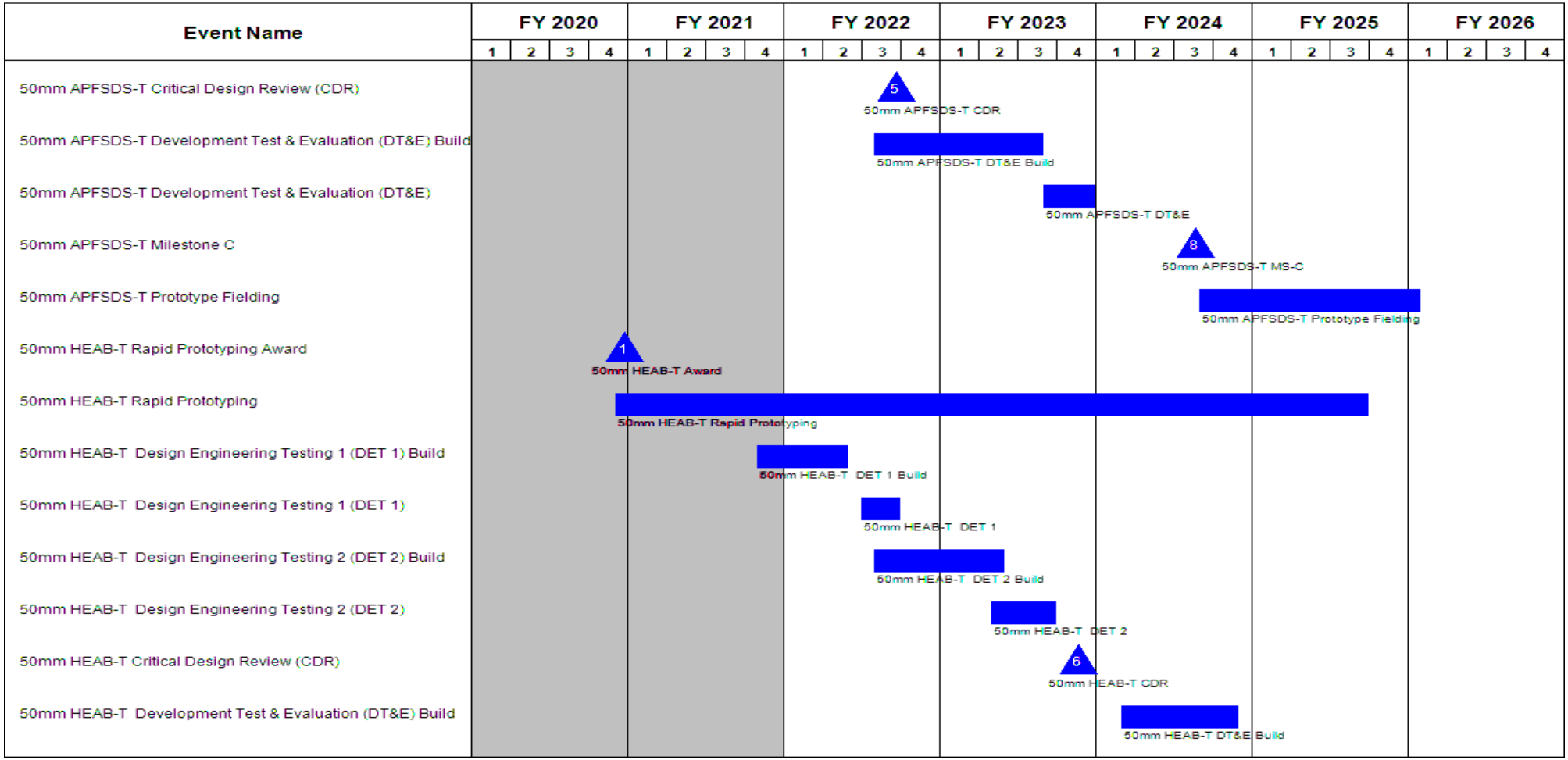


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

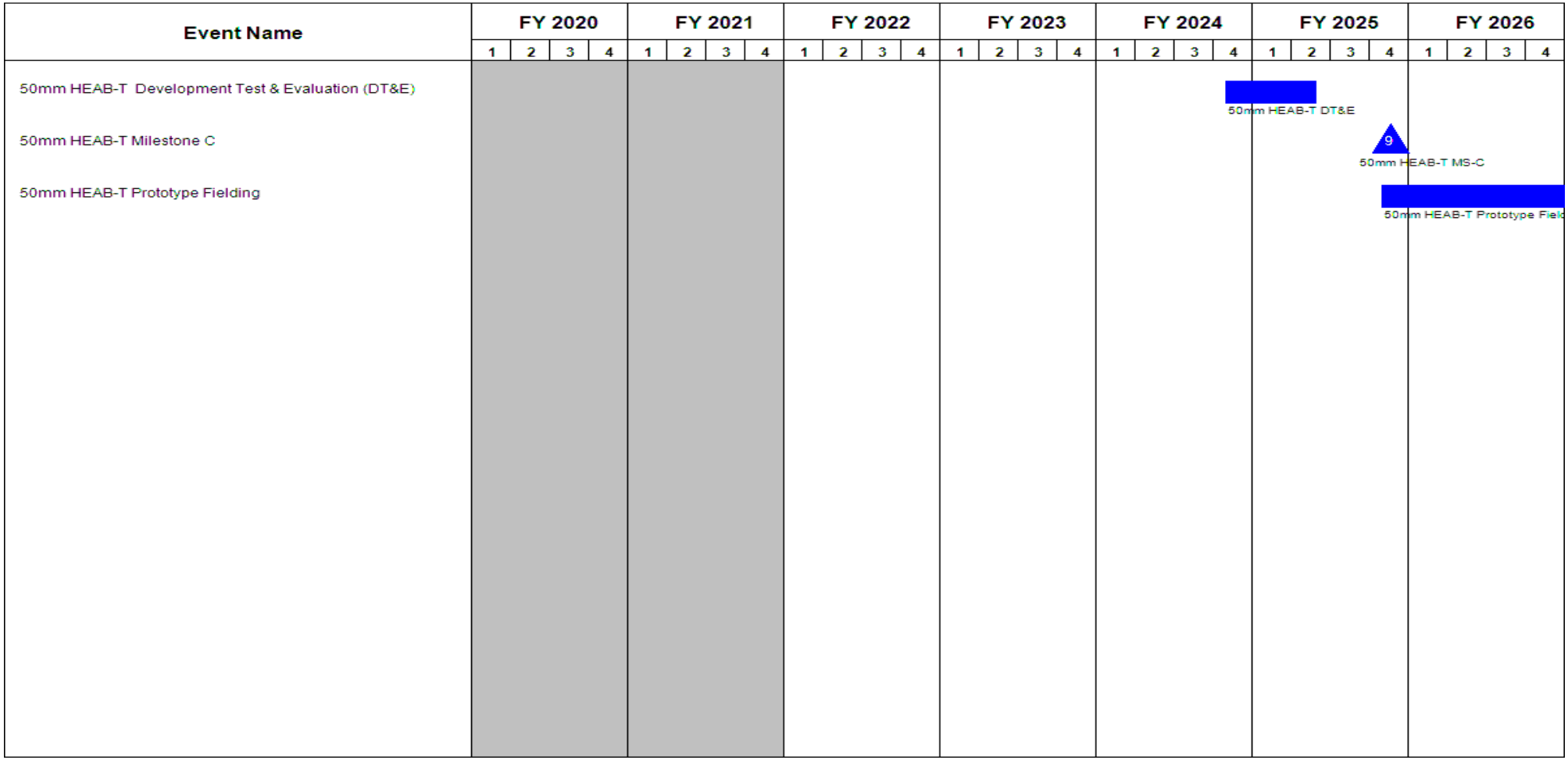


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
50mm TP-T Rapid Prototyping Award	1	2021	1	2021
50mm TP-T Rapid Prototyping	1	2021	2	2024
50mm TP-T Design Engineering Test (DET) Build	3	2021	1	2022
50mm TP-T Design Engineering Test (DET)	1	2022	2	2022
50mm TP-T Critical Design Review (CDR)	2	2022	2	2022
50mm TP-T Development Test & Evaluation (DT&E) Build	2	2022	1	2023
50mm TP-T Development Test & Evaluation (DT&E)	2	2023	3	2023
50mm TP-T Milestone C	2	2024	2	2024
50mm TP-T Prototype Fielding	2	2024	4	2025
50mm APFSDS-T Rapid Prototyping Award	2	2021	2	2021
50mm APFSDS-T Rapid Prototyping	2	2021	3	2024
50mm APFSDS-T Design Engineering Test (DET) Build	3	2021	2	2022
50mm APFSDS-T Design Engineering Testing (DET)	2	2022	3	2022
50mm APFSDS-T Critical Design Review (CDR)	3	2022	3	2022
50mm APFSDS-T Development Test & Evaluation (DT&E) Build	3	2022	3	2023
50mm APFSDS-T Development Test & Evaluation (DT&E)	3	2023	4	2023
50mm APFSDS-T Milestone C	3	2024	3	2024
50mm APFSDS-T Prototype Fielding	3	2024	1	2026
50mm HEAB-T Rapid Prototyping Award	4	2020	4	2020
50mm HEAB-T Rapid Prototyping	4	2020	3	2025
50mm HEAB-T Design Engineering Testing 1 (DET 1) Build	4	2021	2	2022
50mm HEAB-T Design Engineering Testing 1 (DET 1)	3	2022	3	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
50mm HEAB-T Design Engineering Testing 2 (DET 2) Build	3	2022	2	2023
50mm HEAB-T Design Engineering Testing 2 (DET 2)	2	2023	3	2023
50mm HEAB-T Critical Design Review (CDR)	4	2023	4	2023
50mm HEAB-T Development Test & Evaluation (DT&E) Build	1	2024	4	2024
50mm HEAB-T Development Test & Evaluation (DT&E)	4	2024	2	2025
50mm HEAB-T Milestone C	4	2025	4	2025
50mm HEAB-T Prototype Fielding	4	2025	1	2027

Note

Notes:
Target Practice with Trace (TP-T)
Armor-Piercing Fin-Stabilized Discarding Sabot with Trace (APFSDS-T)
High Explosive Airburst with trace (HEAB-T)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CE3: *Precision Munition (Sniper)*	-	-	-	9.275	-	9.275	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY 2022.

Project CE3 / Precision Munition (Sniper) is a New Start in Fiscal Year (FY) 2022.

A. Mission Description and Budget Item Justification

The Precision Munition (Sniper) project is a critical technology development in response to the Precision Munition Capabilities Development Documents (CDD) for the ammunition required to support the Precision Sniper Rifle (PSR) / sniper weapons systems. The objective is to transfer the latest lethality technology into the suite of ammunition used by snipers. The Precision Munition improvement is split into three capability areas: Anti-Materiel (AM), Improved Performance Round (IPR), and Subsonic. The AM and IPR capabilities will enhance lethal effects at greater distances. The Subsonic capability will increase soldier survivability at close range by providing a low-sound signature munition that is undetectable to the enemy. Fiscal Year (FY) 2022 funding supports rapid development of the AM munitions and evaluation of ammunition prototypes/concepts. FY 2022 also supports rapid development of the IPR munitions by manufacturing and maturing prototype designs. And, FY 2022 supports evaluating and maturing industry Subsonic munitions solutions and conducting safety testing.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Develop and Improve Ammunition for Sniper Weapons Systems.	-	-	9.275
Description: Develop, demonstrate, and qualify new sniper ammunition to defeat hard targets for the Precision Sniper Rifle (PSR) and other sniper weapons systems. Integrate latest lethality technology into the current suite of sniper ammunition for the Precision Sniper Rifle (PSR) and other sniper weapons systems. Integrate latest lethality technology into the current subsonic ammunition for the Precision Sniper Rifle (PSR) and other sniper weapons systems. ***FY 2022 Plans:*** Commence rapid development of the AM munitions; manufacture and evaluate prototype ammunition concepts. Commence rapid development of the IPR munitions; manufacture and mature prototype ammunition designs. Evaluate and mature industry Subsonic Munitions prototype solutions and conduct safety testing. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Project is a new start in FY 2022.			
Accomplishments/Planned Programs Subtotals	-	-	9.275

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Precision Munition (Sniper) will utilize the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding to develop ammunition concepts/designs for the AM capability and the IPR capability using Government/Industry developed designs. The Subsonic capability will be satisfied by utilizing Other Transaction Authority (OTA) to acquire and/or mature current industry designs. All three capabilities will be satisfied via competitive contracts to multiple vendors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Materiel Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		0.750	Jun 2022	-		0.750	Continuing	Continuing	Continuing
Improved Performance Round Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.250	Jan 2022	-		2.250	Continuing	Continuing	Continuing
Subsonic Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.500	Jan 2022	-		2.500	Continuing	Continuing	Continuing
		Subtotal	-	-		-		5.500		-		5.500	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Materiel Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.500	May 2022	-		0.500	Continuing	Continuing	Continuing
Improved Performance Round Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.967	Oct 2021	-		0.967	Continuing	Continuing	Continuing
Subsonic Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		1.808	Oct 2021	-		1.808	Continuing	Continuing	Continuing
		Subtotal	-	-		-		3.275		-		3.275	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Lethality Testing and Analysis	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.500	Jan 2022	-		0.500	Continuing	Continuing	Continuing
		Subtotal	-	-		-		0.500		-		0.500	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		9.275		-		9.275	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

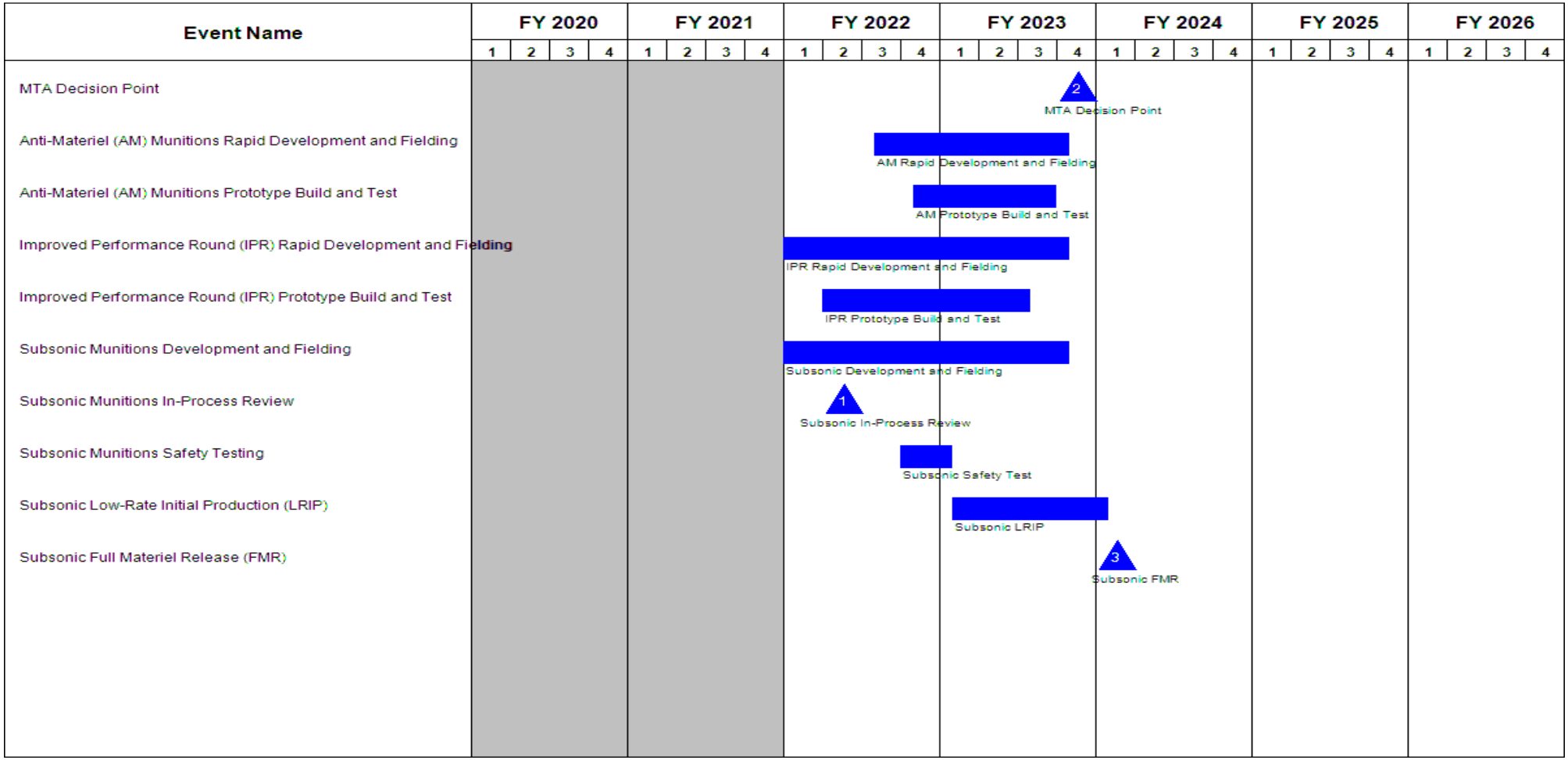


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MTA Decision Point	4	2023	4	2023
Anti-Materiel (AM) Munitions Rapid Development and Fielding	3	2022	4	2023
Anti-Materiel (AM) Munitions Prototype Build and Test	4	2022	3	2023
Improved Performance Round (IPR) Rapid Development and Fielding	1	2022	4	2023
Improved Performance Round (IPR) Prototype Build and Test	2	2022	3	2023
Subsonic Munitions Development and Fielding	1	2022	4	2023
Subsonic Munitions In-Process Review	2	2022	2	2022
Subsonic Munitions Safety Testing	4	2022	1	2023
Subsonic Low-Rate Initial Production (LRIP)	1	2023	1	2024
Subsonic Full Materiel Release (FMR)	1	2024	1	2024

Note

Middle Tier of Acquisition (MTA)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EC4: *Non-Standard Simulator Munitions*	-	2.536	2.154	2.116	-	2.116	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project EC4 Non-Standard Simulator Munitions 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 or material released and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/ simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Mini Blast 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) simulators 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 simulator to replicate indirect fire; simulator to replicate a STINGER firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems and mitigate environmental concerns and safety risks associated with realistic scenario based training. FY 2022 funding will support the development of Yellow Smoke, RPG on a wire, Mini Blast, Tracer, HiOBE, and Micro pyrotechnic simulators.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Standardize Special Use Ammunition	2.536	2.154	2.116
Description: Standardize non-standard pyrotechnic battlefield effects currently used by CTCs. ***FY 2021 Plans:*** This project continues the technical data validation and transition documentation for Artillery Airburst and Black Smoke as well as technology development and maturation for the Yellow Smoke, RPG on a Wire, and Mini Blast Pyrotechnics. ***FY 2022 Plans:*** This project will support Engineering and Manufacturing Development (EMD) activities for Yellow Smoke, RPG on a Wire, and Mini Blast pyrotechnics and will begin technology maturation support for the Tracer and High Order Blast Effect (HiOBE) simulators. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 funding is required to continue the development and maturation of the suite of special use simulators.			
Accomplishments/Planned Programs Subtotals	2.536	2.154	2.116

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E88404: *SIMULATORS, Non-Standard, Special Effects, f/CTCs*	-	1.748	0.108	-	0.108	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The Acquisition strategy is to incrementally develop and field a family of special use ammunition. Initial special use ammunition to be fielded will be the Artillery Airburst/Stinger, and Black Smoke simulators followed by additional training simulators as required in the Future Army System of Integrated Targets (FASIT) Capability Production Document (CPD).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
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*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RPG/Mini Blast Prototype Build	C/FFP	TBD : TBD	-	-		0.533	Jun 2021	-		-		-	0.000	0.533	-
Yellow Smoke Qualification Hardware	C/FFP	TBD : TBD	-	-		0.445	Jul 2021	-		-		-	0.000	0.445	-
Plastic Mold Development	C/FFP	TBD : TBD	-	-		0.280	May 2021	-		-		-	0.000	0.280	-
Product Development	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	2.520	0.986	Nov 2020	-		-		-		-	Continuing	Continuing	-
		Subtotal	2.520	0.986		1.258		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	2.265	1.526	Mar 2020	0.404	Mar 2021	1.081	Oct 2021	-		1.081	Continuing	Continuing	-
EOD Publication Support	MIPR	Naval Surface Warfare Center : Indian Head, MD	-	-		0.042	Apr 2021	-		-		-	0.000	0.042	-
Engineering Support	MIPR	DEVCOM Data and Analysis Center (DAC) : Aberdeen Proving Ground, MD	-	0.024	Sep 2020	-		-		-		-	0.000	0.024	-
		Subtotal	2.265	1.550		0.446		1.081		-		1.081	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RPG on a Wire Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		-		0.370	Jan 2022	-		0.370	0.000	0.370	-
Mini Blast Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		-		0.370	Jan 2022	-		0.370	0.000	0.370	-
Yellow Smoke Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		-		0.295	Jan 2022	-		0.295	0.000	0.295	-
Inhalation Testing	MIPR	Army Public Health Command : Aberdeen Proving Grounds, MD	-	-		0.450	May 2021	-		-		-	0.000	0.450	-
		Subtotal	-	-		0.450		1.035		-		1.035	0.000	1.485	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.785	2.536		2.154		2.116		-		2.116	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

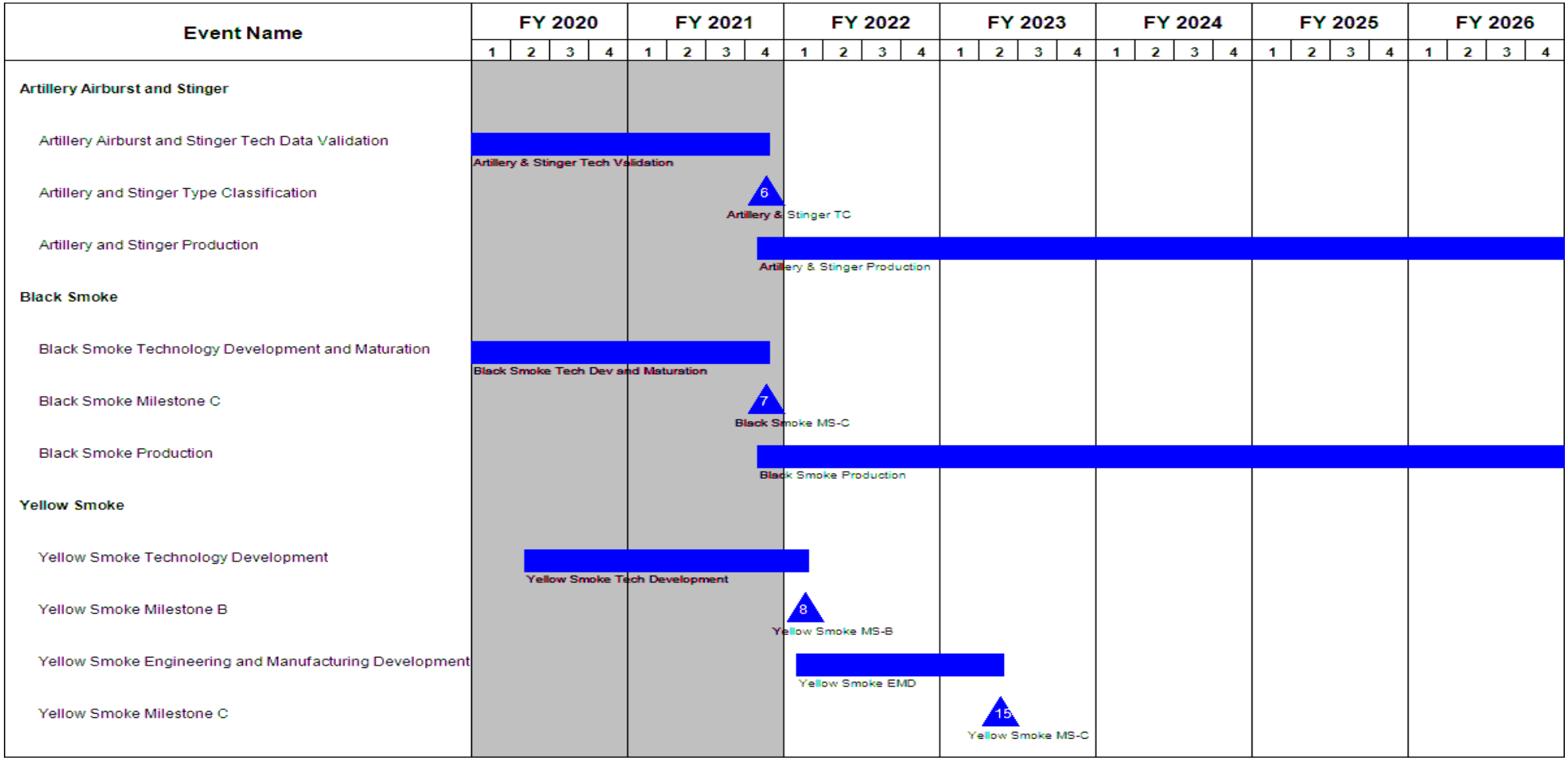


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

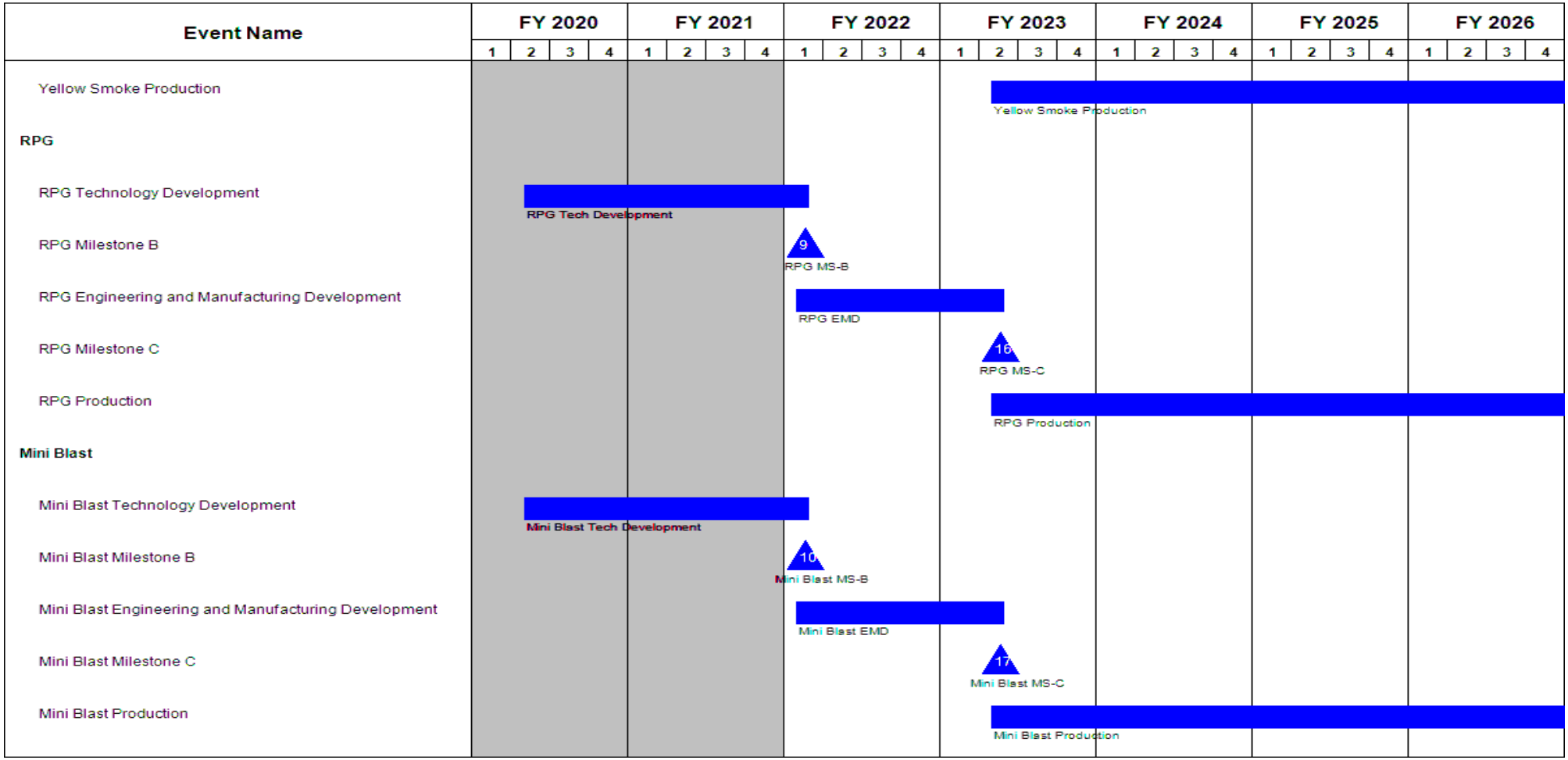


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

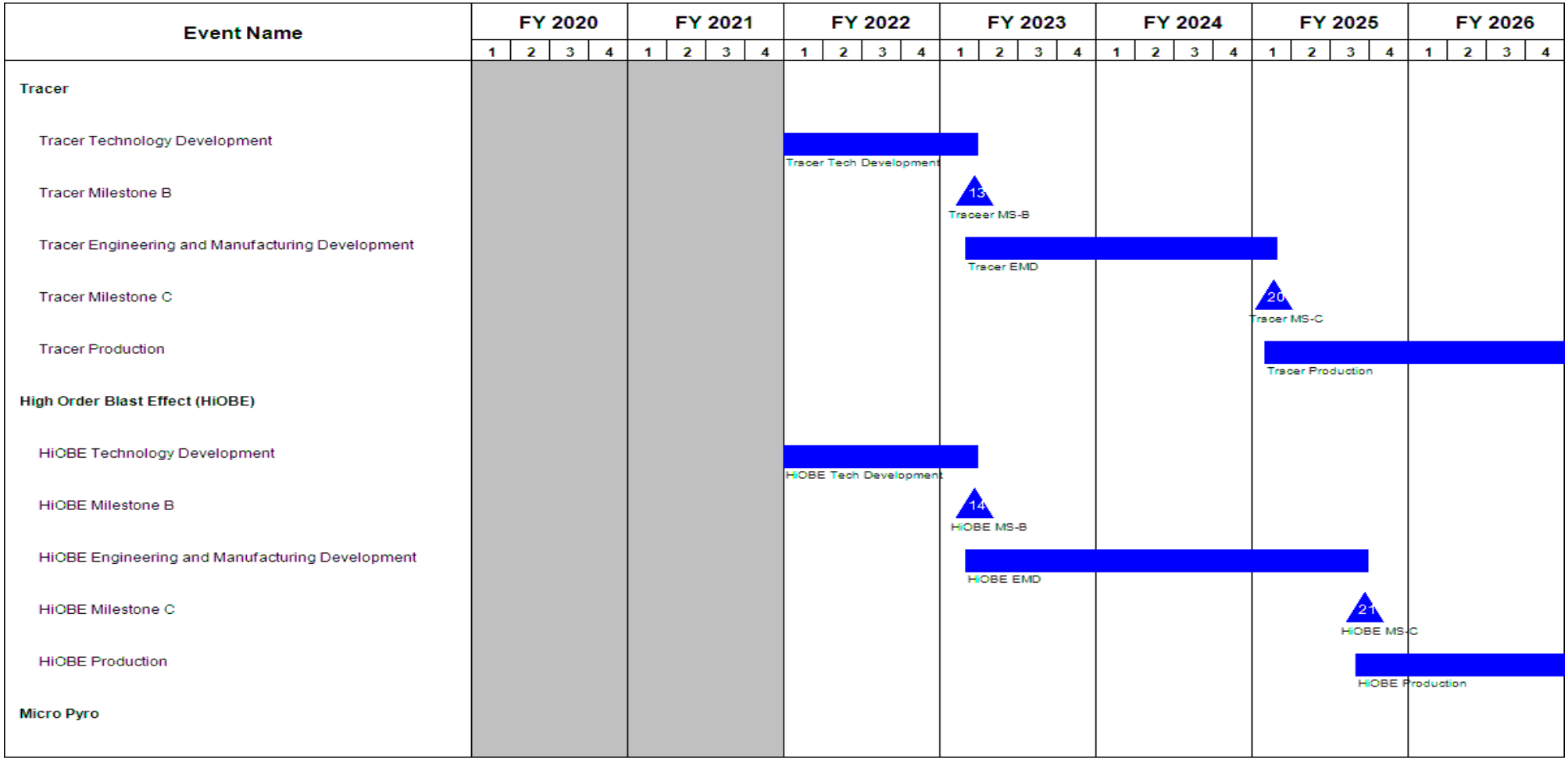


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

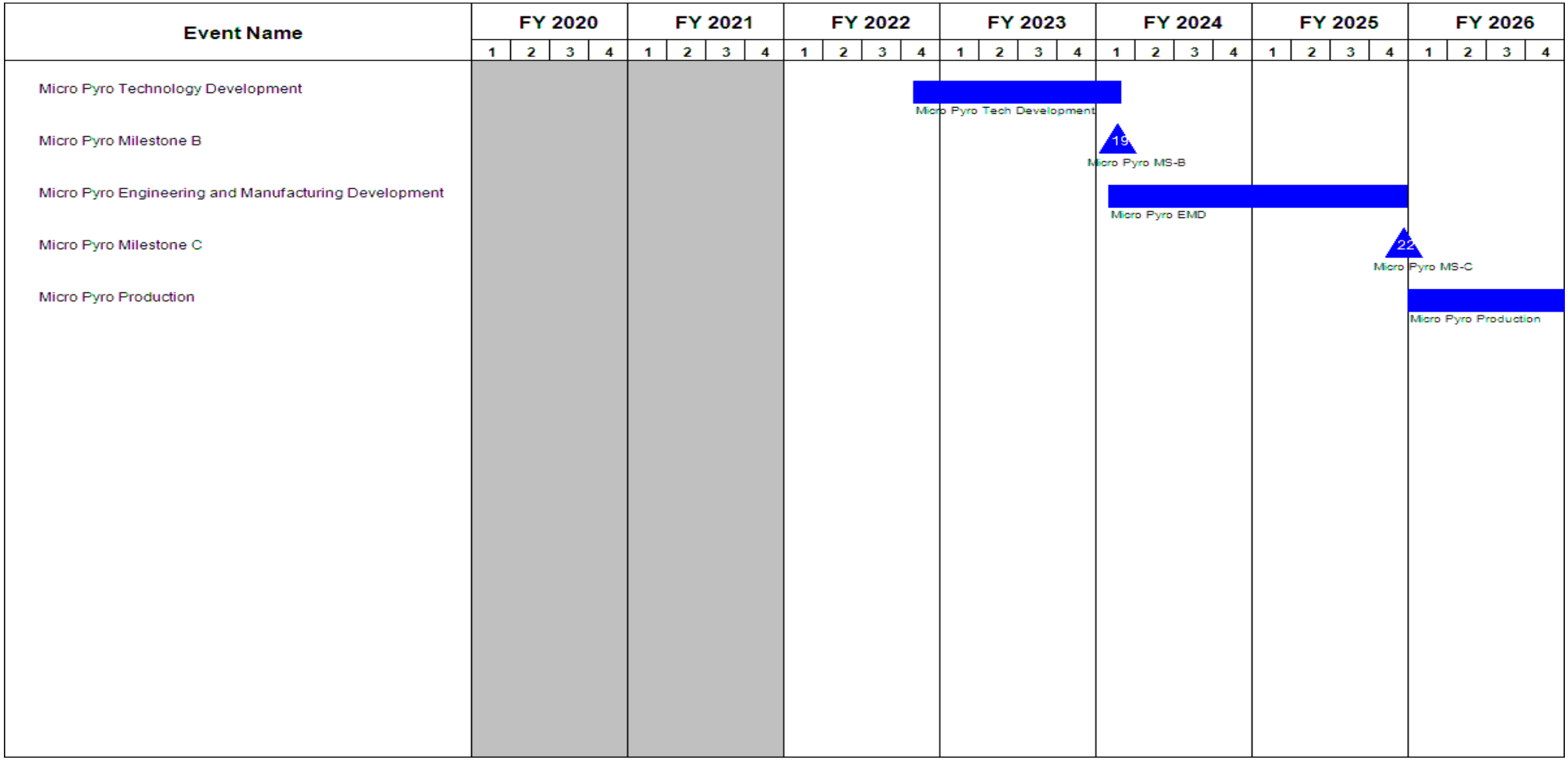


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Artillery Airburst and Stinger	4	2020	4	2020
Artillery Airburst and Stinger Tech Data Validation	4	2019	4	2021
Artillery and Stinger Type Classification	4	2021	4	2021
Artillery and Stinger Production	4	2021	4	2028
Black Smoke	4	2020	4	2020
Black Smoke Technology Development and Maturation	4	2019	4	2021
Black Smoke Milestone C	4	2021	4	2021
Black Smoke Production	4	2021	4	2027
Yellow Smoke	4	2020	4	2020
Yellow Smoke Technology Development	2	2020	1	2022
Yellow Smoke Milestone B	1	2022	1	2022
Yellow Smoke Engineering and Manufacturing Development	1	2022	2	2023
Yellow Smoke Milestone C	2	2023	2	2023
Yellow Smoke Production	2	2023	4	2027
RPG	4	2020	4	2020
RPG Technology Development	2	2020	1	2022
RPG Milestone B	1	2022	1	2022
RPG Engineering and Manufacturing Development	1	2022	2	2023
RPG Milestone C	2	2023	2	2023
RPG Production	2	2023	4	2027
Mini Blast	4	2020	4	2020
Mini Blast Technology Development	2	2020	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mini Blast Milestone B	1	2022	1	2022
Mini Blast Engineering and Manufacturing Development	1	2022	2	2023
Mini Blast Milestone C	2	2023	2	2023
Mini Blast Production	2	2023	4	2027
Tracer	4	2022	4	2022
Tracer Technology Development	1	2022	1	2023
Tracer Milestone B	1	2023	1	2023
Tracer Engineering and Manufacturing Development	1	2023	1	2025
Tracer Milestone C	1	2025	1	2025
Tracer Production	1	2025	1	2031
High Order Blast Effect (HiOBE)	4	2022	4	2022
HiOBE Technology Development	1	2022	1	2023
HiOBE Milestone B	1	2023	1	2023
HiOBE Engineering and Manufacturing Development	1	2023	3	2025
HiOBE Milestone C	3	2025	3	2025
HiOBE Production	3	2025	4	2030
Micro Pyro	1	2024	1	2024
Micro Pyro Technology Development	4	2022	1	2024
Micro Pyro Milestone B	1	2024	1	2024
Micro Pyro Engineering and Manufacturing Development	1	2024	4	2025
Micro Pyro Milestone C	4	2025	4	2025
Micro Pyro Production	1	2026	4	2031

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
ED7: *Advanced Multipurpose (AMP) Cartridge*	-	13.520	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The XM1147 Advanced Multi Purpose (AMP) program is a direct fire line of sight 120 millimeter (mm) 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 50 Meter (m) 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 Fiscal Year (FY) 2014 and achieved Full Materiel Release in FY 2015. In FY 2022 there is no funding request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Engineering and Manufacturing Development (EMD) Phase 2	13.520	-	-
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.			
Accomplishments/Planned Programs Subtotals	13.520	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E88105: *CTG, 120MM TANK, HEMP-T, XM1147*	10.000	38.989	23.359	-	23.359	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The XM1147 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 down-select to a single contractor for EMD Phase 2. The Critical

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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*

Design Review (CDR) was successfully conducted in 1Q FY 2020 followed by Developmental Test & Evaluation (DT&E) conducted throughout FY 2020. A successful Milestone C has been achieved in 1Q FY 2021 which has initiated the first of two Low Rate Initial Productions with one optional year of full procurement in FY 2022. Explore options to increase future competition and facilitate effective training.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : NJ	5.936	1.062	Dec 2019	-		-		-		-	Continuing	Continuing	Continuing
Engineering Manufacturing & Development Contract	C/CPIF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	86.511	3.237	Nov 2019	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	92.447	4.299		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny, NJ	12.521	1.500	Nov 2019	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	12.521	1.500		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Yuma Test Center	MIPR	Yuma Proving Ground : Yuma, AZ	13.441	6.709	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
Aberdeen Test Center	MIPR	Aberdeen Proving Ground : Aberdeen, MD	5.136	1.012	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	18.577	7.721		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	123.545	13.520		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

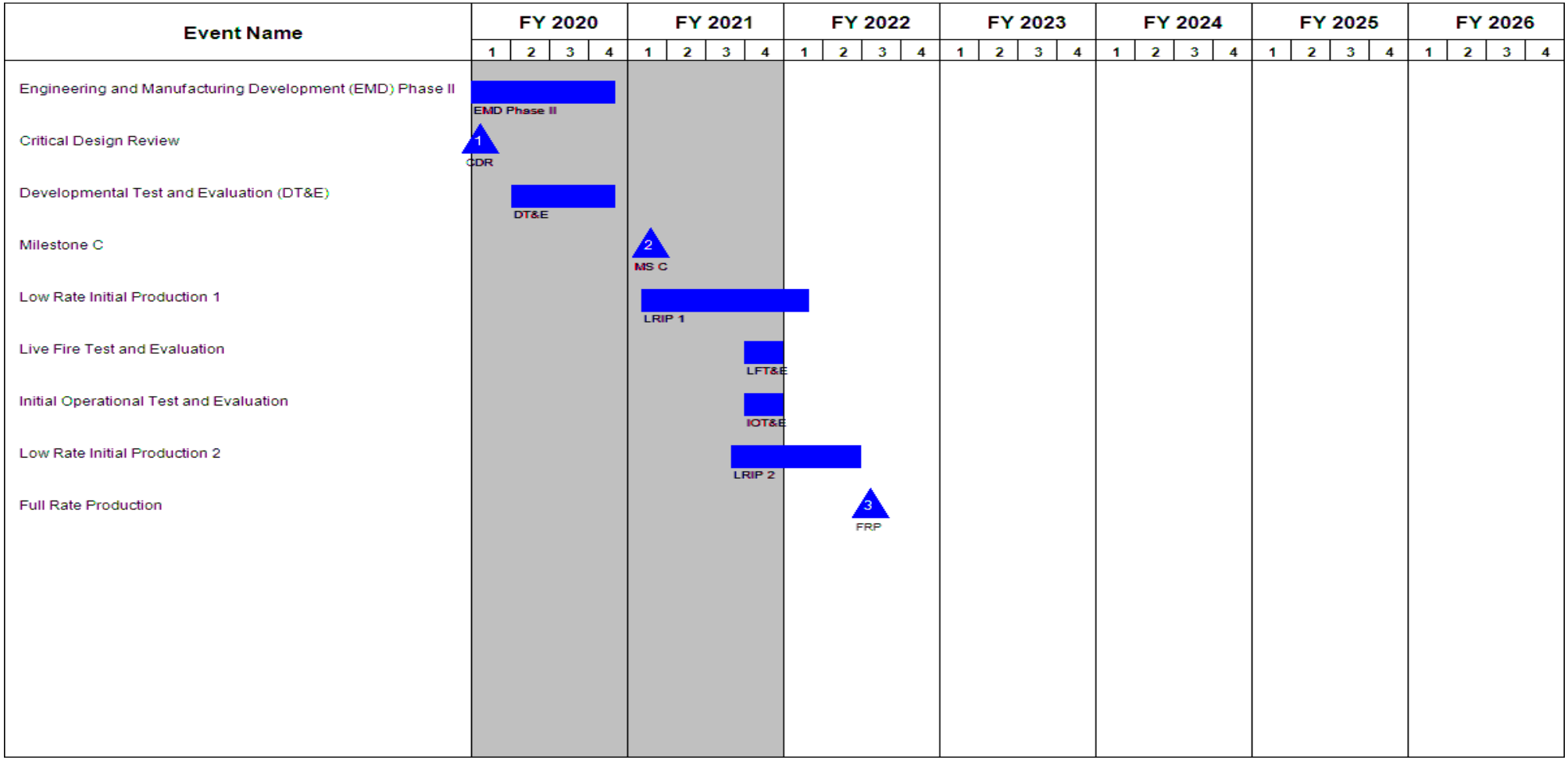


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** ED7 / *Advanced Multipurpose (AMP) Cartridge*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Milestone B	1	2015	1	2015
Engineering and Manufacturing Development (EMD) Contract Phase I Awards	4	2015	4	2015
Engineering and Manufacturing Development (EMD) Phase I	4	2015	2	2017
Preliminary Design Review (PDR)	3	2016	3	2016
EMD Contract Phase II Award / Down-Select	2	2017	2	2017
Engineering and Manufacturing Development (EMD) Phase II	2	2017	4	2020
Critical Design Review	1	2020	1	2020
Developmental Test and Evaluation (DT&E)	2	2020	4	2020
Milestone C	1	2021	1	2021
Low Rate Initial Production 1	1	2021	1	2022
Live Fire Test and Evaluation	4	2021	4	2021
Initial Operational Test and Evaluation	4	2021	4	2021
Low Rate Initial Production 2	3	2021	2	2022
Full Rate Production	3	2022	3	2022
Evaluation for Future Combat Platforms	1	2018	4	2018
Training Round Demonstration	1	2019	3	2019

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EL9: *Ammunitions Logistics Prototyping*	-	2.233	1.639	0.696	-	0.696	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project EL9 Ammunitions Logistics Prototyping supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2022 funding will be focused on integrating commercial off the shelf and/or relatively mature technologies into ammunition resupply enablers required by the Long Range Precision Fire (LRPF) Cross Functional Team (CFT). They will be focused on ensuring that a low risk resupply process solution exists to support the success of the Extended Range Canon Artillery (ERCA).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Munitions Survivability and Logistics Enablers	2.233	1.639	0.696
Description: This program will develop ammunition logistics systems that improve munitions survivability and logistics			
FY 2021 Plans: Continue to integrate passive time/temperature exposure sensor including exploring alternative technologies. Will continue to integrate the munitions health monitoring system with additional ammunition items including item specific form factors. Conduct verification testing of a type II prototype next generation temperature/humidity sensor. Conduct an assessment on the value of storing data in various formats from data rich to highly summarized to support a business case analysis of the transfer and long term storage of data in an overarching data system. Conduct environmental testing on phase 2 health monitoring suite (RRAPDS) prototypes. Conduct verification testing of alternative form factor munitions health monitoring system on multiple packaging types.			
FY 2022 Plans: Assess commercial off the shelf low cost active and passive environmental sensors for applicability of integration to ammunition packaging consolidation techniques to improve transportation efficiencies through last tactical mile. Conduct qualification testing of a type II prototype next generation temperature/humidity sensor. Conduct qualification testing of alternative form factor munitions health monitoring system on multiple packaging types.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
Funding decrease due to maturity level of items ready for transition to PM.			
Accomplishments/Planned Programs Subtotals	2.233	1.639	0.696

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The acquisition strategy is to work directly with the relevant PMs (Combat Ammunition Systems (CAS) & Self Propelled Howitzer (SPH)) to support the development of a resupply system/process to meet the needs of the Extended Range Canon Artillery (ERCA) system. The resultant capabilities will then be transitioned to the appropriate PM for further maturation and/or fielding.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor	C/FFP	Karagozian & Case : Glendale, CA	1.699	0.285	Mar 2020	0.367	Jan 2021	-		-		-	0.000	2.351	-
Contractor	C/FFP	Phase IV : Boulder, CO	0.460	-		-		-		-		-	0.000	0.460	-
Contractor	C/FFP	Cybernet : Ann Arbor, MI	-	-		-		0.500	Jan 2022	-		0.500	0.000	0.500	-
Contractor	C/FFP	AGM : Tuscon, AZ	-	0.856	May 2020	0.466	May 2021	-		-		-	0.000	1.322	-
Contractor	C/FFP	Stevens Institute of Technology : Hoboken, NJ	-	0.167	Sep 2020	0.150	Jul 2021	-		-		-	0.000	0.317	-
Contractor	C/FFP	Mide Tech Corp : Woburn, MA	-	0.203	Jul 2020	0.168	Jun 2021	-		-		-	0.000	0.371	-
		Subtotal	2.159	1.511		1.151		0.500		-		0.500	0.000	5.321	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command, Armaments Center (CCDC, AC)	MIPR	Picatinny Arsenal : NJ	0.311	0.722	Dec 2019	0.488	Dec 2020	0.196	Oct 2021	-		0.196	0.000	1.717	-
		Subtotal	0.311	0.722		0.488		0.196		-		0.196	0.000	1.717	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.470	2.233		1.639		0.696		-		0.696	0.000	7.038	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

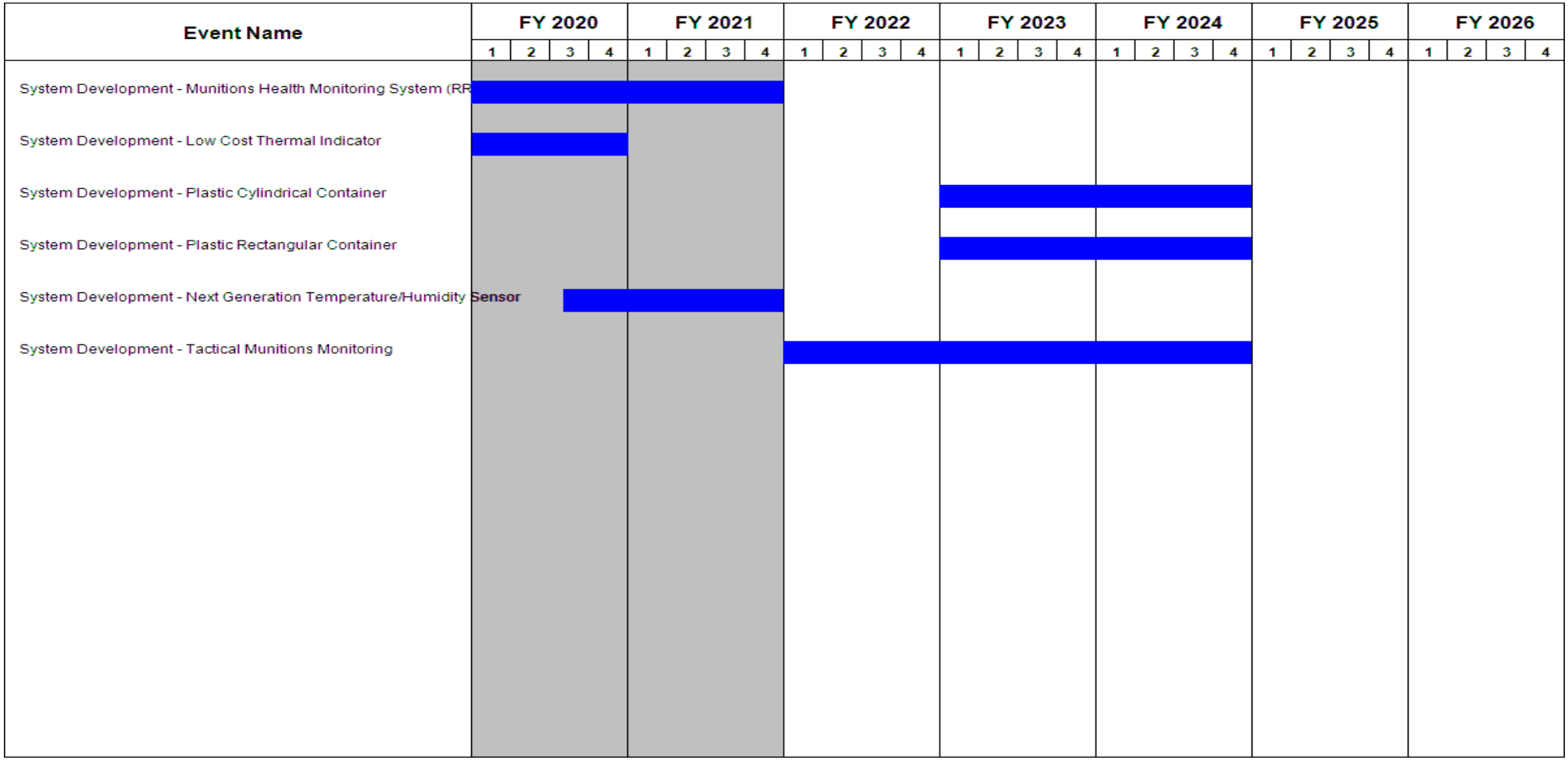


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EL9 / *Ammunitions Logistics Prototyping*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
System Development - Munitions Health Monitoring System (RRAPDS)	2	2018	4	2021
System Development - Low Cost Thermal Indicator	1	2020	4	2020
System Development - Plastic Cylindrical Container	1	2023	4	2024
System Development - Plastic Rectangular Container	1	2023	4	2024
System Development - Next Generation Temperature/Humidity Sensor	3	2020	4	2021
System Development - Tactical Munitions Monitoring	1	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EP2: *Shoulder-Launched Munitions*	-	3.931	10.011	0.987	-	0.987	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The XM919 Individual Assault Munition (IAM) will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. As the next generation SLM, the solution will fit within the Soldier Lethality Modernization Priority, by reducing Soldier load, while providing tactical innovation capable of extending overmatch against near-peer adversaries in a joint, multi-domain, high-intensity conflict. The XM919 IAM will allow Soldiers to conduct Urban Operations and will allow Soldiers to defeat adversaries protected by field expedient structures and light armored vehicles while providing behind the wall lethality effects. This solution will be effective day or night with the ability to safely engage targets from within enclosures, increasing Soldier survivability. This solution will combine the capabilities of the existing Bunker Defeat Munition (BDM) and the AT4 Confined Space - Reduced Sensitivity (AT4CS-RS), which will reduce the logistics burden of having to maintain and train multiple systems. The Individual Assault Munition Capabilities Development Document (CDD) was approved on 11 March 2016. FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: XM919 Individual Assault Munition (IAM)	3.931	10.011	0.987
Description: The XM919 IAM program entered the Engineering and Manufacturing Development (EMD) Phase (MDD approved in 3QFY2020) and awarded multiple 10 US Code (U.S.C.) 2373 "Procurement for Experimentation Purposes" contracts to obtain Shoulder Launched Munition test hardware in support of Phase 1 (System Assessment Phase). The test hardware (tactical and training) will be used to evaluate the maturity of industry solutions to inform both user requirements and the Milestone C production decision. Data gained during the System Assessment phase will be used to develop MS C acquisition documentation and support the production decision. Following production decision and the award of a competitive multi-year production contract, the XM919 IAM program will conduct a User Excursion Soldier Touch Point prior to Type Classification and Full Materiel Release.			
FY 2021 Plans: FY 2021 funding will support test hardware build, initiation of live test firing, development of acquisition documentation, and data compilation.			
FY 2022 Plans: FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2022 funding is needed to complete testing, Soldier touch point activities, development of test reports and documentation in support of a Milestone C decision.			
Accomplishments/Planned Programs Subtotals	3.931	10.011	0.987

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The XM919 Individual Assault Munition (IAM) acquisition strategy is a two phased approach that consists of an accelerated system assessment phase and a production phase. The system assessment phase will survey industry and assess available mature tactical and training hardware solutions through live test firings and soldier touch points to inform the XM919 IAM CDD update and a Milestone C production decision. Upon a successful production decision, the second phase will commence through a competitive multi year production contract award. The XM919 IAM will replace the AT4CS and BDM shoulder launched munition systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Individual Assault Munition (IAM) Hardware 1	C/FFP	SAAB : Stockholm, Sweden	-	0.593	Aug 2020	0.571	Jan 2021	-		-		-	0.000	1.164	-
Individual Assault Munition (IAM) Hardware 2	C/FFP	Dynamit Nobel Defense : Burbach, Germany	-	1.120	Aug 2020	0.816	Jan 2021	-		-		-	0.000	1.936	-
Individual Assault Munition (IAM) Trainer 1	C/FFP	TBD : TBD	-	-		0.300	Jun 2021	-		-		-	0.000	0.300	-
Individual Assault Munition (IAM) Trainer 2	C/FFP	TBD : TBD	-	-		0.300	Jun 2021	-		-		-	0.000	0.300	-
		Subtotal	-	1.713		1.987		-		-		-	0.000	3.700	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.890	Jun 2020	1.810	Feb 2021	0.531	Oct 2021	-		0.531	0.000	3.231	-
Trainer Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		1.193	Feb 2021	0.146	Oct 2021	-		0.146	0.000	1.339	-
Engineering Support - Contract	C/CPFF	Booz Allen Hamilton : McLean, VA	-	-		0.310	Dec 2020	0.310	Dec 2021	-		0.310	0.000	0.620	-
		Subtotal	-	0.890		3.313		0.987		-		0.987	0.000	5.190	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical Evaluation Test and Targets	MIPR	Various : Various	-	1.328	May 2021	3.200	Feb 2021	-		-		-	0.000	4.528	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Trainer Evaluation Testing	MIPR	Various : Various	-	-		0.919	Sep 2021	-		-		-	0.000	0.919	-
Modeling and Simulation	MIPR	DEVCOM Data Analysis Center : Aberdeen, MD	-	-		0.592	Feb 2021	-		-		-	0.000	0.592	-
		Subtotal	-	1.328		4.711		-		-		-	0.000	6.039	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.931		10.011		0.987		-		0.987	0.000	14.929	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

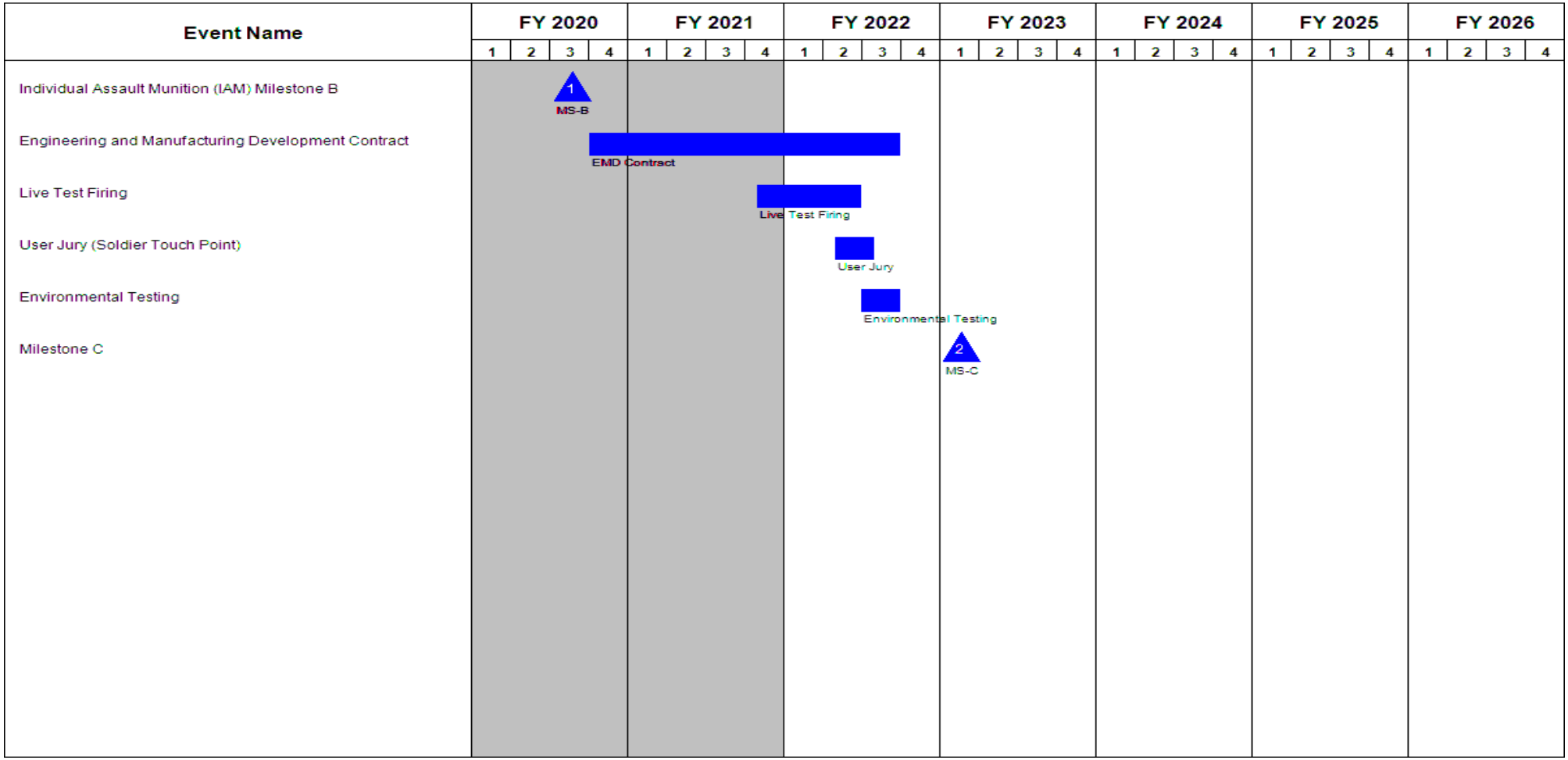

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP2 / *Shoulder-Launched Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Individual Assault Munition (IAM) Milestone B	3	2020	3	2020
Engineering and Manufacturing Development Contract	4	2020	3	2022
Live Test Firing	4	2021	2	2022
User Jury (Soldier Touch Point)	2	2022	3	2022
Environmental Testing	3	2022	3	2022
Milestone C	1	2023	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EP3: *Reduced Range Ammunition - Small Caliber*	-	6.000	13.816	14.000	-	14.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62 millimeter (mm) 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. Fiscal Year (FY) 2022 funding supports completing Engineering and Manufacturing Development (EMD) efforts, conducting Production Qualification Testing (PQT), and performing activities to prepare for ammunition production transition to the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) on the 7.62mm variant. FY 2022 also includes continuing the EMD effort, conducting safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and performing PQT on the 50 caliber variant.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Engineering and Manufacturing Development 7.62mm ***Description:*** EMD Activities for 7.62mm Reduced Range Ammunition. ***FY 2021 Plans:*** Continue EMD efforts, conduct Pre-Production Qualification Testing (PPQT), conduct a Critical Design Review (CDR), and perform activities to prepare for transition to the LCAAP. ***FY 2022 Plans:*** Complete EMD, conduct PQT, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for Low-Rate Initial Production (LRIP). ***FY 2021 to FY 2022 Increase/Decrease Statement:*** EMD effort planned for completion in FY 2022.	3.406	5.816	4.100
Title: Engineering and Manufacturing Development .50 Caliber ***Description:*** EMD Activities for .50 Cal Reduced Range Ammunition. ***FY 2021 Plans:***	2.594	8.000	9.900

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
Continue the EMD effort, conduct Pre-Production Qualification Testing (PPQT), conduct a Preliminary Design Review, and conduct a Critical Design Review (CDR) . ***FY 2022 Plans:*** Continue the EMD effort, conduct safety release testing, conduct a LUA, and perform PQT. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Planned increase due to PQT activities for 3 competing contractors.			
Accomplishments/Planned Programs Subtotals	6.000	13.816	14.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

After 7.62mm Milestone (MS) B in FY 2019, the Government awarded competitive Engineering and Manufacturing Development (EMD) contracts. Upon completing Production Qualification Testing (PQT), the government will then down-select to a single contractor to complete EMD. The .50 Caliber program follows a similar strategy. The Government awarded multiple competitive contracts for the .50 Caliber EMD.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Contract 7.62mm EMD # 1	Option/ CPFF	General Dynamics : St. Petersburg, Florida	0.900	1.016	Feb 2020	1.000	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm EMD # 2	Option/ CPFF	Nammo Tally : Mesa, Arizona	0.750	0.663	Feb 2020	1.000	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm EMD Down-Select	Option/ CPFF	To Be Determined : To Be Determined	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Development Contract 7.62mm Transition to Lake City Army Ammunition Plant (LCAAP)	Option/ CPFF	OLIN Winchester Corporation : Independence, Missouri	-	0.509	Sep 2020	-		0.500	Jan 2022	-		0.500	0.000	1.009	-
Development Contract 7.62mm Tracer Manufacturing	Option/ CPFF	OLIN Winchester Corporation : Independence, Missouri	-	-		0.500	Jun 2021	0.500	Jan 2022	-		0.500	0.000	1.000	-
Development Contract .50 Cal Contractor 1	Option/ CPFF	St. Petersburg, Florida : St. Petersburg, Florida	-	0.352	Feb 2020	2.475	Mar 2021	3.000	Jan 2022	-		3.000	Continuing	Continuing	Continuing
Development Contract .50 Cal Contractor 2	Option/ CPFF	Nammo Tally : Mesa, Arizona	-	0.463	Feb 2020	2.475	Mar 2021	3.000	Jan 2022	-		3.000	Continuing	Continuing	Continuing
Prototype Development	Option/ CPAF	Booz Allen Hamilton : Dover, NJ	0.309	0.081	Feb 2020	-		-		-		-	0.000	0.390	-
		Subtotal	1.959	3.084		7.450		8.000		-		8.000	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command, Armaments Center (CCDC AC) 7.62mm	MIPR	Picatinny Arsenal : New Jersey	1.759	0.938	Oct 2019	1.616	Oct 2020	0.900	Oct 2021	-		0.900	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command, Armaments Center (CCDC AC) .50 Cal	MIPR	Picatinny Arsenal : New Jersey	-	1.050	Oct 2019	1.000	Oct 2020	1.400	Oct 2021	-		1.400	Continuing	Continuing	Continuing
US Army Research Lab (ARL) 7.62mm	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	0.270	Oct 2019	-		0.600	Oct 2021	-		0.600	Continuing	Continuing	Continuing
US Army Research Lab (ARL) .50 Cal	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.800	Oct 2021	-		0.800	Continuing	Continuing	Continuing
		Subtotal	1.759	2.258		2.616		3.700		-		3.700	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Verification Test (DVT 7.62mm)	MIPR	U.S. Army Test Center : Yuma, Arizona	0.482	-		-		-		-		-	0.000	0.482	-
Engineering Tests 7.62mm	MIPR	U.S. Army Test Center : Aberdeen, Maryland	-	-		0.200	Oct 2020	-		-		-	0.000	0.200	-
Pre-Production Qualification Testing (PPQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.500	Dec 2020	-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		-		0.600	Nov 2021	-		0.600	Continuing	Continuing	Continuing
Pre-Production Qualification Testing (PPQT) .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.400	Nov 2020	-		-		-	0.000	1.400	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
User Evaluation .50 Cal	MIPR	Maneuver Battle Labs : Fort Benning, Georgia	-	-		0.550	Oct 2020	0.600	Oct 2021	-		0.600	Continuing	Continuing	Continuing
Engineering Tests .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	0.658	Oct 2019	0.100	Oct 2020	-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT) .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		-		1.100	Oct 2021	-		1.100	Continuing	Continuing	Continuing
		Subtotal	0.482	0.658		3.750		2.300		-		2.300	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.200	6.000		13.816		14.000		-		14.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

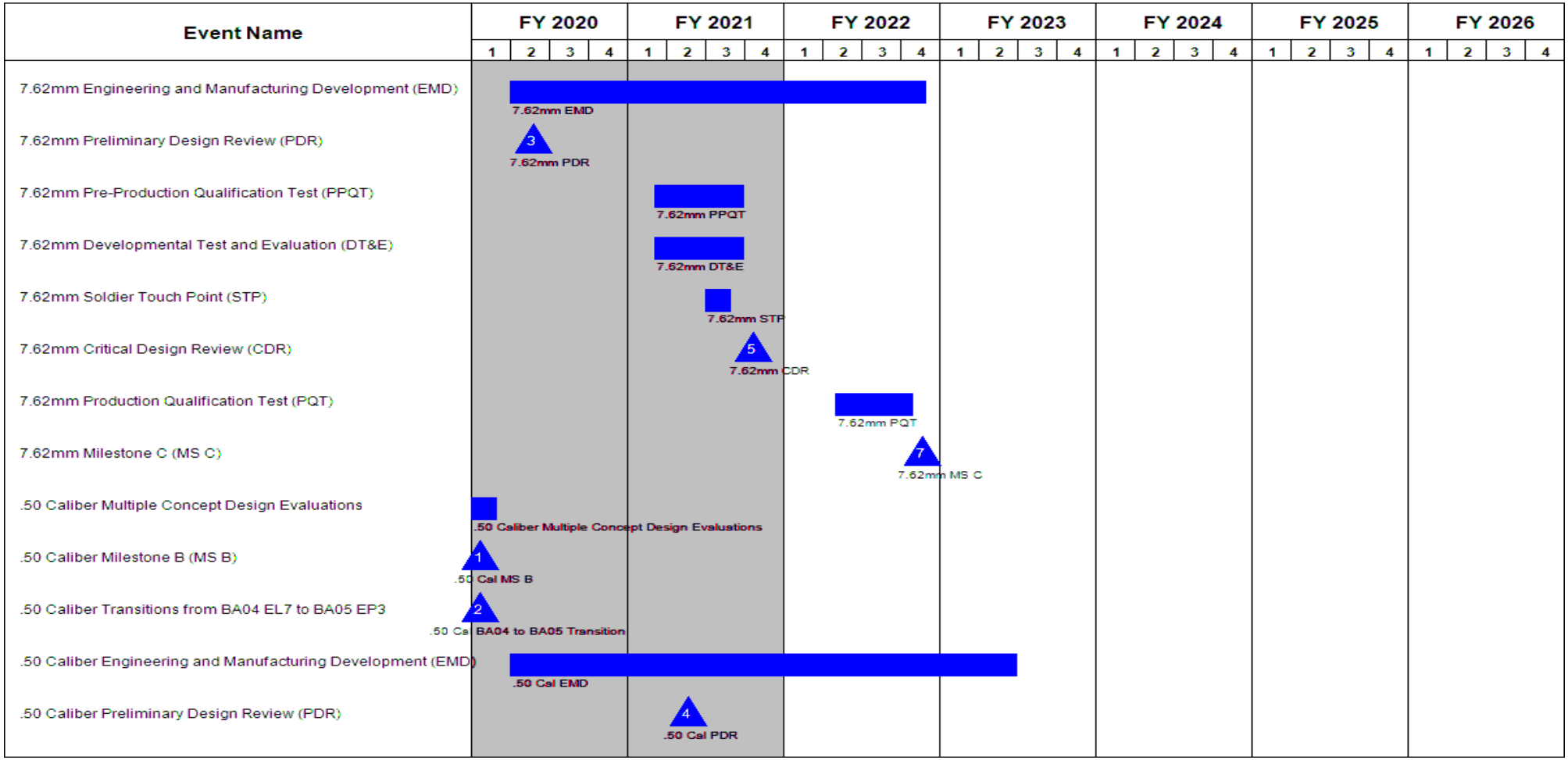


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

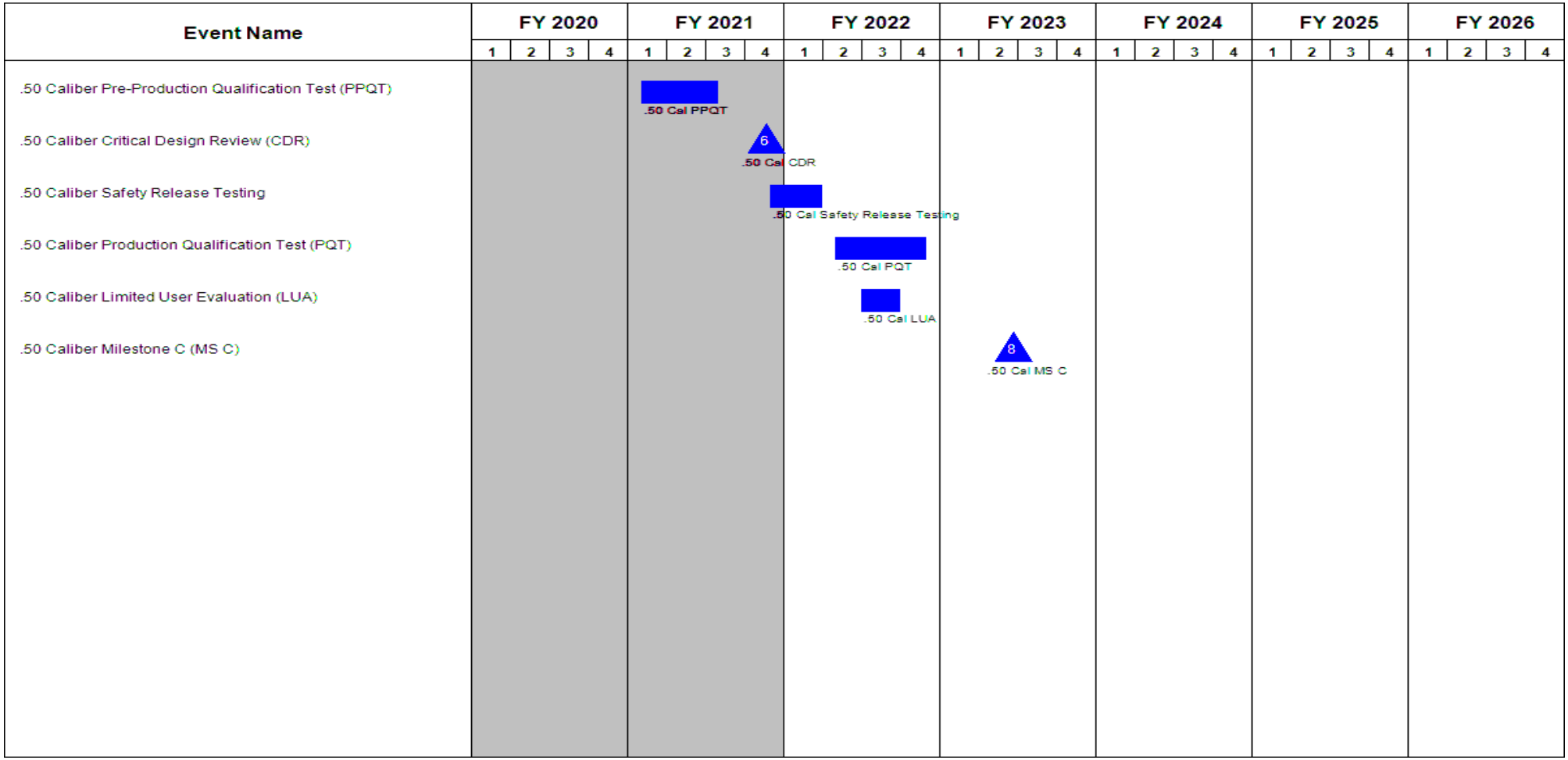


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
7.62mm Multiple Concept Design Evaluations	1	2017	4	2018
7.62mm Materiel Development Decision (MDD)	4	2017	4	2017
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	4	2022
7.62mm Preliminary Design Review (PDR)	2	2020	2	2020
7.62mm Pre-Production Qualification Test (PPQT)	1	2021	3	2021
7.62mm Developmental Test and Evaluation (DT&E)	1	2021	3	2021
7.62mm Soldier Touch Point (STP)	3	2021	3	2021
7.62mm Critical Design Review (CDR)	4	2021	4	2021
7.62mm Production Qualification Test (PQT)	2	2022	4	2022
7.62mm Milestone C (MS C)	4	2022	4	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)	2	2021	2	2021
.50 Caliber Pre-Production Qualification Test (PPQT)	1	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
.50 Caliber Critical Design Review (CDR)	4	2021	4	2021
.50 Caliber Safety Release Testing	4	2021	1	2022
.50 Caliber Production Qualification Test (PQT)	2	2022	4	2022
.50 Caliber Limited User Evaluation (LUA)	3	2022	3	2022
.50 Caliber Milestone C (MS C)	2	2023	2	2023

Note

Next Generation Squad Weapon (NGSW)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EP4: *One-Way Luminescence for Small Caliber Ammo*	-	8.195	13.467	6.896	-	6.896	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62 millimeter (mm) 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 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, and increasing lethality by incorporating Enhanced Performance Round (EPR) technology into the new tracer ammunition. 7.62mm and 5.56mm are the immediate focus; later followed by .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. Fiscal Year (FY) 2022 funding will support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), conducting a Critical Design review (CDR), conducting a Limited User Evaluation (LUE), and performing preparation activities for manufacturing at the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) for the 7.62mm variant. FY 2022 funding will also support EMD efforts, a Preliminary Design Review (PDR), Pre-Production Qualification Testing (PPQT), and a Soldier Touch Point STP / User Evaluation for the 5.56mm variant. FY 2022 also supports assessing OWL technologies for the potential to adapt the technology into other small caliber ammunition variants.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: EMD 7.62mm	8.100	7.100	2.000
Description: EMD efforts for the 7.62mm variant. ***FY 2021 Plans:*** Continuing EMD efforts, perform Safety Release Tests, perform preparation activities to conduct a CDR, and down-select to a single contractor to complete EMD. ***FY 2022 Plans:*** Complete EMD efforts, perform PQT, conduct LFT&E, conduct a CDR, conduct a LUE, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for LRIP. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** EMD effort to be completed in FY 2022. Effort transitions to production.			
Title: EMD 5.56mm	-	6.217	4.781

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
Description: EMD efforts for the 5.56mm variants. ***FY 2021 Plans:*** Start EMD efforts, perform Design Verification Tests (DVT), and begin preparation for the PDR. ***FY 2022 Plans:*** Continue EMD efforts, conduct a PDR, conduct PPQT, and conduct a STP / User Evaluation. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Planned EMD activities in FY 2022.			
Title: Prototype and Concept Evaluation for Other Small Caliber Ammunition ***Description:*** Supports concept development/evaluation of applying OWL tracer solutions to other small caliber ammunition; including .50 Caliber ammunition. ***FY 2021 Plans:*** Assess OWL technologies for potential to adapt the technology into the into other small caliber ammunition variants. ***FY 2022 Plans:*** Will continue to assess OWL technologies for potential to adapt the technology into other small caliber ammunition variants. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** To cover planned activities in FY 2022.	0.095	0.150	0.115
Accomplishments/Planned Programs Subtotals	8.195	13.467	6.896

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• EB8: *OWL for Small Caliber Ammunition*	1.918	-	-	-	-	-	-	-	-	-	-

Remarks

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 matured the effort transitioned from BA4 PE 0603639A Tank and Medium Caliber Ammunition Project EB8 One Way Luminescence (OWL) to BA5 PE 0604802A One-Way Luminescence for Small Caliber Ammo Project EP4 One Way Luminescence

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost

(OWL) for Small Caliber Ammunition in FY 2019 for 7.62mm, and FY 2021 for 5.56mm. The OWL cartridge will be compatible with all Army Small Caliber weapon systems, but optimized for Machine Guns and will provide improved survivability and lethality / target effects over the current tracer munition.

D. Acquisition Strategy

The OWL concept will be developed through Government and Industry prototyping efforts. Technology Readiness Assessments (TRAs) were conducted in FY 2017 and FY 2018 to evaluate the industry and Government concepts in order to proceed with the 7.62mm EMD. The 5.56mm, NGSW, and .50 Caliber cartridges will follow the 7.62mm schedule with EMD starting in FY 2021 for the 5.56mm variant after conducting a TRA and achieving Technology Readiness Level 6 (TRL6) in FY 2020. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : New Jersey	0.014	0.001	Oct 2019	0.006	May 2021	-		-		-	0.000	0.021	-
EMD Contractor # 1 (7.62mm)	Option/ CPFF	General Dynamics : Florham Park, NJ	1.000	2.908	Jan 2020	0.736	Mar 2021	-		-		-	0.000	4.644	-
EMD Contractor # 2 (7.62mm)	Option/ CPFF	Nammo Tally : Mesa, AZ	1.082	2.400	Jan 2020	0.736	Nov 2020	-		-		-	0.000	4.218	-
Down-Selected EMD Contractor (7.62mm)	Option/ CPFF	To be determined : To be determined	-	-		0.500	Jun 2021	0.500	Oct 2021	-		0.500	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (7.62mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	1.244	-		-		0.100	Oct 2021	-		0.100	Continuing	Continuing	Continuing
OWL Prototype Development (7.62mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	-	0.951	Mar 2020	1.372	Nov 2020	-		-		-	Continuing	Continuing	Continuing
Lake City Army Ammunition Plant Tech Integration (7.62mm)	Option/ FFP	OLIN Winchester Corporation : Independence, MO	-	-		0.550	May 2021	0.600	Oct 2021	-		0.600	Continuing	Continuing	Continuing
Lake City Army Ammunition Plant Tech Integration (5.56mm)	Option/ FFP	OLIN Winchester Corporation : Independence, MO	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (5.56mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	-	-		1.745	Nov 2020	0.250	Oct 2021	-		0.250	Continuing	Continuing	Continuing
EMD Contract (5.56mm)	Option/ CPFF	OLIN Winchester Corporation : Independence, MO	-	-		2.200	May 2021	2.000	Oct 2021	-		2.000	Continuing	Continuing	Continuing
		Subtotal	3.340	6.260		7.845		4.450		-		4.450	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CCDC Armaments Center (CCDC-AC) 7.62mm	MIPR	Picatinny Arsenal : New Jersey	1.739	0.645	Oct 2019	2.350	Nov 2020	0.700	Oct 2021	-		0.700	Continuing	Continuing	Continuing
Product Development Support (7.62mm)	Option/ FFP	Leidos Inc. : Reston, VA	0.068	-		-		-		-		-	0.000	0.068	-
CCDC Armaments Center (CCDC-AC) 5.56mm	MIPR	Picatinny Arsenal : New Jersey	-	-		1.822	Nov 2020	0.900	Oct 2021	-		0.900	Continuing	Continuing	Continuing
OWL Solutions/Evaluation	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	0.095	Oct 2019	0.150	Feb 2021	0.115	Oct 2021	-		0.115	Continuing	Continuing	Continuing
		Subtotal	1.807	0.740		4.322		1.715		-		1.715	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
U.S. Army Aberdeen Test Center (ATC) 7.62mm	MIPR	Aberdeen Proving Ground : Maryland	0.060	0.425	Oct 2019	0.500	May 2021	-		-		-	Continuing	Continuing	Continuing
Independent Testing (7.62mm)	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, MO	0.035	0.050	Oct 2019	-		0.100	Feb 2022	-		0.100	0.000	0.185	-
User Evaluation (7.62mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	-	0.180	Oct 2019	0.050	Apr 2021	-		-		-	0.000	0.230	-
Radar Testing (7.62mm)	MIPR	US Army Research Lab : Aberdeen, MD	0.563	0.540	Oct 2019	0.300	May 2021	-		-		-	Continuing	Continuing	Continuing
Data Analysis and Testing (7.62mm)	MIPR	US Army COE-ERDC : Vicksburg, VA	0.050	-		-		-		-		-	0.000	0.050	-
Safety Release Testing (5.56mm)	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		0.200	May 2021	-		-		-	0.000	0.200	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radar Testing (5.56mm)	MIPR	US Army Research Lab : Aberdeen, MD	-	-		0.250	Apr 2021	0.100	Nov 2021	-		0.100	Continuing	Continuing	Continuing
Pre-Production Qualification Testing (PPQT) 5.56mm	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		-		0.300	May 2022	-		0.300	Continuing	Continuing	Continuing
Independent Testing (5.56mm)	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, MO	-	-		-		0.031	May 2022	-		0.031	Continuing	Continuing	Continuing
Soldier Touch Point 1 (5.56mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	-	-		-		0.200	Feb 2022	-		0.200	Continuing	Continuing	Continuing
		Subtotal	0.708	1.195		1.300		0.731		-		0.731	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.855	8.195		13.467		6.896		-		6.896	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

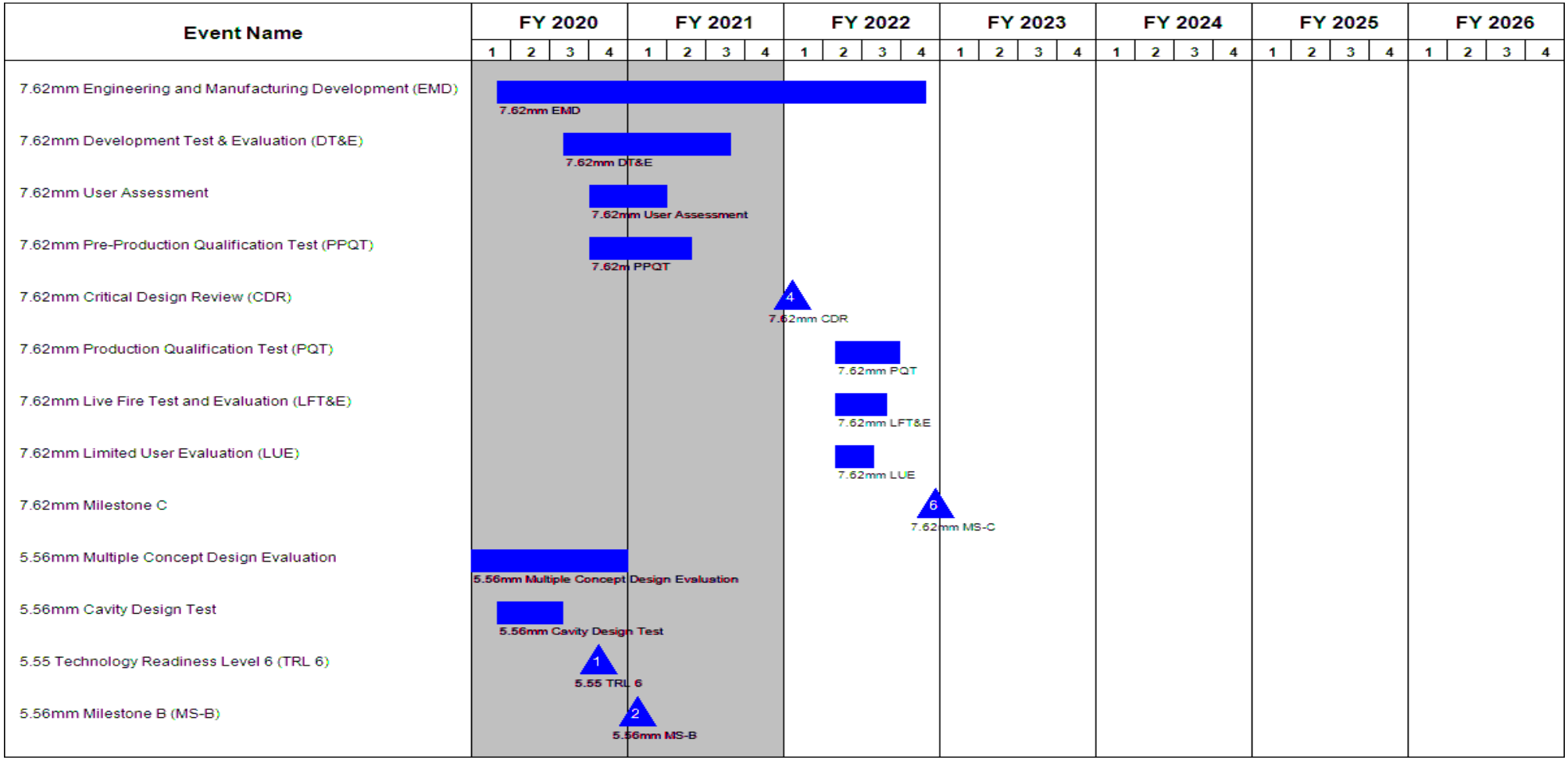


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

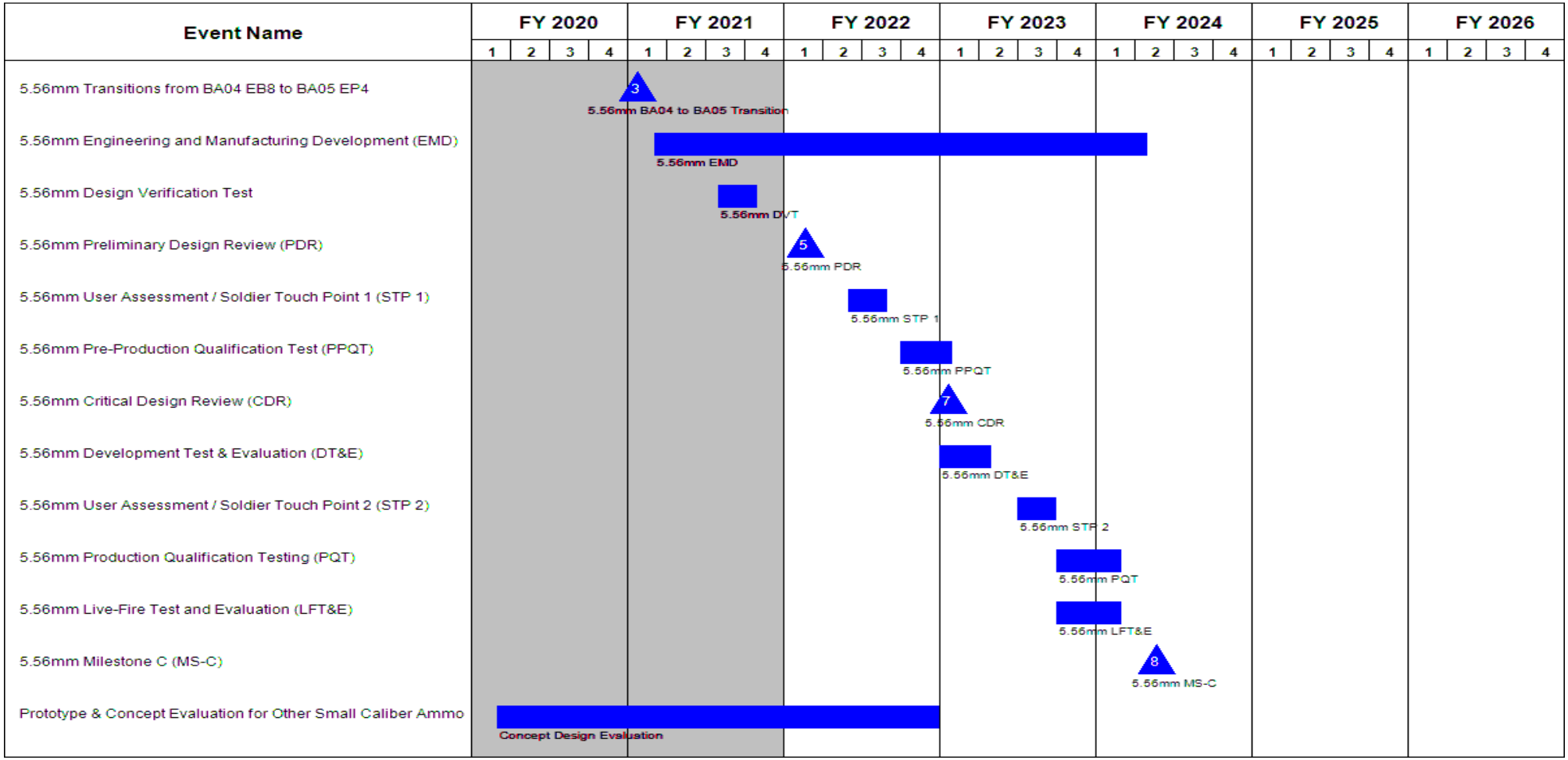


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
7.62mm Materiel Development Decision (MDD)	4	2016	4	2016
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	4	2022
7.62mm Design Verification Test	2	2019	3	2019
7.62mm Preliminary Design Review (PDR)	3	2019	3	2019
7.62mm Development Test & Evaluation (DT&E)	3	2020	3	2021
7.62mm User Assessment	4	2020	1	2021
7.62mm Pre-Production Qualification Test (PPQT)	4	2020	2	2021
7.62mm Critical Design Review (CDR)	1	2022	1	2022
7.62mm Production Qualification Test (PQT)	2	2022	3	2022
7.62mm Live Fire Test and Evaluation (LFT&E)	2	2022	3	2022
7.62mm Limited User Evaluation (LUE)	2	2022	3	2022
7.62mm Milestone C	4	2022	4	2022
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

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
5.56mm Engineering and Manufacturing Development (EMD)	1	2021	2	2024
5.56mm Design Verification Test	3	2021	4	2021
5.56mm Preliminary Design Review (PDR)	1	2022	1	2022
5.56mm User Assessment / Soldier Touch Point 1 (STP 1)	2	2022	3	2022
5.56mm Pre-Production Qualification Test (PPQT)	4	2022	1	2023
5.56mm Critical Design Review (CDR)	1	2023	1	2023
5.56mm Development Test & Evaluation (DT&E)	1	2023	2	2023
5.56mm User Assessment / Soldier Touch Point 2 (STP 2)	3	2023	3	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)	2	2024	2	2024
Prototype & Concept Evaluation for Other Small Caliber Ammo	1	2020	4	2022

Note

As the technology matures, the One Way Luminescence (OWL) projects transitions from BA4 PE 0603639A Tank and Medium Caliber Ammunition Project EB8 One Way Luminescence (OWL) to BA5 PE 0604802A One-Way Luminescence for Small Caliber Ammo Project EP4 One Way Luminescence (OWL) for Small Caliber Ammunition

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EP7: *Aviation Airborne Expendable Countermeasures*	-	4.717	4.313	7.526	-	7.526	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

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

A. Mission Description and Budget Item Justification

Aviation Airborne Expendable Countermeasures (AAECM) will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on expendable countermeasure flares and decoys to include the XM215 Infrared (IR) countermeasure Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical enabler for enduring aircraft and the Future Vertical Lift (FVL) - Aircraft Survivability Equipment (ASE) Cross Functional Team (CFT) within Army's Top modernization priorities.

These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and proliferated current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, 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 RF expendables). FY 2022 will support the final prototype build, development testing, and operational testing of the XM215 design as well as operational test and evaluation for the XM20 design.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Improvements to Countermeasure Flares	4.717	4.313	7.526
Description: This program will develop XM215 Infrared and XM20 Radio Frequency expendable countermeasure flare/decoy to defeat specific threats of interest and qualify them for Army use. This program will also develop countermeasure patterns/cocktails solutions to integrate these new expendables into Army's rotary wing and fixed wing aircraft.			
FY 2021 Plans: FY 2021 activities include refining XM215 design, conduct design verification testing and flight testing.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
FY 2022 will continue development of the XM215 countermeasure and conduct developmental testing and operational testing of the final flare design. Development and flight testing for the XM20 countermeasure will continue as well. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Continued development of the XM215 countermeasure, build final flare design prototypes to support and conduct developmental testing and operational testing.			
Accomplishments/Planned Programs Subtotals	4.717	4.313	7.526

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• EB9: *Aviation Airborne Expendable Countermeasures*	3.055	4.332	5.529	-	5.529	-	-	-	-	-	-

Remarks

Project EB9 Aviation Airborne Expendable Countermeasures within PE 0604802A / Weapons and Munitions - Eng Dev supports the XM20 Radio Frequency (RF) AAECM capability development.

D. Acquisition Strategy

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Development Government	MIPR	CCDC Armaments Center : Picatinny Arsenal, NJ	-	1.426	Feb 2020	0.480	Feb 2021	0.658	Oct 2021	-		0.658	0.000	2.564	-
XM215 Development Contractor 1	C/CPFF	TBD : TBD	-	-		1.455	May 2021	0.806	Dec 2021	-		0.806	0.000	2.261	-
XM215 Development Contractor 2	C/CPFF	TBD : TBD	-	-		0.367	May 2021	0.594	Dec 2021	-		0.594	0.000	0.961	-
		Subtotal	-	1.426		2.302		2.058		-		2.058	0.000	5.786	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	1.280	Dec 2019	1.335	Jan 2021	1.568	Oct 2021	-		1.568	0.000	4.183	-
XM20 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.913	Oct 2021	-		0.913	0.000	0.913	-
XM215 Prototyping Support	MIPR	Naval Surface Warfare Center : Crane, IN	-	0.500	Dec 2020	-		-		-		-	0.000	0.500	-
		Subtotal	-	1.780		1.335		2.481		-		2.481	0.000	5.596	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Development and Operational Testing	MIPR	Various : Various	-	-		-		1.787	Mar 2022	-		1.787	0.000	1.787	-
XM215 Modeling and Simulation	MIPR	Naval Air Warfare : China Lake, CA	-	0.350	Jun 2020	0.180	Mar 2021	0.350	Nov 2021	-		0.350	0.000	0.880	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM20 Flight Testing	MIPR	Various : Various	-	-		-		0.850	Jun 2022	-		0.850	0.000	0.850	-
XM215 Seeker Bowl Flight Testing	MIPR	Various : Various	-	1.161	Jan 2021	0.496	Jan 2021	-		-		-	0.000	1.657	-
		Subtotal	-	1.511		0.676		2.987		-		2.987	0.000	5.174	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.717		4.313		7.526		-		7.526	0.000	16.556	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

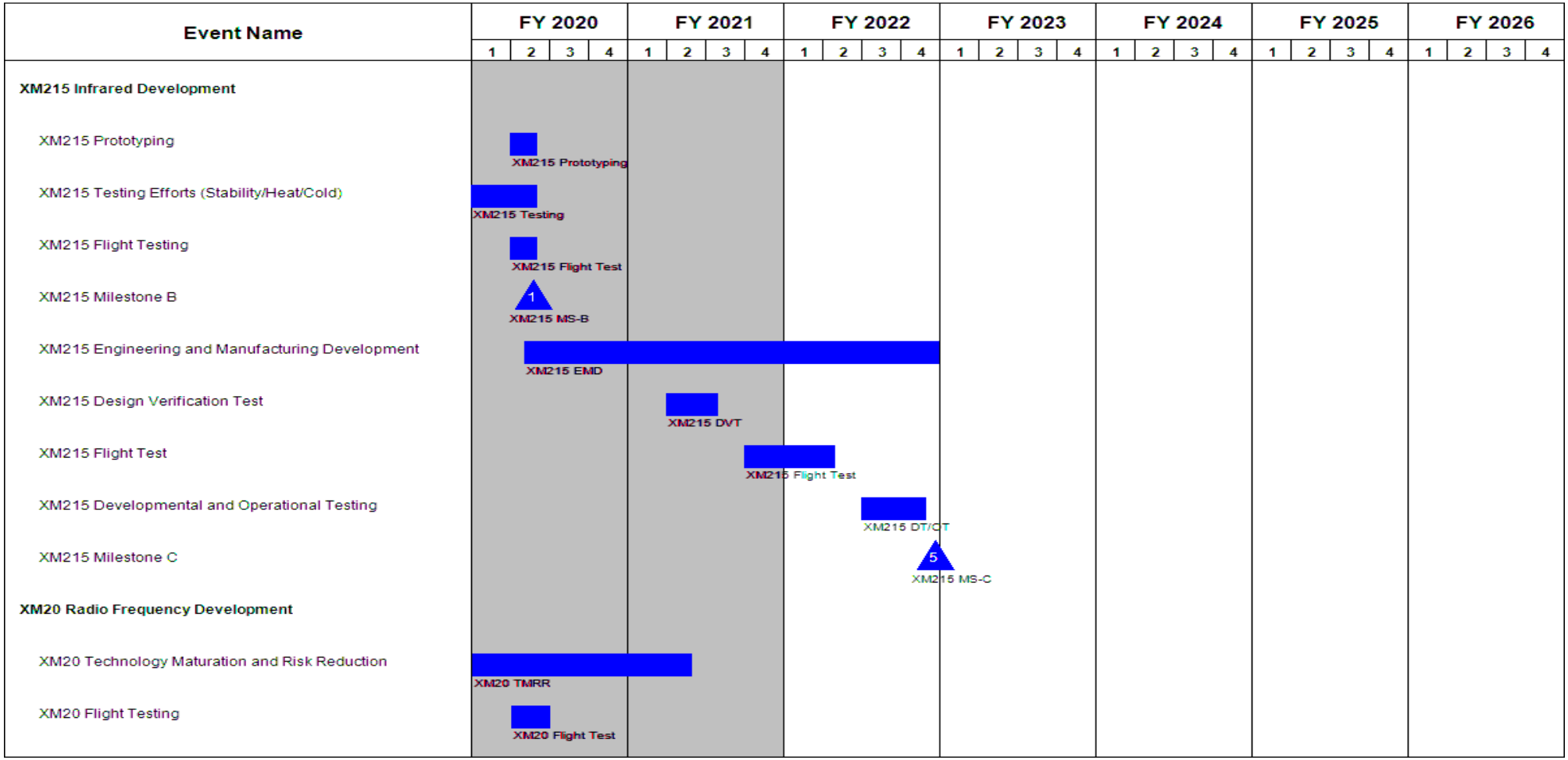
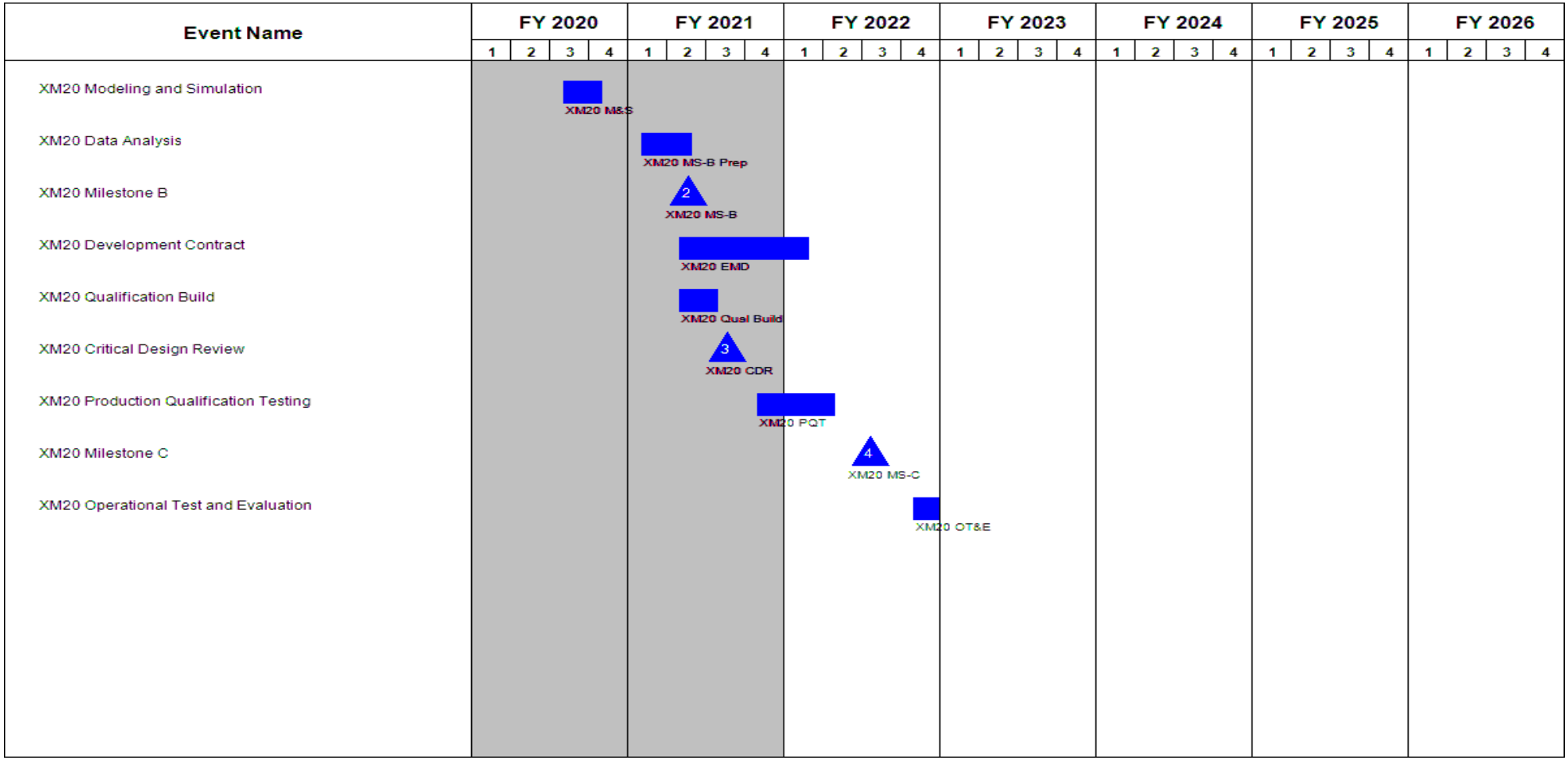


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*



Note

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

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM215 Infrared Development	1	2019	4	2025
XM215 Milestone A	1	2019	1	2019
XM215 Prototyping	1	2019	2	2020
XM215 Down Select	3	2019	3	2019
XM215 Testing Efforts (Stability/Heat/Cold)	3	2019	2	2020
XM215 Flight Testing	1	2020	2	2020
XM215 Milestone B	2	2020	2	2020
XM215 Engineering and Manufacturing Development	2	2020	4	2022
XM215 Design Verification Test	2	2021	3	2021
XM215 Flight Test	4	2021	2	2022
XM215 Developmental and Operational Testing	3	2022	4	2022
XM215 Milestone C	4	2022	4	2022
XM20 Radio Frequency Development	1	2019	4	2025
XM20 Milestone A	1	2019	1	2019
XM20 Prototype Development	1	2019	4	2019
XM20 Demonstrations	2	2019	3	2019
XM20 Technology Maturation and Risk Reduction	1	2020	2	2021
XM20 Flight Testing	2	2020	2	2020
XM20 Modeling and Simulation	3	2020	4	2020
XM20 Data Analysis	1	2021	2	2021
XM20 Milestone B	2	2021	2	2021
XM20 Development Contract	2	2021	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM20 Qualification Build	2	2021	3	2021
XM20 Critical Design Review	3	2021	3	2021
XM20 Production Qualification Testing	4	2021	2	2022
XM20 Milestone C	3	2022	3	2022
XM20 Operational Test and Evaluation	4	2022	4	2022

Note

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

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army											Date: May 2021	
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 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
EU4: *40mm HV Improved High Explosive Dual Purpose*	-	12.517	8.046	2.111	-	2.111	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

40 millimeter (mm) 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. Fiscal Year (FY) 2022 funding supports the completion of Developmental Test & Evaluation (DT&E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award.

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2020**	**FY 2021**	**FY 2022**
Title: Engineering and Manufacturing Development (EMD)	12.517	8.046	2.111
Description: Award EMD contracts to support Design Engineering Testing (DET) and Developmental Test & Evaluation (DT&E) of the 40mm dual purpose airburst capability. ***FY 2021 Plans:*** FY 2021 funding will support continuing EMD activities including Developmental Test & Evaluation (DT&E), Soldier Touch Point (STP), Family of Weapon Sights ? Crew Served (FWS-CS)and Common Remotely Operated Weapon Station (CROWS) Integration. ***FY 2022 Plans:*** FY 2022 funding supports the completion of Developmental Test & Evaluation (DT&E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease due to planned reduction in EMD requirements in FY 2022. The program is expected to achieve MS-C in FY 2022.			
Accomplishments/Planned Programs Subtotals	12.517	8.046	2.111

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E70505: *CTG, 40MM, HV HEDP-AB, XM1176*	-	-	13.844	-	13.844	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The 40mm HV HEDP-AB cartridge will be developed through a competitive EMD program. Milestone B approval was followed by a competitive award for the EMD phase which included DET 1 and DET 2 and an option for DT&E. One contractor was awarded to develop an airburst capable fuze to be retrofitted onto the currently fielded, High Explosive Dual Purpose cartridges and develop a Programming Unit. Test results will support the documentation for Milestone C. After Milestone C is achieved, a contract will be awarded for Low Rate Initial Production (LRIP) followed by two options.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Manager Maneuver Ammunition Systems (PM MAS)	MIPR	Picatinny Arsenal : NJ	0.542	-		-		-		-		-	0.000	0.542	-
Engineering and Manufacturing Development (EMD) Contract DET 1 & 2	C/CPFF	Rheinmatell, Day & Zimmermann Munitions : Rosslyn, Va.	4.858	4.972	Oct 2019	5.735	Dec 2020	-		-		-	Continuing	Continuing	Continuing
Engineering and Manufacturing Development (EMD) Contract DT&E	C/CPFF	Rheinmatell, Day & Zimmermann Munitions : Rosslyn, Va.	-	4.430	Oct 2019	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	5.400	9.402		5.735		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	3.610	1.780	Oct 2019	1.245	Oct 2020	1.861	Oct 2021	-		1.861	Continuing	Continuing	Continuing
		Subtotal	3.610	1.780		1.245		1.861		-		1.861	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Engineering Test (DET) 1	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	0.322	0.466	Oct 2019	-		-		-		-	0.000	0.788	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Engineering Test (DET) 2	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	0.819	Mar 2020	-		-		-		-	0.000	0.819	-
Developmental Test and Evaluation (DT&E)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		0.768	Jul 2021	-		-		-	0.000	0.768	-
Limited User Evaluation (LUE)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	0.050		0.298	Aug 2021	0.250	Oct 2021	-		0.250	0.000	0.598	-
		Subtotal	0.322	1.335		1.066		0.250		-		0.250	0.000	2.973	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9.332	12.517		8.046		2.111		-		2.111	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

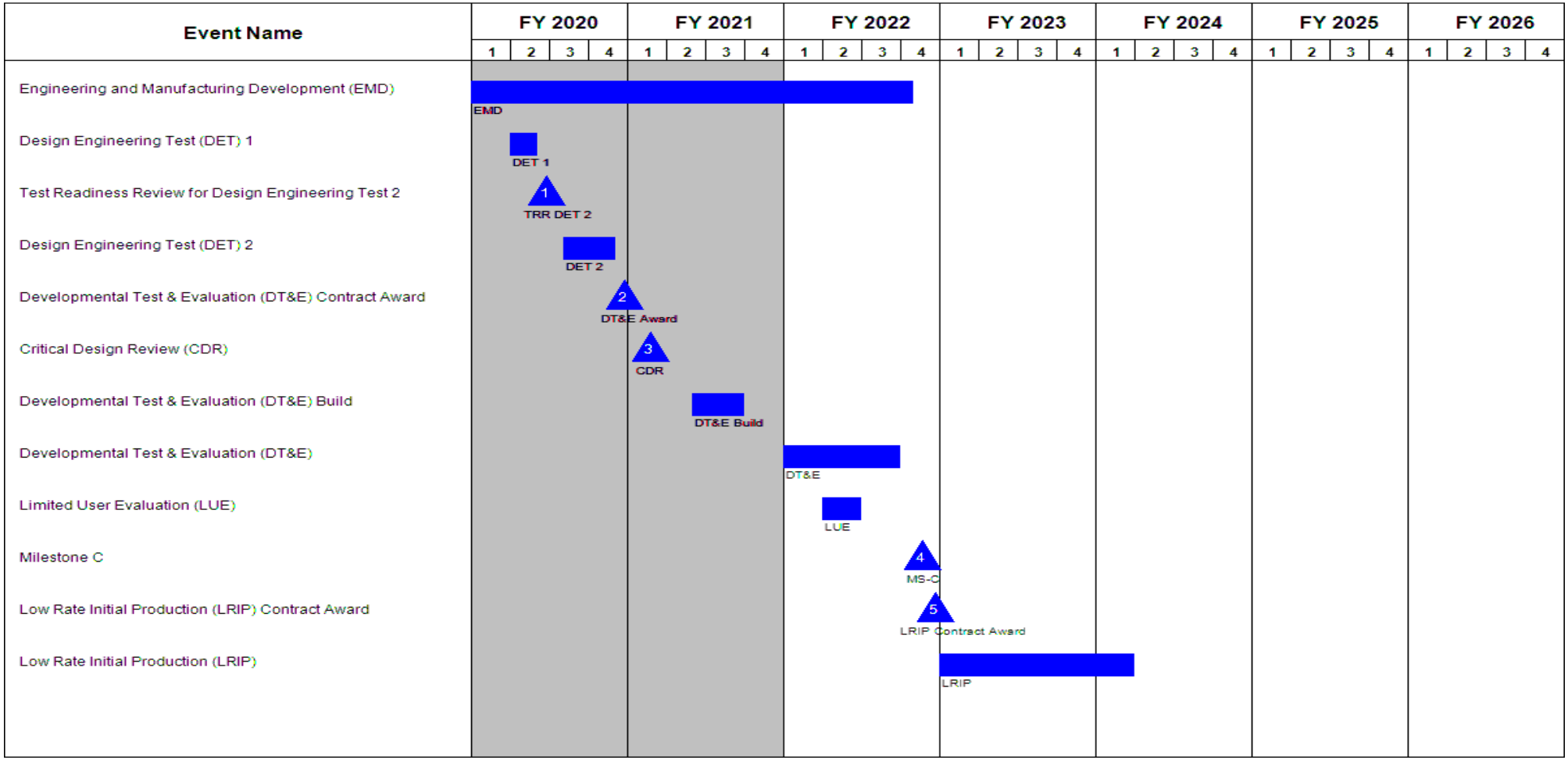


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU4 / *40mm HV Improved High Explosive Dual Purpose*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Milestone B Support Documents	2	2017	4	2018
Milestone B	4	2018	4	2018
Engineering and Manufacturing Development (EMD)	4	2018	4	2022
Test Readiness Review for Design Engineering Test 1	4	2019	4	2019
Design Engineering Test (DET) 1	1	2020	2	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) Contract Award	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
Developmental Test & Evaluation (DT&E) Build	2	2021	3	2021
Developmental Test & Evaluation (DT&E)	1	2022	3	2022
Limited User Evaluation (LUE)	2	2022	2	2022
Milestone C	4	2022	4	2022
Low Rate Initial Production (LRIP) Contract Award	4	2022	4	2022
Low Rate Initial Production (LRIP)	1	2023	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EU5: *.50 Caliber All-Purpose Tactical cartridge (APTC)*	-	-	3.931	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Elimination: Project EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC) has no funding request for Fiscal Year (FY) 2022.

A. Mission Description and Budget Item Justification

The APTC project is a critical technology development in response to the .50 caliber Munitions Capabilities Development Documents (CDD). The overall objective of All-Purpose Tactical Cartridge is to deliver Ball and Tracer ammunition that replaces and improves current legacy .50 caliber ammunition. The All-Purpose Tactical Cartridge will be compatible with all Army .50 caliber weapons but specifically optimized to work in the M2 Machine Guns. There is no Fiscal Year (FY) 2022 request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: .50 Cal All-Purpose Tactical Cartridge EMD	-	3.931	-
Description: Engineering and Manufacturing Development (EMD) Activities for the development of the .50 Caliber All-Purpose Tactical Cartridge APTC. ***FY 2021 Plans:*** Will achieve Milestone B (MS-B), award two competing EMD contracts to two contractors, conduct Design Verification Test (DVT) on the competing concepts, and perform Pre-Production Qualification Testing (PPQT) on the competing concepts. And, make EMD continuation decision. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Planned program activities.			
Accomplishments/Planned Programs Subtotals	-	3.931	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Evaluate competing concepts/prototypes from contractors and Government. In FY 2021, the Government intends to make a decision on continuation of the Engineering and Manufacturing Development (EMD).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Contract # 1	Option/ CPFF	To be determined : To be determined	-	-		1.700	May 2021	-		-		-	0.000	1.700	-
		Subtotal	-	-		1.700		-		-		-	0.000	1.700	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command, Armaments Center (CCDC, AC) Support	MIPR	Picatinny Arsenal : New Jersey	-	-		0.741	May 2021	-		-		-	0.000	0.741	-
Combat Capabilities Development Command (CCDC) Army Research Lab (ARL)	MIPR	CCDC Army Research Lab (ARL) : Aberdeen, Maryland	-	-		0.640	May 2021	-		-		-	0.000	0.640	-
		Subtotal	-	-		1.381		-		-		-	0.000	1.381	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pre-Production Qualification Testing (PPQT)	MIPR	US Army Test Center (ATC) : Aberdeen, Maryland	-	-		0.500	May 2021	-		-		-	0.000	0.500	-
Design Verification Testing	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.350	May 2021	-		-		-	0.000	0.350	-
		Subtotal	-	-		0.850		-		-		-	0.000	0.850	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.931		-		-		-	0.000	3.931	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*

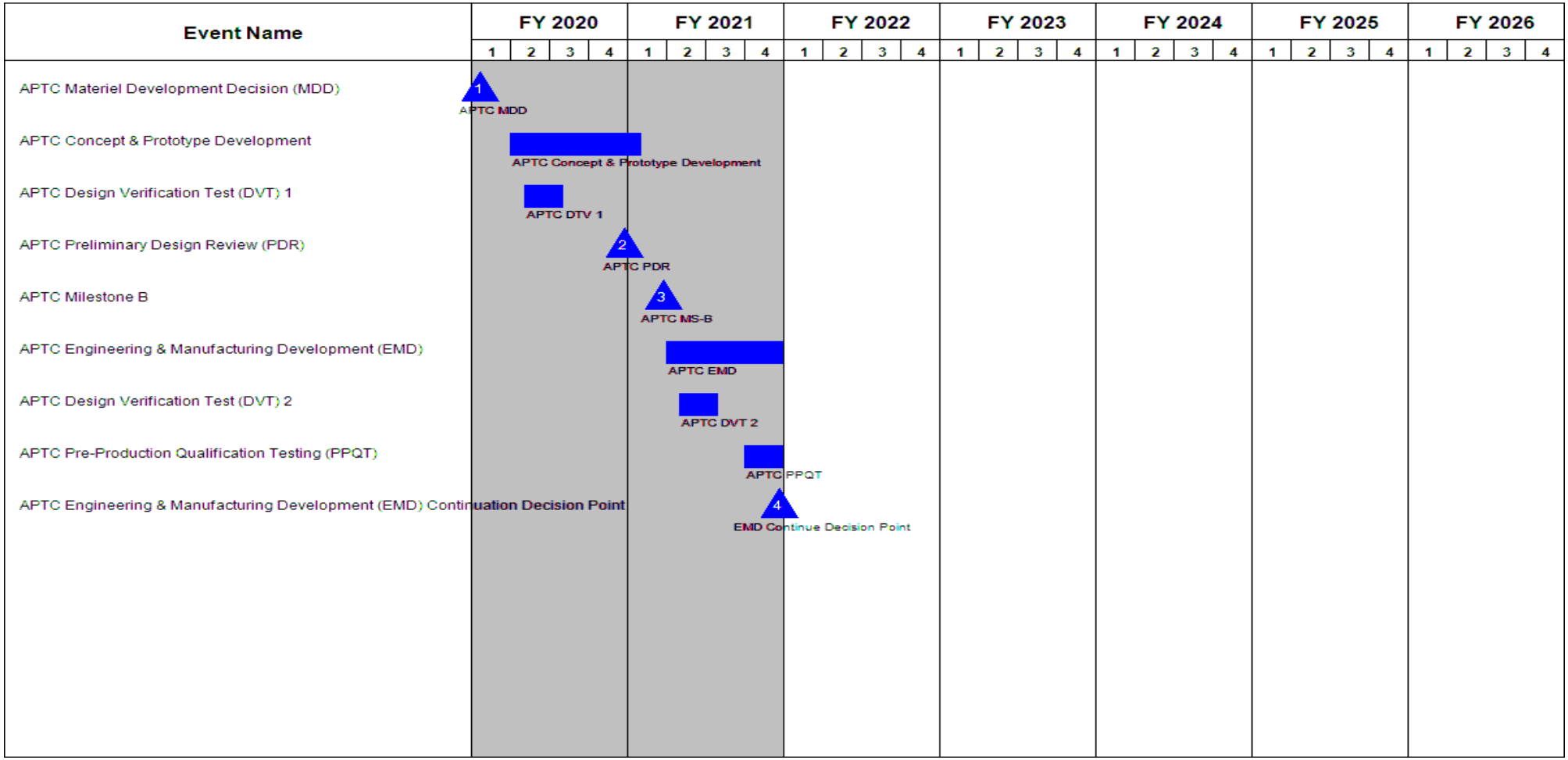


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
APTC Materiel Development Decision (MDD)	1	2020	1	2020
APTC Concept & Prototype Development	1	2020	1	2021
APTC Design Verification Test (DVT) 1	2	2020	3	2020
APTC Preliminary Design Review (PDR)	4	2020	4	2020
APTC Milestone B	1	2021	1	2021
APTC Engineering & Manufacturing Development (EMD)	2	2021	4	2021
APTC Design Verification Test (DVT) 2	2	2021	3	2021
APTC Pre-Production Qualification Testing (PPQT)	4	2021	4	2021
APTC Engineering & Manufacturing Development (EMD) Continuation Decision Point	4	2021	4	2021

Note

Note:
All-Purpose Tactical Cartridge (APTC)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EU6: *155mm HE Rocket Assist Project Extended Range*	-	18.804	51.095	27.655	-	27.655	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 155 millimeter (mm) High Explosive (HE) Rocket Assisted Projectile, Extended Range Project supports projectile development efforts to achieve ranges of 40km in current 39 caliber artillery weapon systems and longer ranges in future 58 caliber Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH) to achieve the Army's requirement of extended range lethality. The Project is executing an evolutionary approach consisting of two parallel efforts to meet the objectives of extended range and precision. The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113 Extended Range (ER) will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA. These efforts will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. Fiscal Year (FY) 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113ER development and qualification activities to directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 155mm High Explosive Rocket Assisted Projectile (RAP) Extended Range	8.804	30.095	27.655
Description: The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113 Extended Range (ER), previously known as XM1113E1, will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA. ***FY 2021 Plans:*** Fiscal Year (FY) 2021 funding supports XM1113 Urgent Materiel Release (UMR) activities including fire control software integration and development and qualification testing for current artillery systems. FY 2021 funding also supports XM1113ER development activities to achieve the Army's requirement of extended range lethality with precision accuracy. ***FY 2022 Plans:*** FY 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113ER development and qualification			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
activities to directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease in funding in FY 2022 due to the reduction in contract costs associated with the XM1113 hardware required to support qualification activities.			
Accomplishments/Planned Programs Subtotals	8.804	30.095	27.655

	FY 2020	FY 2021
Congressional Add: Precision Guidance Aft	10.000	21.000
FY 2020 Accomplishments: FY 2020 Congressional Add effort leverages existing 155mm projectile components and technology to develop an extended range 155mm all-up round, Precision Guidance Aft. ***FY 2021 Plans:*** FY 2021 Congressional Add is supporting the continuation of Precision Guidance Aft development culminating in a demonstration planned for 4QFY21.		
Congressional Adds Subtotals	10.000	21.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E66501: *PROJ, 155mm ARTY HE RAP, XM1113*	20.000	26.972	51.098	-	51.098	-	-	-	-	-	-

Remarks

A Procurement of Ammunition, Army (PAA) budget line item, Standard Study Number E66501, has been established to resource the procurement of XM1113 and XM1113ER quantities.

D. Acquisition Strategy

The 155mm HE Rocket Assisted Projectile, Extended Range Project is utilizing a DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiative with GD-OTS to support the accelerated timeline to develop and qualify the XM1113 for 39 caliber weapon systems as well as 58 caliber Extended Range Cannon Artillery (ERCA) compatibility efforts. A separate DOTC OTA initiative with GD-OTS is being utilized for XM1113ER development and qualification activities required to achieve ranges of 70km and greater with ERCA. The Project will complete XM1113ER qualification efforts in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment. The Project is also utilizing a Cornerstone OTA with Northrop Grumman Defense Systems (NGDS) to develop and evaluate Precision Guidance Aft. The XM1113 and XM1113ER efforts will transition to Federal Acquisition Regulation (FAR) based production contracts in support of Milestone C for Low Rate Initial Production (LRIP) and Full Rate Production (FRP).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	1.448	0.125	Oct 2019	0.100	Jul 2021	0.100	Oct 2021	-		0.100	0.000	1.773	-
		Subtotal	1.448	0.125		0.100		0.100		-		0.100	0.000	1.773	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DOTC - XM1113 and XM1113ER Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology Consortium Other Transaction Agreement (DOTC OTA) : Various	37.639	8.110	Nov 2019	22.965	Nov 2020	19.487	Nov 2021	-		19.487	0.000	88.201	-
Cornerstone - Precision Guidance Aft Development - Congressional Add	MIPR	Cornerstone OTA : Northrup Grumman Defense Systems	-	7.436	Aug 2020	18.732	Jun 2021	-		-		-	0.000	26.168	-
		Subtotal	37.639	15.546		41.697		19.487		-		19.487	0.000	114.369	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	4.455	1.289	Mar 2020	1.798	Mar 2021	2.818	Nov 2021	-		2.818	0.000	10.360	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fire Control Software Integration	MIPR	U.S. Army Communications-Electronics Command (CECOM) : Aberdeen, MD	0.200	-		-		-		-		-	0.000	0.200	-
		Subtotal	4.655	1.289		1.798		2.818		-		2.818	0.000	10.560	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Water Pit Testing	MIPR	Army Research Lab (ARL) : Adelphi, MD	0.600	-		-		-		-		-	0.000	0.600	-
Qualification Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	1.741	0.924	Jun 2020	7.500	Jan 2021	4.650	Mar 2022	-		4.650	0.000	14.815	-
Arena Testing	MIPR	Army Test and Evaluation Command (ATEC) Aberdeen Proving Ground (APG) : Aberdeen, MD	0.801	0.507	Sep 2020	-		0.600	Jun 2022	-		0.600	0.000	1.908	-
Material Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.062	0.144	Sep 2020	-		-		-		-	0.000	0.206	-
Material Testing	MIPR	Naval Air Warfare Center (NAWC) : China Lake, CA	-	0.130	Nov 2020	-		-		-		-	0.000	0.130	-
Material and Setback Testing	MIPR	Naval Surface Warfare Center	-	0.139	Nov 2020	-		-		-		-	0.000	0.139	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(NSWC) : Indian Head, MD													
		Subtotal	3.204	1.844		7.500		5.250		-		5.250	0.000	17.798	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	46.946	18.804		51.095		27.655		-		27.655	0.000	144.500	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

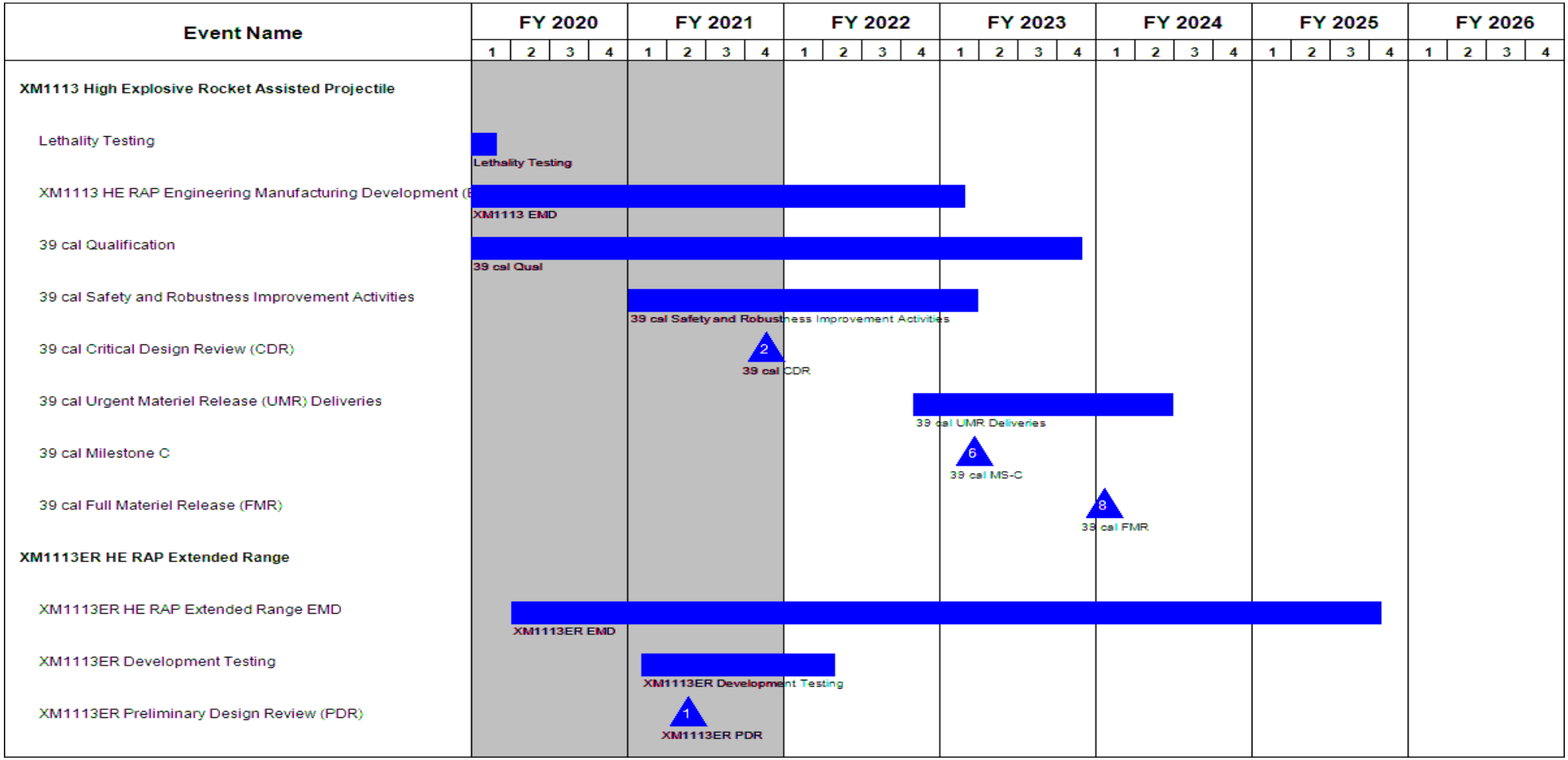
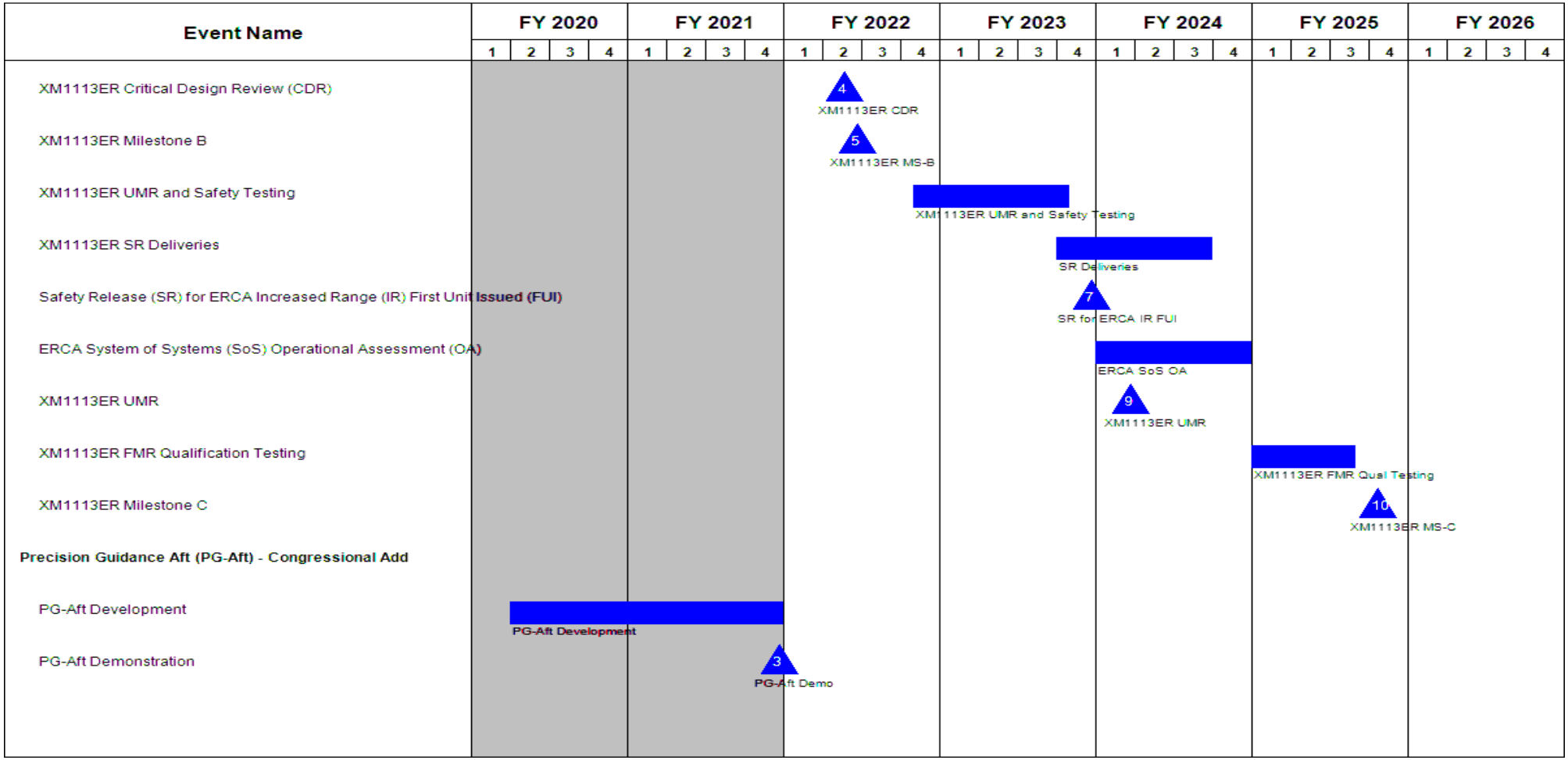


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*



Note

XM1113 will achieve lethality against targets at 40km range. XM1113ER will achieve 70+km out of ERCA.

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM1113 High Explosive Rocket Assisted Projectile	1	2019	4	2023
Lethality Testing	1	2019	1	2020
Materiel Development Decision (MDD)	4	2019	4	2019
XM1113 HE RAP Engineering Manufacturing Development (EMD)	4	2019	1	2023
39 cal Qualification	4	2019	4	2023
39 cal Safety and Robustness Improvement Activities	1	2021	1	2023
39 cal Critical Design Review (CDR)	4	2021	4	2021
39 cal Urgent Materiel Release (UMR) Deliveries	4	2022	2	2024
39 cal Milestone C	1	2023	1	2023
39 cal Full Materiel Release (FMR)	1	2024	1	2024
XM1113ER HE RAP Extended Range	3	2021	4	2023
XM1113ER HE RAP Extended Range EMD	2	2020	4	2025
XM1113ER Development Testing	1	2021	2	2022
XM1113ER Preliminary Design Review (PDR)	2	2021	2	2021
XM1113ER Critical Design Review (CDR)	2	2022	2	2022
XM1113ER Milestone B	2	2022	2	2022
XM1113ER UMR and Safety Testing	4	2022	4	2023
XM1113ER SR Deliveries	4	2023	3	2024
Safety Release (SR) for ERCA Increased Range (IR) First Unit Issued (FUI)	4	2023	4	2023
ERCA System of Systems (SoS) Operational Assessment (OA)	1	2024	4	2024
XM1113ER UMR	1	2024	1	2024
XM1113ER FMR Qualification Testing	1	2025	3	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM1113ER Milestone C	4	2025	4	2025
Precision Guidance Aft (PG-Aft) - Congressional Add	1	2020	4	2021
PG-Aft Development	1	2020	4	2021
PG-Aft Demonstration	4	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EU7: *Enhanced Lethality Cannon Munitions*	-	8.362	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Enhanced Lethality Cannon Munitions (ELCM) Project will evaluate, develop, and qualify new lethality technologies for 155 millimeter (mm) 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 in support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). This Project also accelerates the qualification of the 155mm XM1128 High Explosive Projectile, which will replace the M795 Critical Munition once qualified. Engineering efforts are ongoing and 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 Fiscal Year (FY) 2021. In FY 2022, this Project does not have a Research Development Technology & Evaluation (RDT&E) request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 155mm XM1128 High Explosive Projectile ***Description:*** Evaluate, Develop, and Qualify Enhanced Lethality Technologies.	8.362	-	-
Accomplishments/Planned Programs Subtotals	8.362	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E67802: *PROJ, 155mm ARTY HE-BB, XM1128*	-	15.000	12.961	-	12.961	-	-	-	-	-	-

Remarks

In FY 2020, XM1128 is transitioning to production. A Procurement of Ammunition, Army (PAA) funding line, Standard Study Number (SSN) E67802, PROJ, 155mm ARTY HE-BB, XM1128, has been established.

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 DPICM as of 22 December 2016, as an inherent part of the Rapid Bridging solution for 155mm DPICM. Prototyping was awarded in 1st Quarter (1Q) FY 2018 through Department of Defense (DoD) Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives to multiple vendors (subcontractors to United States (U.S.)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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*

Government system integrator) through Engineering & Manufacturing Development (EMD). The U.S. Government will lead EMD efforts to complete development 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enhanced Lethality Cannon Munitons (ELCM) Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.487	0.149	Oct 2019	-		-		-		-	0.000	0.636	-
		Subtotal	0.487	0.149		-		-		-		-	0.000	0.636	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Prototype Qualification Test (PQT) Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	13.378	2.935	Dec 2019	-		-		-		-	0.140	16.453	-
XM1128 Prototype Qualification Test (PQT) Hardware	Reqn	Cornerstone Other Transaction Agreement (OTA) : Various	2.185	0.891	Mar 2020	-		-		-		-	0.000	3.076	-
XM1113 Prototype Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	4.494	-		-		-		-		-	0.000	4.494	-
		Subtotal	20.057	3.826		-		-		-		-	0.140	24.023	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center	7.426	2.812	Mar 2020	-		-		-		-	1.377	11.615	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(CCDC AC) : Picatinny Arsenal, NJ													
XM1128 Firing Table Software Updates	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Adelphi, MD	2.123	-		-		-		-		-	0.000	2.123	-
M999 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	0.750	-		-		-		-		-	0.000	0.750	-
XM1113 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	0.606	-		-		-		-		-	0.000	0.606	-
		Subtotal	10.905	2.812		-		-		-		-	1.377	15.094	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total 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	3.089	1.500	Jan 2020	-		-		-		-	0.000	4.589	-
XM1128 Testing	MIPR	Naval Surface Warfare Center	1.500	0.075	Jun 2020	-		-		-		-	0.000	1.575	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(NSWC) ? Dahlgren : Dahlgren, VA													
XM1128 Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.817	-		-		-		-		-	0.000	0.817	-
M999 Testing	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Alexandria, VA	1.770	-		-		-		-		-	0.000	1.770	-
XM1128 Testing	MIPR	Army Research Lab (ARL) : Adelphi, MD	0.075	-		-		-		-		-	0.000	0.075	-
		Subtotal	7.251	1.575		-		-		-		-	0.000	8.826	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.700	8.362		0.000		-		-		-	1.517	48.579	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

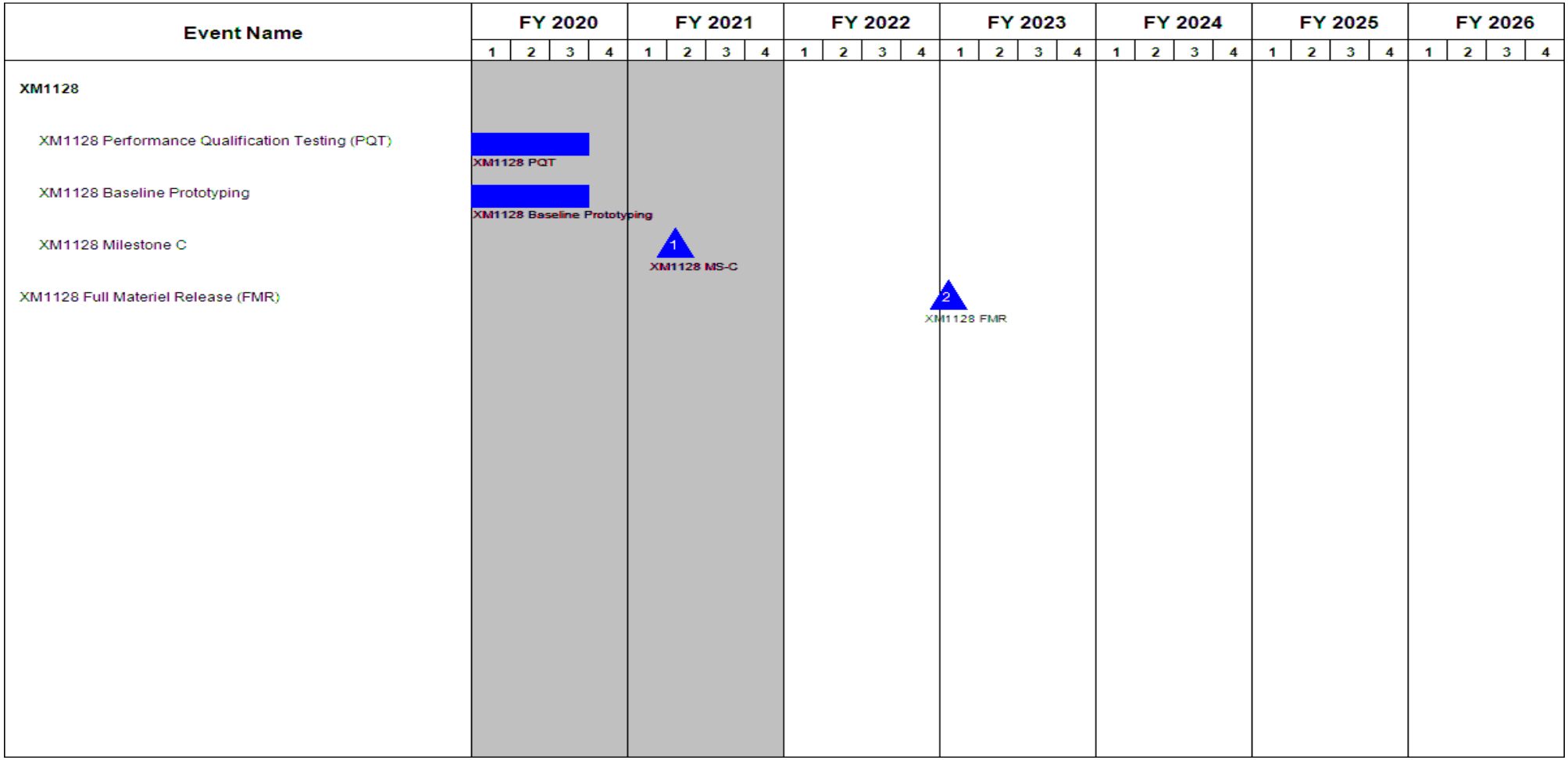


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU7 / *Enhanced Lethality Cannon Munitions*

Schedule Details

	Start		End	
Events	**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

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EU8: *Improved Multi-Option Fuze*	-	9.589	7.700	4.562	-	4.562	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Improved Multi-Option Fuze Project 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 fuze 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 Project 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. Fiscal Year (FY) 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Improved Multi-Option Fuze Development	9.589	7.700	4.562
Description: Develop and qualify improved multi-option fuze technologies. ***FY 2021 Plans:*** FY 2021 funding supports MOFA II and iMOFM design verification, hardware fabrication, qualification testing, and Fuze Qualification Testing. ***FY 2022 Plans:*** FY 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease in funding in FY 2022 due to the reduction in contract costs associated with the design and fabrication of MOFA II and iMOFM hardware to support qualification testing.			
Accomplishments/Planned Programs Subtotals	9.589	7.700	4.562

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU8 / *Improved Multi-Option Fuze*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E99909: *Multi-Option Fuze, Artillery M782*	-	-	13.653	-	13.653	-	-	-	-	-	-

Remarks

FY 2022 Procurement of Ammunition, Army (PAA) funding will be executed on Standard Study Number (SSN) E99909, Multi-Option Fuze, Artillery (MOFA) M782 for the procurement of legacy MOFA fuzes.

D. Acquisition Strategy

The Improved Multi-Option Fuze Project currently utilizes the DoD Ordnance Technology Consortium Other Transaction Agreement (DOTC OTA) with incrementally funded Engineering and Manufacturing Development (EMD) contracts for improved and modernized Multi-Option Fuze Artillery (MOFA) II detailed designs and the fabrication of hardware through FY 2022. The Improved Multi-Option Fuze Project will enhance the existing multi-option fuzes for cannon artillery and mortar munitions programs of record. Detailed government-owned Technical Data Packages (TDPs) will enable "build to print" designs 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 Improved Multi-Option Fuze Mortar (iMOFM) effort will be a qualified TRL-8 design for incorporation into mortar cartridge production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	1.033	-		-		-		-		-	0.000	1.033	-
		Subtotal	1.033	-		-		-		-		-	0.000	1.033	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MOFA II Development & PQT Support	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	5.395	6.075	Dec 2019	2.014	Jan 2021	0.350	Nov 2021	-		0.350	0.000	13.834	-
iMOFM Fuze Test Hardware & Qualification	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	0.595	1.737	Apr 2020	1.100	Apr 2021	0.645	Jan 2022	-		0.645	0.000	4.077	-
		Subtotal	5.990	7.812		3.114		0.995		-		0.995	0.000	17.911	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	2.676	1.260	Nov 2019	1.103	Nov 2020	1.217	Nov 2021	-		1.217	0.000	6.256	-
Fuze Engineering Support	C/LH	SAVIT Corporation : Rockaway, NJ	-	-		0.300	Mar 2021	0.150	May 2022	-		0.150	0.000	0.450	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	2.676	1.260		1.403		1.367		-		1.367	0.000	6.706	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Multi-Option Fuze Test and Evaluations	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.083	Mar 2021	0.250	Dec 2021	-		0.250	0.000	0.333	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.402	0.062	Jun 2020	1.750	Mar 2021	1.250	Jan 2022	-		1.250	0.000	3.464	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	U.S. Army Research Lab (ARL) : Adelphi, MD	0.300	0.100	Jan 2020	-		-		-		-	0.000	0.400	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	Army Test and Evaluation Command (ATEC) Aberdeen Proving Ground (APG) : Aberdeen, MD	-	0.040	Oct 2020	0.250	May 2021	0.120	Nov 2021	-		0.120	0.000	0.410	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	White Sands Missile Range (WSMR) : White Sands, NM	-	0.315	Sep 2020	0.750	Mar 2021	0.330	Dec 2021	-		0.330	0.000	1.395	-
Improved Multi-Option Fuze Cyber Security Testing	MIPR	TBD : TBD	-	-		0.350	Mar 2021	0.250	Mar 2022	-		0.250	0.000	0.600	-
		Subtotal	0.702	0.517		3.183		2.200		-		2.200	0.000	6.602	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Cyber Security testing for MOFA II is required during Fiscal Year (FY) 2021 and FY 2022. The test location will be determined based on informed requirements by March 2021.

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.401	9.589		7.700		4.562		-		4.562	0.000	32.252	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

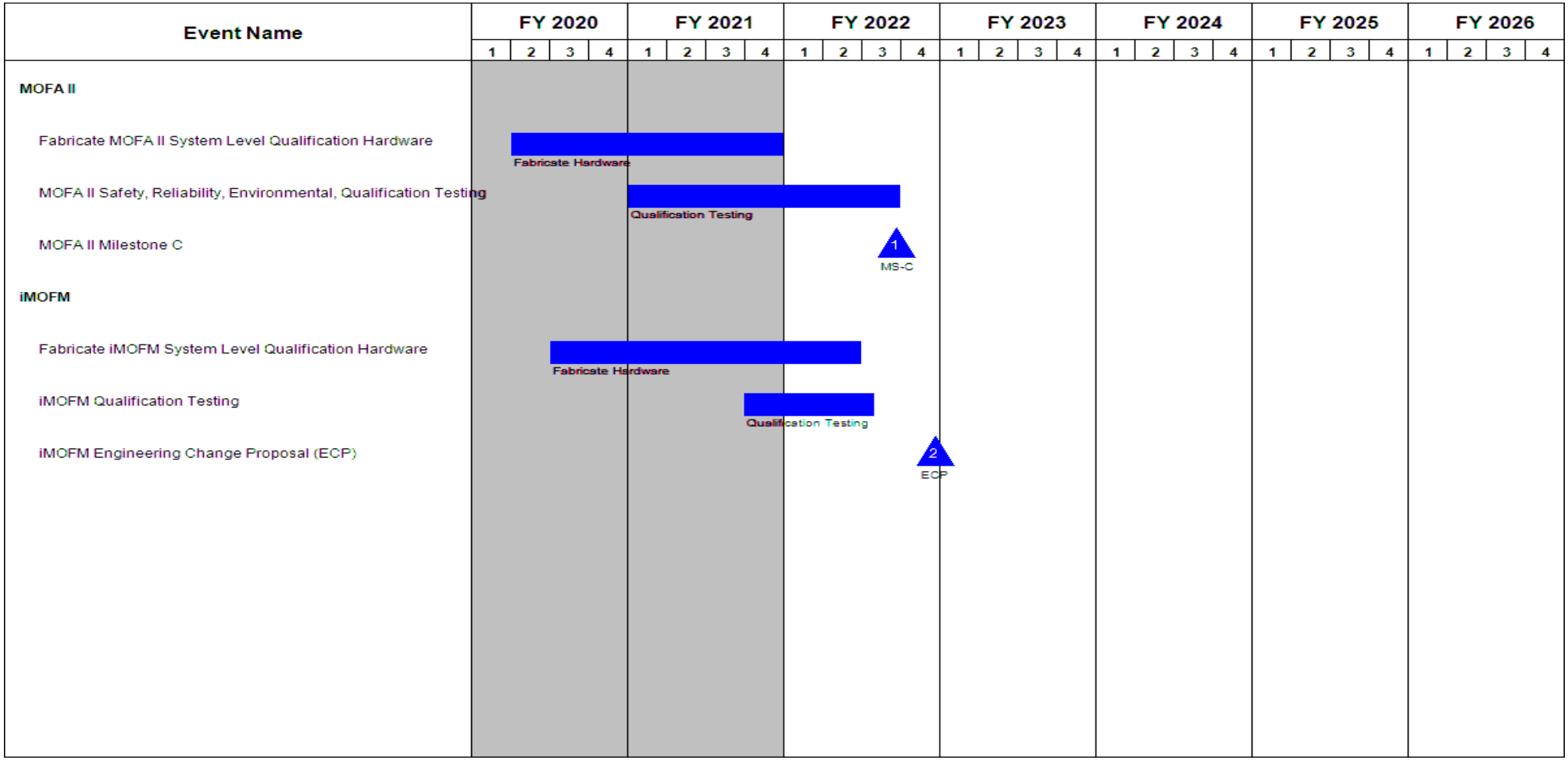


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU8 / *Improved Multi-Option Fuze*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Fabricate Prototypes	3	2018	3	2019
Conduct Evaluations and Design Reviews	2	2019	4	2019
MOFA II	3	2019	4	2022
Fabricate MOFA II System Level Qualification Hardware	2	2020	4	2021
MOFA II Safety, Reliability, Environmental, Qualification Testing	1	2021	3	2022
MOFA II Milestone C	3	2022	3	2022
iMOFM	2	2020	4	2022
Fabricate iMOFM System Level Qualification Hardware	3	2020	2	2022
iMOFM Qualification Testing	4	2021	3	2022
iMOFM Engineering Change Proposal (ECP)	4	2022	4	2022

Note

Multi-Option Fuze Artillery (MOFA)
improved Multi-Option Fuze Mortar (iMOFM)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EW1: *40mm Low Velocity Ammunition*	-	13.454	21.659	3.640	-	3.640	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 40 millimeter (mm) 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 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 resulting in increased soldier survivability. FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 40mm LV HEAB, XM1166	13.454	21.659	3.640
Description: Engineering Manufacturing Development (EMD) of the 40mm LV HEAB munition. ***FY 2021 Plans:*** FY 2021 will support the remaining DET 3 build and test, Critical Design Review, Test Readiness Reviews (TRR) and hardware build for Development Test and Evaluation. ***FY 2022 Plans:*** FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3). ***FY 2021 to FY 2022 Increase/Decrease Statement:*** n/a			
Accomplishments/Planned Programs Subtotals	13.454	21.659	3.640

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E71005: *CTG, 40MM, LV HEAB, XM1166*	-	-	10.500	-	10.500	-	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) Program. Potential designs were evaluated as part of the pre-EMD activities using a Cooperative Research and Development Agreement (CRADA) with contractors. For EMD, the Government awarded 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 (DET) 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 Contractor 1	C/CPFF	Day & Zimmerman, Inc (DZI) : Middletown, IA	7.367	7.112	Oct 2019	9.540	Jan 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
LV HEAB XM1166 Contractor 2	C/CPFF	Chemring Ordnance, Inc : Perry, FL	7.176	4.064	Oct 2019	9.540	Jan 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
		Subtotal	14.543	11.176		19.080		2.000		-		2.000	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 - Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	2.314	1.490	Oct 2019	1.479	Jan 2021	0.700	Nov 2021	-		0.700	Continuing	Continuing	Continuing
LV HEAB XM1166 - Lethality Analysis	MIPR	Combat Capabilities Development Command Data & Analysis Center (DAC) : Aberdeen Proving Ground, Md	-	-		-		0.100	Nov 2021	-		0.100	0.000	0.100	-
		Subtotal	2.314	1.490		1.479		0.800		-		0.800	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total 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	0.660	-		-		-		-		-	0.000	0.660	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 Design Engineering Test (DET) 2	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	0.788	Feb 2020	-		-		-		-	0.000	0.788	-
LV HEAB XM1166 Design Engineering Test (DET) 3	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		1.100	Jan 2021	-		-		-	0.000	1.100	-
LV HEAB XM1166 Developmental Test and Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		-		0.740	Dec 2021	-		0.740	0.000	0.740	-
Soldier Touch Point 3 (STP 3)	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		-		0.100	Apr 2022	-		0.100	0.000	0.100	-
		Subtotal	0.660	0.788		1.100		0.840		-		0.840	0.000	3.388	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.517	13.454		21.659		3.640		-		3.640	Continuing	Continuing	N/A

Remarks

Notes:
Low Velocity (LV)
High Explosive Air Burst (HEAB)

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

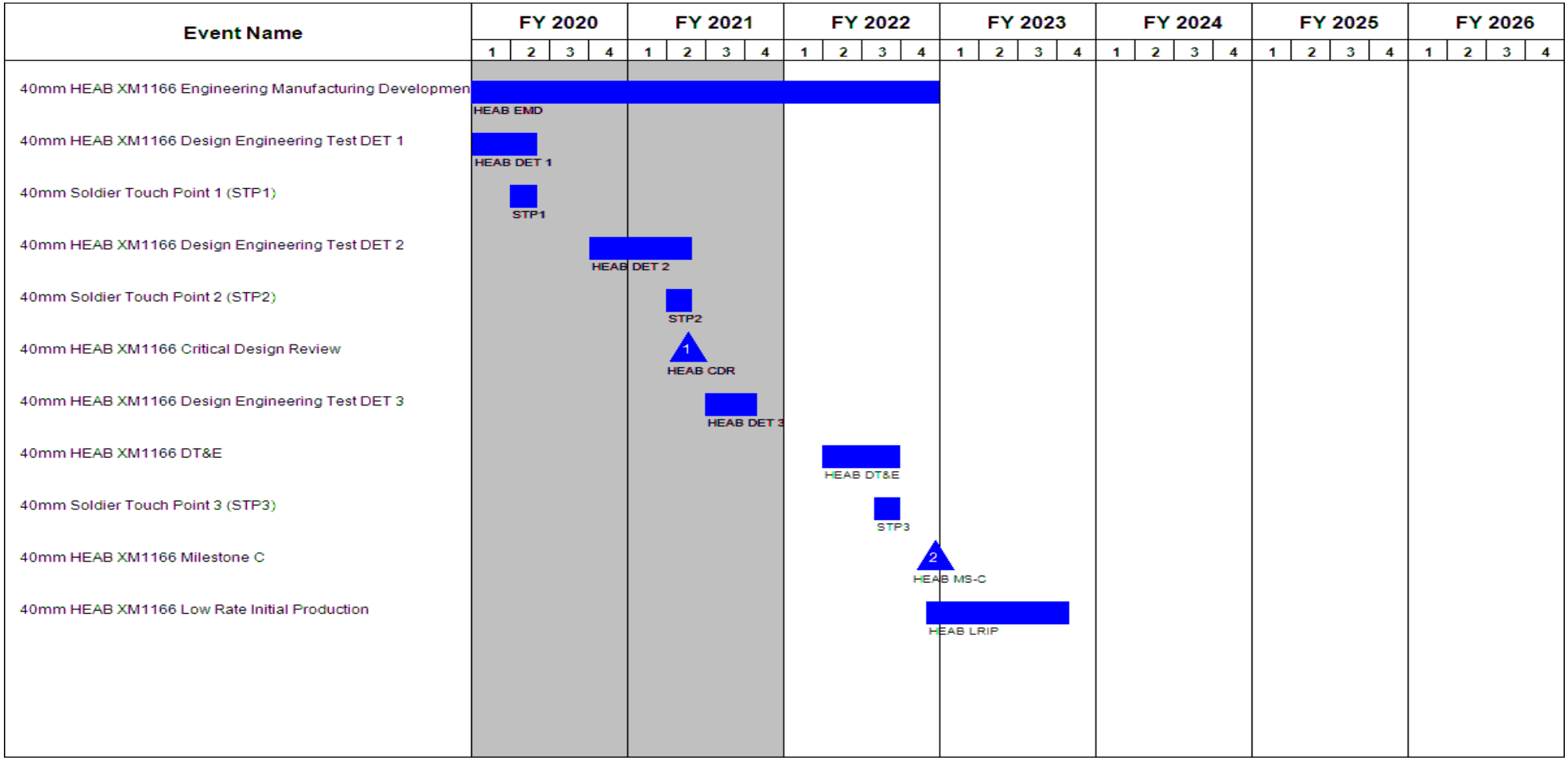


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EW1 / *40mm Low Velocity Ammunition*

Schedule Details

	Start		End	
Events	**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	1	2020	2	2020
40mm Soldier Touch Point 1 (STP1)	1	2020	2	2020
40mm HEAB XM1166 Design Engineering Test DET 2	4	2020	2	2021
40mm Soldier Touch Point 2 (STP2)	2	2021	2	2021
40mm HEAB XM1166 Critical Design Review	2	2021	2	2021
40mm HEAB XM1166 Design Engineering Test DET 3	3	2021	4	2021
40mm HEAB XM1166 DT&E	2	2022	3	2022
40mm Soldier Touch Point 3 (STP3)	3	2022	3	2022
40mm HEAB XM1166 Milestone C	4	2022	4	2022
40mm HEAB XM1166 Low Rate Initial Production	4	2022	4	2023

Note

millimeter (mm)
Low Velocity (LV)
High Explosive Air Burst (HEAB)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
FA6: *30mm Lethality*	-	26.030	19.358	8.939	-	8.939	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 30 millimeter (mm) Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes a XM1182 High Explosive Airburst with Trace (HEAB-T) cartridge for increased anti-personnel effects, XM1170 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) cartridge for anti-materiel, and ballistically matched training cartridges; XM1173 Target Practice with Trace (TP-T) cartridge and XM1172 Target Practice Discarding Sabot with Trace (TPDS-T) cartridge. 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 APFSDS-T cartridge will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging light-to-medium armored vehicles. The HEAB-T cartridge will provide the Warfighter with increased lethality against troops in the open, counter defilade, Anti-Tank Guided Missile (ATGM) teams, and troops behind urban structures. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This project is a follow-on of the earlier efforts in support of the United States Army Europe (USAREUR) Operational Needs Statement (ONS) #15-20590 Stryker Increased Lethality for the 2nd Cavalry Regiment (2CR). Fiscal Year (FY) 2022 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include Developmental Test & Evaluation (DT&E) and preparation for Milestone C decision.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 30X173mm Armor-Piercing Fin-Stabilized Discarding Sabot Trace (APFSDS-T) and Target Practice Discarding Sabot with Trace (TPDS-T) ***Description:*** Qualify 30x173mm armor piercing tactical and training cartridges for use on Stryker ICV, NGCV or other Army Future Fighting Vehicles. ***FY 2021 Plans:*** FY 2021 primary activities will include prototype fabrication and Design Engineering Tests (DET). ***FY 2022 Plans:*** FY 2022 primary activities will include Developmental Test & Evaluation (DT&E) hardware fabrication and testing and preparation for Milestone C decision. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 funding decreases due to cartridge component procurement starting in FY 2021. Remaining activities will only include hardware build and DT&E.	5.140	10.564	3.149
Title: 30x173mm HEAB-T and TP-T	20.890	8.794	5.790

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022
Description: Develop and qualify a 30x173mm airburst cartridge and trainer for use on Stryker Infantry Combat Vehicles (ICV), Next Generation Combat Vehicles (NGCV), or other Army Future Fighting Vehicles. ***FY 2021 Plans:*** FY 2021 primary activities include DET and DT&E build. ***FY 2022 Plans:*** FY 2022 primary activities will include DT&E testing and preparation for Milestone C decision. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 funding decreases due to the cartridge build completion. FY 2022 activities will only include DT&E and the preparation of Milestone C.			
Accomplishments/Planned Programs Subtotals	26.030	19.358	8.939

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E07610: *CTG, 30MM, Progrmabl Air Burst Mun, Mk310, Linked*	13.412	14.550	-	-	-	-	-	-	-	-	-
• E07306: *CTG, 30mm TP-T, MK239, Single*	8.528	5.997	0.823	-	0.823	-	-	-	-	-	-
• E07406: *CTG, 30mm Hi Expl Incendry-T(HEI-T), Mk238 Series*	5.976	8.405	-	-	-	-	-	-	-	-	-
• E09191: *CTG, 30mm TPDS-T, MK317 (SABOT Trng), Single*	9.200	9.012	-	-	-	-	-	-	-	-	-
• E09292: *CTG, 30mm APFSDS-T, MK258, Single*	21.032	14.464	-	-	-	-	-	-	-	-	-

Remarks

Items listed in Other Program Funding will be updated in FY 2023 with the corresponding XM rounds as reflected in the Mission Description.

D. Acquisition Strategy

30X173mm APFSDS-T and TPDS-T: Proposals were requested from Industry to develop a 30x173mm APFSDS-T anti-materiel tactical cartridge (XM1170) and a 30x173mm TPDS-T ballistically matched training cartridge (XM1172) that will meet Army Performance Specifications and Stryker Lethality Annex Requirements. The Government awarded two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC)

to support development, Design Engineering Tests (DET) and Developmental Test & Evaluation (DT&E) in support of Milestone C. The Government will award Federal Acquisition Regulation (FAR)-based contracts for production of each cartridge.

30x173mm HEAB-T and TP-T: In support of the approved 30mm Multi-Function Munition Capability Development Document (CDD), the 30x173mm HEAB-T cartridge (XM1182) and the ballistically matched TP-T cartridge (XM1173) will be developed to meet the requirements. The Government awarded two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC) to support development, Design Engineering Tests (DET) and Developmental Test & Evaluation (DT&E) in support of Milestone C. The Government will down-select and award a single FAR-based contract for production of the XM1182 HEAB-T cartridge, and up to two FAR based contract for the XM1173 TP-T.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
High Explosive Airburst with Trace (HEAB-T) TMRR Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	5.650	-		-		-		-		-	0.000	5.650	-
High Explosive Airburst with Trace (HEAB-T) TMRR Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	5.650	-		-		-		-		-	0.000	5.650	-
High Explosive Airburst with Trace (HEAB-T) EMD Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	-	8.868	May 2020	2.033	Jul 2021	0.560	Jan 2022	-		0.560	Continuing	Continuing	Continuing
High Explosive Airburst with Trace (HEAB-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	-	10.997	May 2020	4.066	Apr 2021	0.560	Jan 2022	-		0.560	Continuing	Continuing	Continuing
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) EMD Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	3.275	-		4.419	Jan 2021	0.280	Jan 2022	-		0.280	0.000	7.974	-
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	3.275	4.031	Jun 2020	4.420	Jan 2021	0.534	Jan 2022	-		0.534	0.000	12.260	-
Steel Cartridge Case Development Contract	C/CPFF	General Dynamics - Ordnance and Tactical Systems : Marion, IL	5.793	-		-		-		-		-	0.000	5.793	-
		Subtotal	23.643	23.896		14.938		1.934		-		1.934	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	5.066	2.134	Jun 2020	1.850	Jan 2021	2.000	Nov 2021	-		2.000	Continuing	Continuing	Continuing
		Subtotal	5.066	2.134		1.850		2.000		-		2.000	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
APFSDS-T Design Engineering Tests (DET)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		0.875	Feb 2021	-		-		-	0.000	0.875	-
APFSDS-T / TPSD-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		1.335	Mar 2022	-		1.335	Continuing	Continuing	Continuing
High Explosive Airburst with Trace (HEAB-T) TMRR Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	1.450	-		-		-		-		-	0.000	1.450	-
HEAB-T / TP-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		3.670	Jan 2022	-		3.670	0.000	3.670	-
HEAB-T Design Engineering Tests (DET)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		1.695	Feb 2021	-		-		-	0.000	1.695	-
		Subtotal	1.450	-		2.570		5.005		-		5.005	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	30.159	26.030		19.358		8.939		-		8.939	Continuing	Continuing	N/A

Remarks

Design Engineering Tests (DET)
Engineering and Manufacturing Development (EMD)
Technology Maturation & Risk Reduction (TMRR)

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

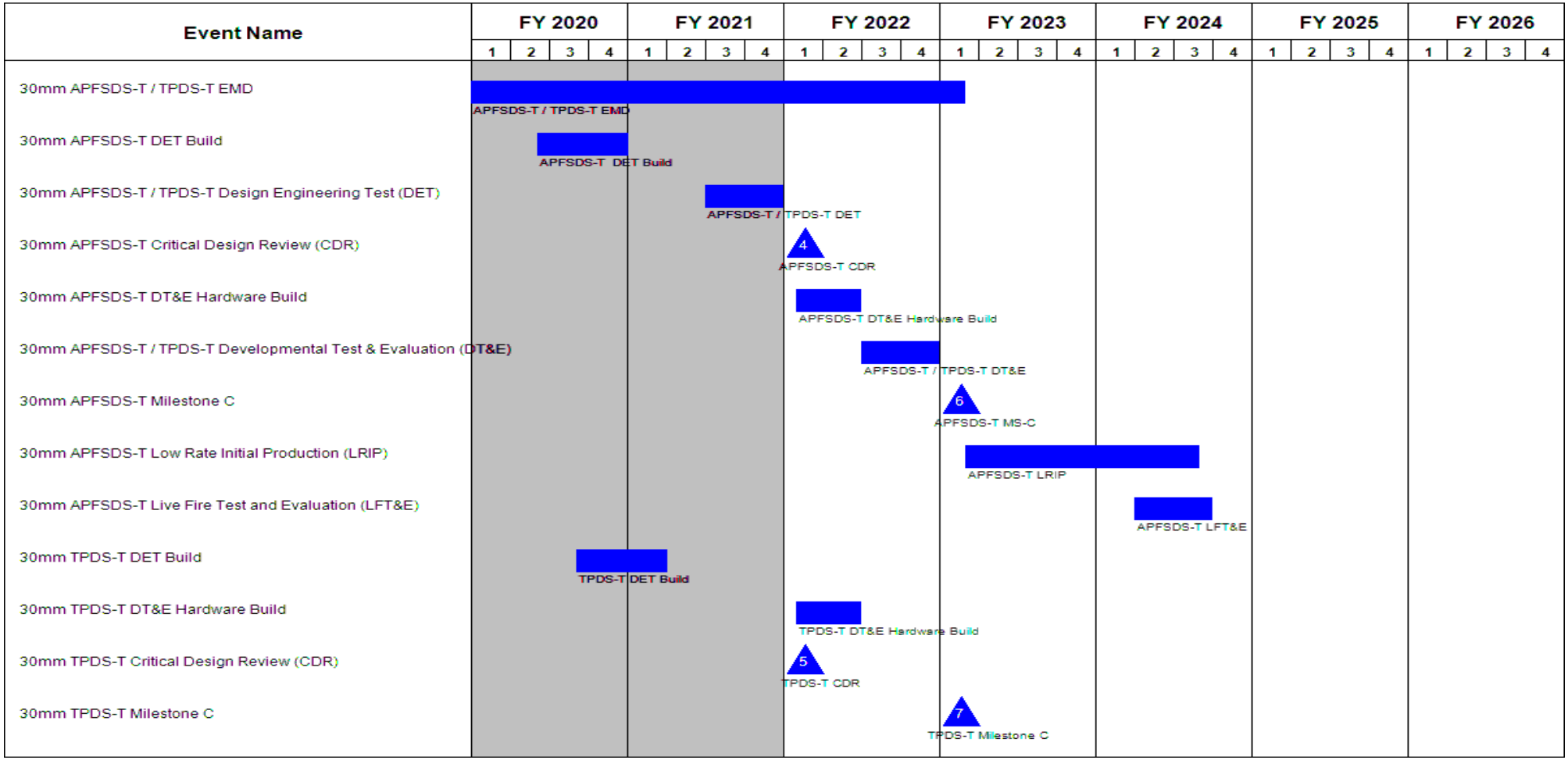


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

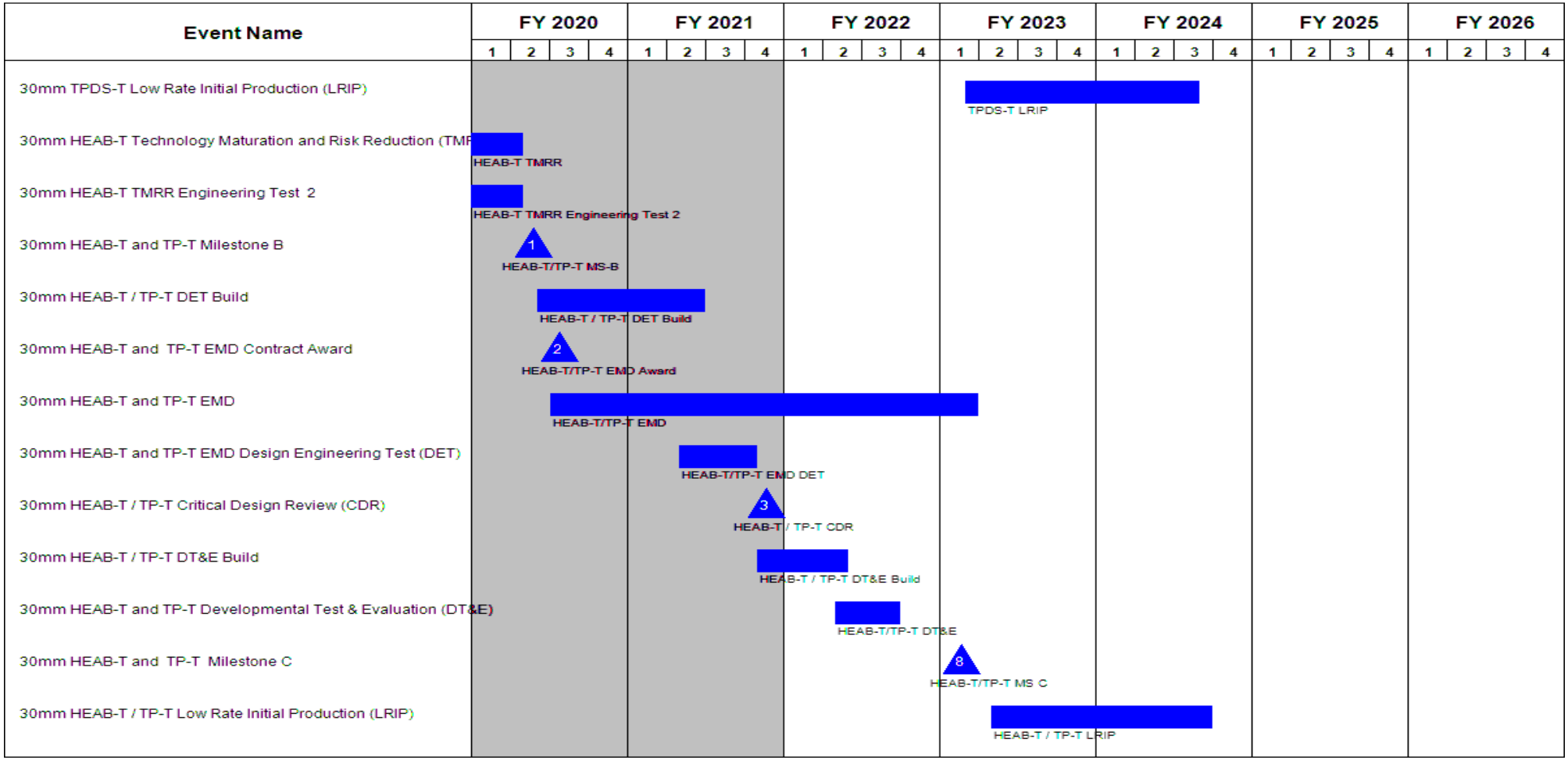


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

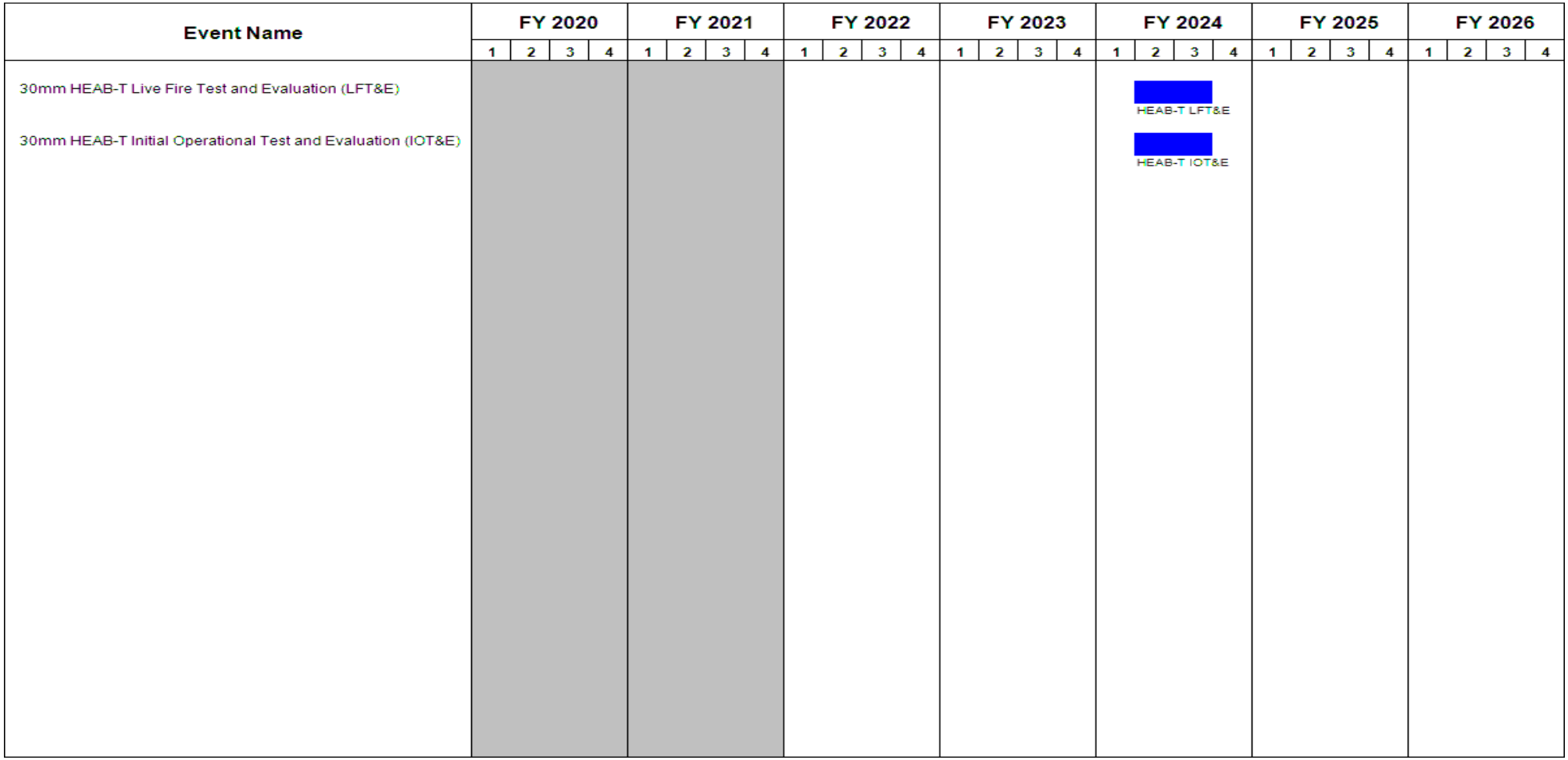


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Materiel Development Decision (MDD)	3	2019	3	2019
30mm APFSDS-T / TPDS-T EMD Contract Award	4	2019	4	2019
30mm APFSDS-T / TPDS-T EMD	4	2019	1	2023
30mm APFSDS-T DET Build	2	2020	4	2020
30mm APFSDS-T / TPDS-T Design Engineering Test (DET)	3	2021	4	2021
30mm APFSDS-T Critical Design Review (CDR)	1	2022	1	2022
30mm APFSDS-T DT&E Hardware Build	1	2022	2	2022
30mm APFSDS-T / TPDS-T Developmental Test & Evaluation (DT&E)	3	2022	4	2022
30mm APFSDS-T Milestone C	1	2023	1	2023
30mm APFSDS-T Low Rate Initial Production (LRIP)	1	2023	3	2024
30mm APFSDS-T Live Fire Test and Evaluation (LFT&E)	2	2024	3	2024
30mm TPDS-T DET Build	3	2020	1	2021
30mm TPDS-T DT&E Hardware Build	1	2022	2	2022
30mm TPDS-T Critical Design Review (CDR)	1	2022	1	2022
30mm TPDS-T Milestone C	1	2023	1	2023
30mm TPDS-T Low Rate Initial Production (LRIP)	1	2023	3	2024
30mm HEAB-T TMRR Contract Awards	1	2019	1	2019
30mm HEAB-T Technology Maturation and Risk Reduction (TMRR)	1	2019	1	2020
30mm HEAB-T TMRR Engineering Test 1	3	2019	4	2019
30mm HEAB-T TMRR Engineering Test 2	4	2019	1	2020
30mm HEAB-T and TP-T Milestone B	2	2020	2	2020
30mm HEAB-T / TP-T DET Build	2	2020	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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 and TP-T EMD Contract Award	3	2020	3	2020
30mm HEAB-T and TP-T EMD	3	2020	1	2023
30mm HEAB-T and TP-T EMD Design Engineering Test (DET)	2	2021	4	2021
30mm HEAB-T / TP-T Critical Design Review (CDR)	4	2021	4	2021
30mm HEAB-T / TP-T DT&E Build	4	2021	2	2022
30mm HEAB-T and TP-T Developmental Test & Evaluation (DT&E)	2	2022	3	2022
30mm HEAB-T and TP-T Milestone C	1	2023	1	2023
30mm HEAB-T / TP-T Low Rate Initial Production (LRIP)	2	2023	3	2024
30mm HEAB-T Live Fire Test and Evaluation (LFT&E)	2	2024	3	2024
30mm HEAB-T Initial Operational Test and Evaluation (IOT&E)	2	2024	3	2024

Note

Engineering Manufacturing Development (EMD)
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T)
Target Practice Discarding Sabot with Trace (TPDS-T)
High Explosive Airburst with Trace (HEAB-T)
Target-Practice with Trace (TP-T)
Technology Maturation and Risk Reduction (TMRR)
Urgent Materiel Release (UMR)
Programmable Airburst Munition with Trace (PABM-T)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
FJ4: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	-	26.593	89.138	-	89.138	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide United States (U.S.) ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155 millimeter (mm) Dual Purpose Improved Conventional Munitions (DPICM) with Department of Defense (DoD) policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel to support the Army's modernization priorities; C-DAEM Armor and C-DAEM DPICM Replacement. C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. Fiscal Year (FY) 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR), and engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s). C-DAEM DPICIM Replacement will destroy personnel to soft-skinned targets. On 11 September 2020, the Army approved the Israeli M999 advanced anti-personnel munition as the C-DAEM DPICM Replacement solution. FY 2022 funding will also support M999 testing and qualification activities to ensure effectiveness, suitability and survivability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: C-DAEM Armor	-	-	83.056
Description: C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. ***FY 2022 Plans:*** FY 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR) and engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s). ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase in funding in FY 2022 due to transition of C-DAEM Armor from PE 0603639A, Project FG1, Cannon-Delivered Area Effects Munitions in accordance with the completion of C-DAEM Armor competitive demonstration phase and risk reduction activities and initiation of development and qualification efforts for selected solution(s) to support UMR.			
Title: C-DAEM DPICM Replacement	-	26.593	6.082
Description: C-DAEM DPICM Replacement will destroy personnel to soft-skinned vehicles.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2021 Plans: FY 2021 funding supports the acquisition of M999 hardware and initiation of testing and qualification activities to support the Army's modernization priorities. ***FY 2022 Plans:*** FY 2022 funding will support M999 testing and qualification activities to ensure effectiveness, suitability and survivability. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease in funding due to the completion of initial M999 test and qualification activities.			
Accomplishments/Planned Programs Subtotals	-	26.593	89.138

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• FG1: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	20.564	38.466	-	-	-	-	-	-	-	-	-
• E68603: *PROJ, ARTY, 155MM C-DAEM INCREMENT 1*	-	-	-	-	-	-	-	-	-		

Remarks

Project FJ4 Cannon-Delivered Area Effects Munitions (C-DAEM) transitions from BA 4 PE 0603639A Tank and Medium Caliber Ammunition Project FG1 C-DAEM. In FY 2022, Project FJ4 is not a New Start.

A Procurement of Ammunition, Army (PAA) funding line for C-DAEM Armor, Standard Study Number (SSN), E68603, PROJ, ARTY, 155MM C-DAEM INCREMENT 1, has been established. A PAA funding line for C-DAEM DPICM Replacement, SSN E68604, PROJ, ARTY, 155MM C-DAEM INCREMENT 2, has been established.

D. Acquisition Strategy

C-DAEM will employ an evolutionary acquisition approach to efficiently transition the unique ammunition products as they become available. The Analysis of Alternatives (AoA) completed on 31 January 2018 qualified a significant enhancement of operational fires effectiveness, efficiency, and maneuver support when cannon artillery was equipped with a dedicated extended range anti-armor projectile. The U.S. Government is currently reducing risk by executing prototype testing and evaluation efforts, while utilizing the AoA results to shape the selection criteria. In FY 2021, C-DAEM Armor is using the selection criteria to sponsor competitive demonstrations for C-DAEM Armor to streamline the acquisition process. At the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD), the U.S. Government will select the most promising candidate(s) that will address medium to heavy armored targets in support of an Urgent Materiel Release (UMR) and follow on Full Materiel Release (FMR). C-DAEM Armor will use the Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) to further support the continued development and testing of the selected C-DAEM Armor candidate(s) in FY 2022 in accordance with the decisions granted at the Army Requirements Oversight

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

Council (AROC) in April 2018. C-DAEM Armor will also utilize DOTC OTAs to complete development and qualification activities, including the NavStorm-M Global Positioning System (GPS) Receiver integration efforts, in support of Milestone C for Low Rate Initial Production (LRIP) and Full Rate Production (FRP). C-DAEM DPICM Replacement is utilizing a Combating Terrorism Technical Support Office (CTTSO) task plan with Israel Ministry of Defense (IMOD) to deliver M999 hardware in support of qualification activities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager Combat Ammunition Systems (PM CAS) : Picatinny Arsenal, NJ	-	-		0.050	Jul 2021	0.450	Oct 2021	-		0.450	0.000	0.500	-
		Subtotal	-	-		0.050		0.450		-		0.450	0.000	0.500	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DOTC - Armor Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology Consortium (DOTC) : Picatinny Arsenal, NJ	-	-		-		67.000	Nov 2021	-		67.000	0.000	67.000	-
DOTC - Armor NavStorm-M GPS Receiver Integration	MIPR	DoD Ordnance Technology Consortium (DOTC) : Picatinny Arsenal, NJ	-	-		-		7.780	Nov 2021	-		7.780	0.000	7.780	-
CTTSO - DPICM Replacement Hardware	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Israel Ministry of Defense (IMOD)	-	-		16.904	Mar 2021	-		-		-	0.000	16.904	-
		Subtotal	-	-		16.904		74.780		-		74.780	0.000	91.684	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command	-	-		3.694	Nov 2020	6.748	Nov 2021	-		6.748	0.000	10.442	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ													
Fire Control Software Update	MIPR	Multiple : Various	-	-		2.469	May 2021	4.160	May 2022	-		4.160	0.000	6.629	-
		Subtotal	-	-		6.163		10.908		-		10.908	0.000	17.071	N/A

Remarks

Additional support required in FY 2022 due to the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD) activities.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Armor Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		-		1.500	Mar 2022	-		1.500	0.000	1.500	-
DPICM Replacement Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		3.476	Mar 2021	1.500	Mar 2022	-		1.500	0.000	4.976	-
		Subtotal	-	-		3.476		3.000		-		3.000	0.000	6.476	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		26.593		89.138		-		89.138	0.000	115.731	N/A

Remarks

C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. C-DAEM Dual Purpose Improved Conventional Munition (DPICM) Replacement will destroy personnel to soft-skinned vehicles. C-DAEM Armor and DPICM Replacement are being pursued in parallel to support the Army's modernization priorities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract

In FY 2022, C-DAEM Armor development activities transition from BA 4 PE 0603639A Tank and Medium Caliber Ammunition Project FG1 Cannon-Delivered Area Effects Munitions (C-DAEM).

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

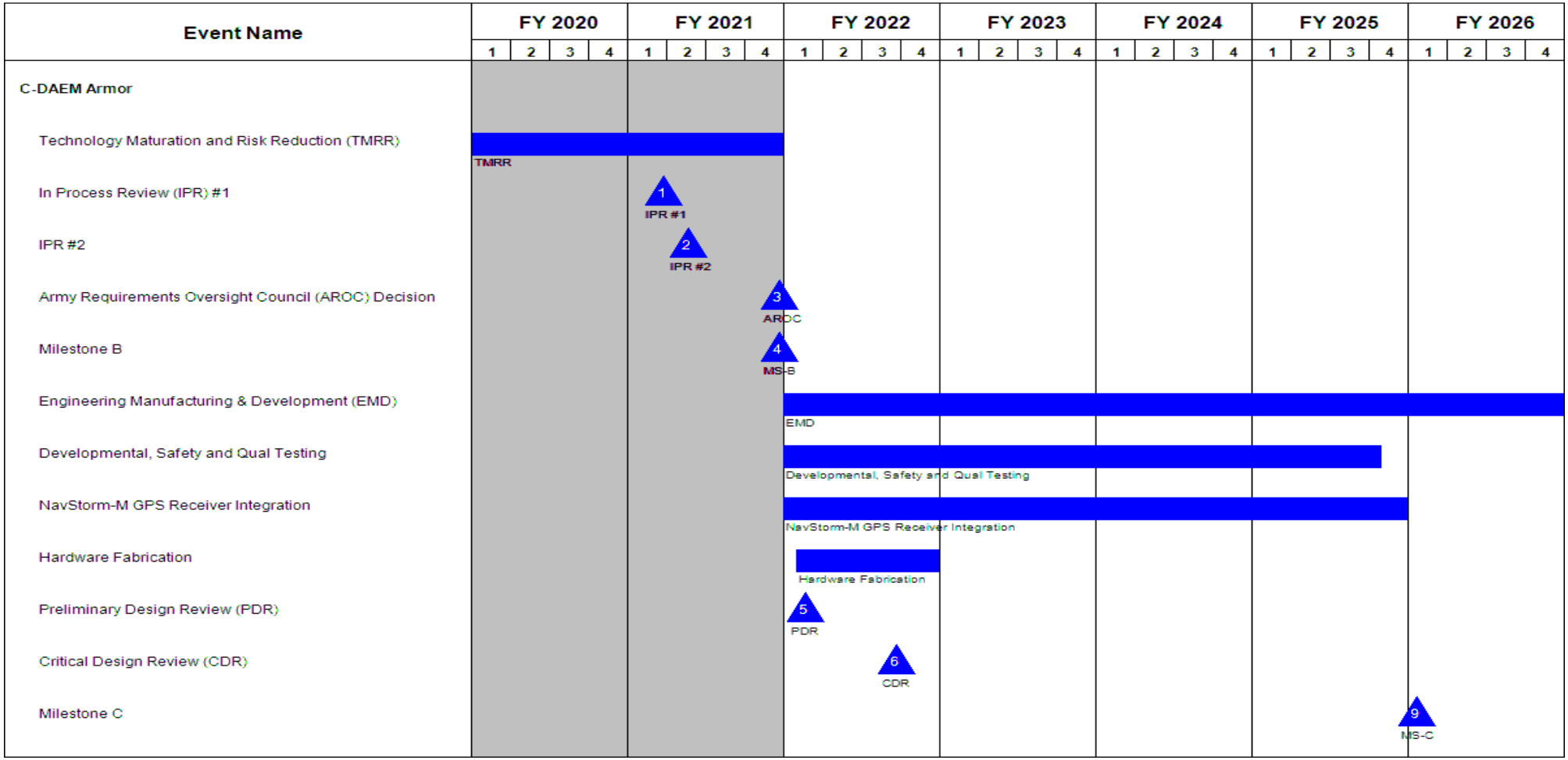
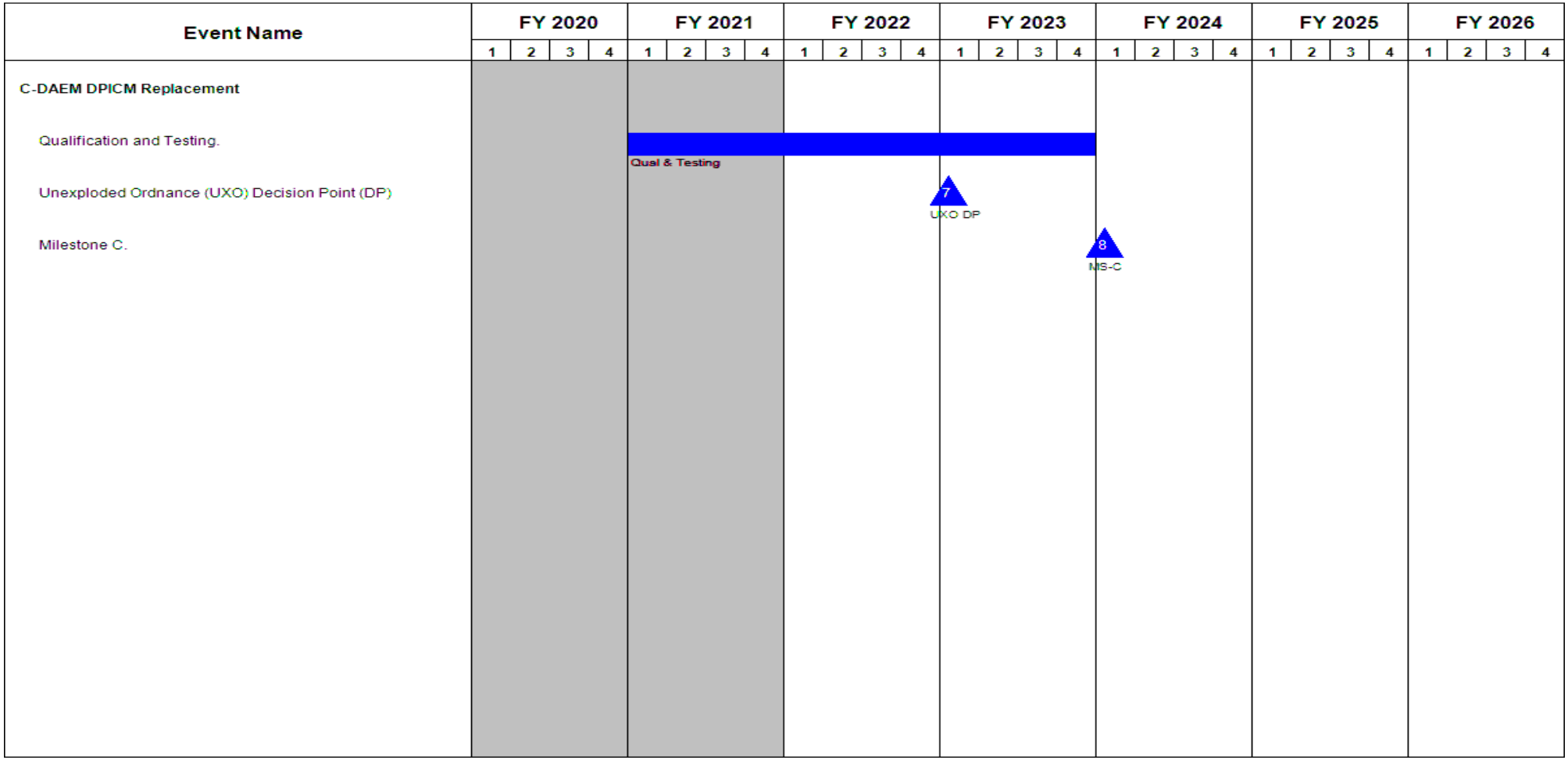


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*



Note

At the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD), the U.S. Government will select the most promising candidate(s) that will address medium to heavy armored targets in support of an Urgent Materiel Release (UMR) and follow on Full Materiel Release (FMR).

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
C-DAEM Armor	1	2022	4	2026
Technology Maturation and Risk Reduction (TMRR)	1	2020	4	2021
In Process Review (IPR) #1	1	2021	1	2021
IPR #2	2	2021	2	2021
Army Requirements Oversight Council (AROC) Decision	4	2021	4	2021
Milestone B	4	2021	4	2021
Engineering Manufacturing & Development (EMD)	1	2022	4	2026
Developmental, Safety and Qual Testing	1	2022	4	2025
NavStorm-M GPS Receiver Integration	1	2022	4	2025
Hardware Fabrication	1	2022	4	2022
Preliminary Design Review (PDR)	1	2022	1	2022
Critical Design Review (CDR)	3	2022	3	2022
Milestone C	1	2026	1	2026
C-DAEM DPICM Replacement	1	2021	4	2022
Qualification and Testing.	1	2021	4	2023
Unexploded Ordnance (UXO) Decision Point (DP)	1	2023	1	2023
Milestone C.	1	2024	1	2024

Note

C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. C-DAEM Dual Purpose Improved Conventional Munition (DPICM) Replacement will destroy personnel to soft-skinned vehicles. C-DAEM Armor and DPICM Replacement are being pursued in parallel to support the Army's modernization priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
FL4: *Small Caliber Ammo for Next Gen Squad Weapons*	-	17.432	26.483	28.372	-	28.372	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding. The objective is to develop and Full Materiel Release (FMR) the new ammunition in parallel with the NGSW rifle and automatic rifle. The NGSW ammunition is split into multiple ammunition variants, the General Purpose (GP), the Special Purpose (SP), the Reduced Range Ammunition (RRA), Tracer Ammunition, Blank Ammunition, the Close Combat Mission Capability Kit (CCMCK) training ammunition, Drill Dummy Inert (DDI) cartridge, and High Pressure Test (HPT) cartridge. Fiscal Year (FY) 2022 funding supports completing the GP rapid prototyping/development effort and starting the GP optimization effort. FY 2022 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for safety testing, and conducting safety testing. FY 2022 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, conducting a Critical Design Review (CDR), and manufacturing prototype ammunition required for safety testing. FY 2022 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, conducting a Preliminary Design Review (PDR), building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2022 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2022 also supports the start of rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluating competing CCMCK training ammunition designs/concepts, down-selecting to a CCMCK design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results. FY 2022 also initiates the refined development of the DDI and HPT cartridges. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Rapid Prototyping GP	12.987	7.983	0.500
Description: Develop, demonstrate, and qualify new ammunition for the NGSW systems.			
FY 2021 Plans: Continuing rapid prototyping/development of the GP projectile, build prototypes and deliver prototypes to the weapon system contractors for integration into the weapon system development and conduct prototype testing and engineering testing. Evaluate prototype weapon systems from three contractors, conduct system level CDR, and down-select to one weapon system.			
FY 2022 Plans: Complete GP rapid prototyping/development effort and begin GP optimization efforts.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Effort transitions to production with Urgent Materiel Release (UMR) planned in FY 2022.			
Title: Rapid Prototyping SP ***Description:*** Develop, demonstrate, and qualify new ammunition to defeat hard targets for the NGSW systems. ***FY 2021 Plans:*** Continuing rapid prototyping for the Special Purpose (SP) projectile, conduct a Critical Design Review (CDR), and conduct prototype testing and engineering testing in preparation for cartridge system integration with weapons systems from three contractors. ***FY 2022 Plans:*** Continuing rapid prototyping for the Special Purpose (SP) projectile, manufacture prototype ammunition required for safety testing, and conduct safety testing. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding request decreased due to planned FY 2022 activities.	2.895	12.500	10.700
Title: Rapid Prototyping Reduced Range Ammunition (RRA) for NGSW ***Description:*** Develop and qualify RRA for the NGSW that will satisfy the requirement to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. Two RRA variants will be developed under this effort - the NGSW RRA and the NGSW Reduced Range (RR) Tracer. ***FY 2021 Plans:*** Begin rapid prototyping effort to develop RRA for the NGSW. Develop and mature RRA projectile concepts, award prototype development contract, investigate manufacturing processes, build and evaluate concept/prototype RRA ammunition. And, conduct a PDR in preparation for cartridge integration. ***FY 2022 Plans:*** Continue rapid prototyping effort to develop RRA and RR Tracer ammunition for the NGSW, conduct a Critical Design Review (CDR), and manufacture prototype ammunition required for safety testing. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding request increased due to planned FY 2022 activities.	0.050	3.500	8.500
Title: Rapid Prototyping Tracer Ammunition for NGSW ***Description:*** Rapid prototyping effort to develop and field tracer ammunition for the NGSW systems by building and evaluating competing tracer ammunition designs/concepts then down-selecting to a final tracer design.	-	1.500	4.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2021 Plans: Will begin rapid prototyping effort to develop tracer ammunition for the NGSW. Build and evaluate competing tracer ammunition designs/concepts, down-select to a tracer ammunition design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results. ***FY 2022 Plans:*** Continue rapid prototyping effort to develop tracer ammunition for the NGSW, conduct a Preliminary Design Review (PDR), build and test tracer ammunition prototypes, and mature/refine down-selected tracer ammunition design. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding request increased due to planned FY 2022 activities.			
Title: Concept Evaluation of other NGSW Ammunition Variants ***Description:*** Concept development/evaluation of follow-on variants / ammunition for the NGSW. ***FY 2021 Plans:*** The follow-on variations of the ammunition for the various concepts will be developed and fabricated in support of engineering development, safety, prototype system testing. Complete a system Design Review and a user assessment planned in FY 2021. Follow-on NGSW ammunition types included: tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Follow-on effort requirements / ammunition variants were moved to individual lines within this form.	1.500	1.000	-
Title: Rapid Prototyping Blank Ammo ***Description:*** Rapid prototyping effort to develop and field blank ammunition for the NGSW systems by building and evaluating competing blank ammunition designs/concepts then down-selecting to a final blank design. ***FY 2022 Plans:*** Continue rapid prototyping effort to mature the Blank ammunition and perform activities to accelerate the development/maturation of Blank ammunition designs. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Planned development efforts for the blank variant.	-	-	2.000
Title: Rapid Prototyping CCMCK Training Ammo	-	-	2.122

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: Rapid prototyping effort to develop training ammunition for the NGSW systems by building and evaluating competing CCMCK training ammunition designs/concepts then down-selecting to a final design. ***FY 2022 Plans:*** Start rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluate CCMCK training ammunition designs/concepts, mature/refine selected design/designs by performing engineering tests and implementing improvements based upon test results. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Start of full CCMCK effort.			
Title: Rapid Prototyping DDI and HPT Cartridges ***Description:*** Rapid prototyping effort to develop and field DDI and HPT cartridges NGSW weapon systems. ***FY 2022 Plans:*** Begin rapid prototyping activities to mature the DDI and HPT cartridges by building and evaluating competing DDI and HPT cartridge designs/concepts, maturing/refining selected design/designs by performing engineering tests and implementing improvements based upon test results. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Start of full DDI and HPT effort.	-	-	0.550
Accomplishments/Planned Programs Subtotals	17.432	26.483	28.372

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• EC2: *Adv Armor-Piercing (ADVAP) for Small Cal Ammo*	8.572	-	-	-	-	-	-	-	-	-	-
• E06002: *NEXT GENERATION COMBAT ROUND*	-	11.988	65.056	-	65.056	-	-	-	-	-	-
• E06014: *NEXT GENERATION REDUCED RANGE ROUND*	-	-	4.807	-	4.807	-	-	-	-	-	-
• E06015: *NEXT GENERATION SQUAD WEAPON SPECIAL PURPOSE ROUND*	-	-	3.369	-	3.369	-	-	-	-	-	-

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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E60011: *NEXT GENERATION BLANK ROUND*	-	-	3.562	-	3.562	-	-	-	-	-	-

Remarks

Budget Activity (BA) 4 (Program Element (PE) 0603639A Tank and Medium Caliber Ammunition Project EC2 RDTE/Adv Armor-Piercing (ADVAP) for Small Cal Ammo: This funding line starts the rapid development/rapid prototyping work on ammunition for the NGSW systems.

Procurement of Ammunition, Army E06002, E06014, E06015, and E60011: These funding lines supports the procurement of ammunition for the NGSW.

D. Acquisition Strategy

The NGSW ammunition program will utilize the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding to develop ammunition concepts/designs for the GP variant and the 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 FMR in FY 2024. Development effort for the Reduced Range and Tracer ammunition will follow a similar strategy beginning in FY 2021. Follow-on development efforts for additional NGSW ammunition variants including blank, CCMCK ammunition, DDI cartridge, and HPT cartridge will start in FY 2022.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Follow-on Ammo Prototypes/Concepts	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.200	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Follow-on Ammo Prototypes/Concepts Contracts	Option/ CPFF	Various : Various	-	1.500	May 2020	-		-		-		-	Continuing	Continuing	Continuing
Projectile and Ammo Development Contract General Purpose	Option/ CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	-	1.740	Sep 2020	2.400	Apr 2021	-		-		-	Continuing	Continuing	Continuing
Projectile and Ammo Development Contract General Purpose	Option/ CPFF	Northrop Grumman Innovation Systems (NGIS) LCAAP : Independence, Missouri	-	7.189	Nov 2019	-		-		-		-	0.000	7.189	-
Projectile and Ammo Development Contract Special Purpose	Option/ CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	-	2.033	Sep 2020	5.400	May 2021	5.000	Dec 2021	-		5.000	Continuing	Continuing	Continuing
Ammo Development Support Special Purpose	Option/ CPFF	Concurrent Technologies Corporation (CTC) : Johnstown, Pennsylvania	-	0.862	Sep 2020	-		-		-		-	0.000	0.862	-
Tracer Ammunition Prototype Contract	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, New Jersey	-	-		0.750	May 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype Contract 1	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, New Jersey	-	-		1.000	Feb 2021	2.200	Jan 2022	-		2.200	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Reduced Range Ammunition Prototype Contract 2	Option/ FFP	OLIN Winchester Corporation : Independence, Missouri	-	-		1.000	Apr 2021	2.200	Jan 2022	-		2.200	Continuing	Continuing	Continuing
General Purpose Optimization	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.500	Nov 2021	-		0.500	Continuing	Continuing	Continuing
Blank Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
CCMCK Training Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
DDI and HPT Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		0.400	Feb 2022	-		0.400	Continuing	Continuing	Continuing
		Subtotal	-	13.324		10.750		13.300		-		13.300	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Projectile Development and Support General Purpose	MIPR	Army Research Lab : Aberdeen, Maryland	-	1.153	Oct 2019	-		-		-		-	Continuing	Continuing	Continuing
Tracer Ammunition Development and Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.350	May 2021	1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype and Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	0.050	Jul 2020	1.000	Dec 2020	1.700	Nov 2021	-		1.700	Continuing	Continuing	Continuing
Projectile Development and Support General Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	2.080	Oct 2019	2.083	Feb 2021	-		-		-	0.000	4.163	-

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Projectile Development and Support Special Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		5.150	Feb 2021	2.500	Nov 2021	-		2.500	Continuing	Continuing	Continuing
Blank Ammo Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.650	Nov 2021	-		0.650	Continuing	Continuing	Continuing
Blank Ammo Development and Support ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.300	Nov 2021	-		0.300	Continuing	Continuing	Continuing
CCMCK Training Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.647	Nov 2021	-		0.647	Continuing	Continuing	Continuing
CCMCK Training Ammo Development and Support ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.200	Nov 2021	-		0.200	Continuing	Continuing	Continuing
DDI and HPT Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.150	Nov 2021	-		0.150	Continuing	Continuing	Continuing
		Subtotal	-	3.283		8.583		7.147		-		7.147	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
U.S. Army Aberdeen Test Center (ATC) General Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.900	May 2021	-		-		-	Continuing	Continuing	Continuing
U.S. Army Aberdeen Test Center (ATC) Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.500	May 2021	-		-		-	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing General Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	0.800	Oct 2019	1.300	Nov 2020	-		-		-	0.000	2.100	-

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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army Research Lab (ARL) Testing Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		1.250	Nov 2020	1.100	Dec 2021	-		1.100	Continuing	Continuing	Continuing
Tracer Ammunition Engineering Tests	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.400	May 2021	0.300	Dec 2021	-		0.300	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype Testing	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		0.500	Feb 2021	1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Engineering Tests General Purpose	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	0.025	Oct 2019	-		-		-		-	0.000	0.025	-
Engineering Tests General Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		1.300	Feb 2021	-		-		-	0.000	1.300	-
Engineering Tests Special Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		1.000	Feb 2021	1.000	Nov 2021	-		1.000	Continuing	Continuing	Continuing
Safety Tests Special Purpose	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Independent Tests Special Purpose	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing
Independent Tests Reduced Range	MIPR	Joint Munitions Command/ Ballistics Services Organization :	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing

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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Independence, Missouri													
Army Research Lab (ARL) Testing Reduced Range	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		-		1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Independent Tests Tracer	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing Tracer	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		-		1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Engineering Tests Tracer	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		-		0.900	Jan 2022	-		0.900	Continuing	Continuing	Continuing
Blank Ammo Engineering Tests	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.050	Apr 2022	-		0.050	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests BSO	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.075	Apr 2022	-		0.075	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.200	Dec 2021	-		0.200	Continuing	Continuing	Continuing
		Subtotal	-	0.825		7.150		7.925		-		7.925	Continuing	Continuing	N/A

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	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	17.432		26.483		28.372		-		28.372	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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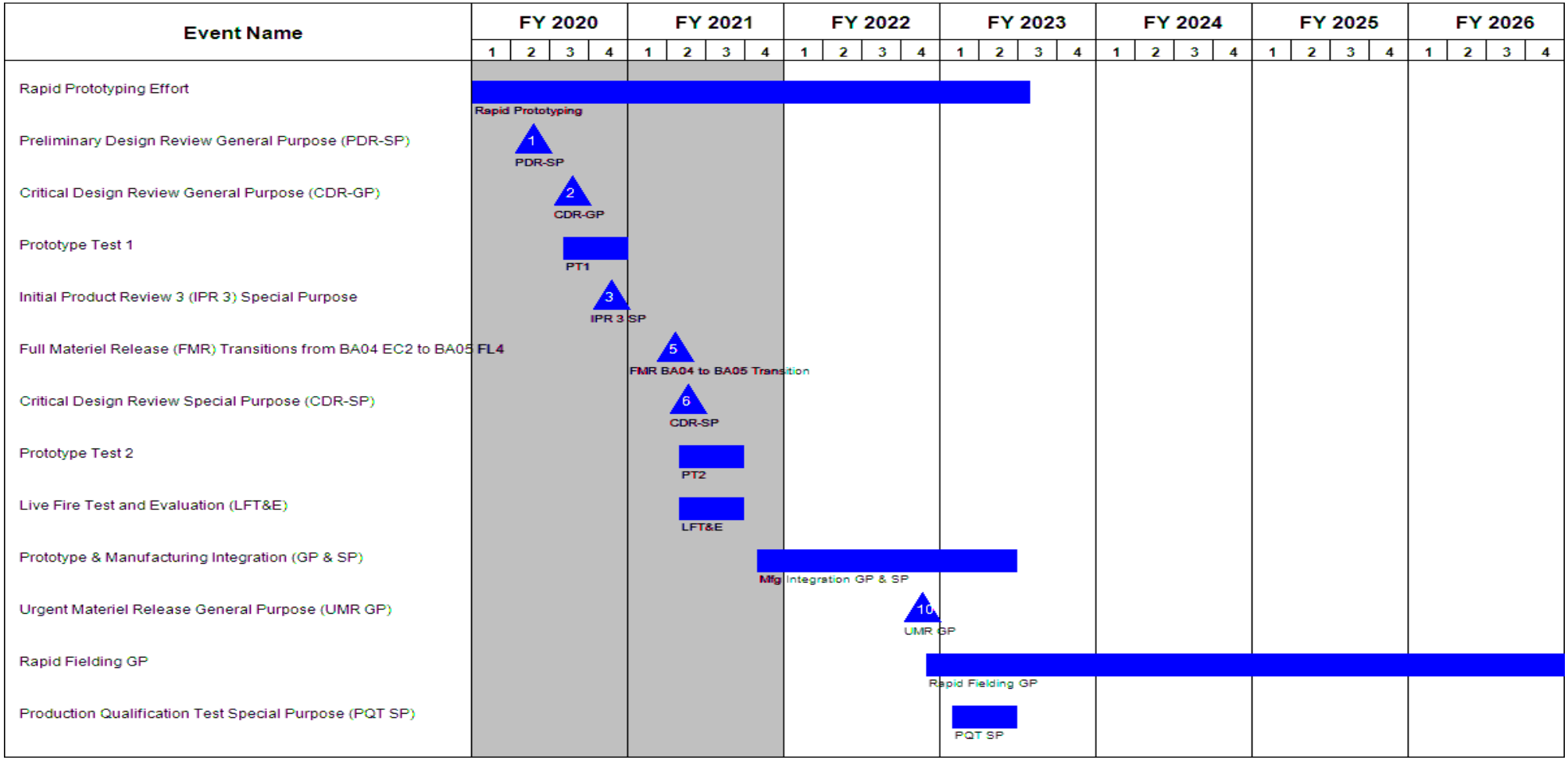

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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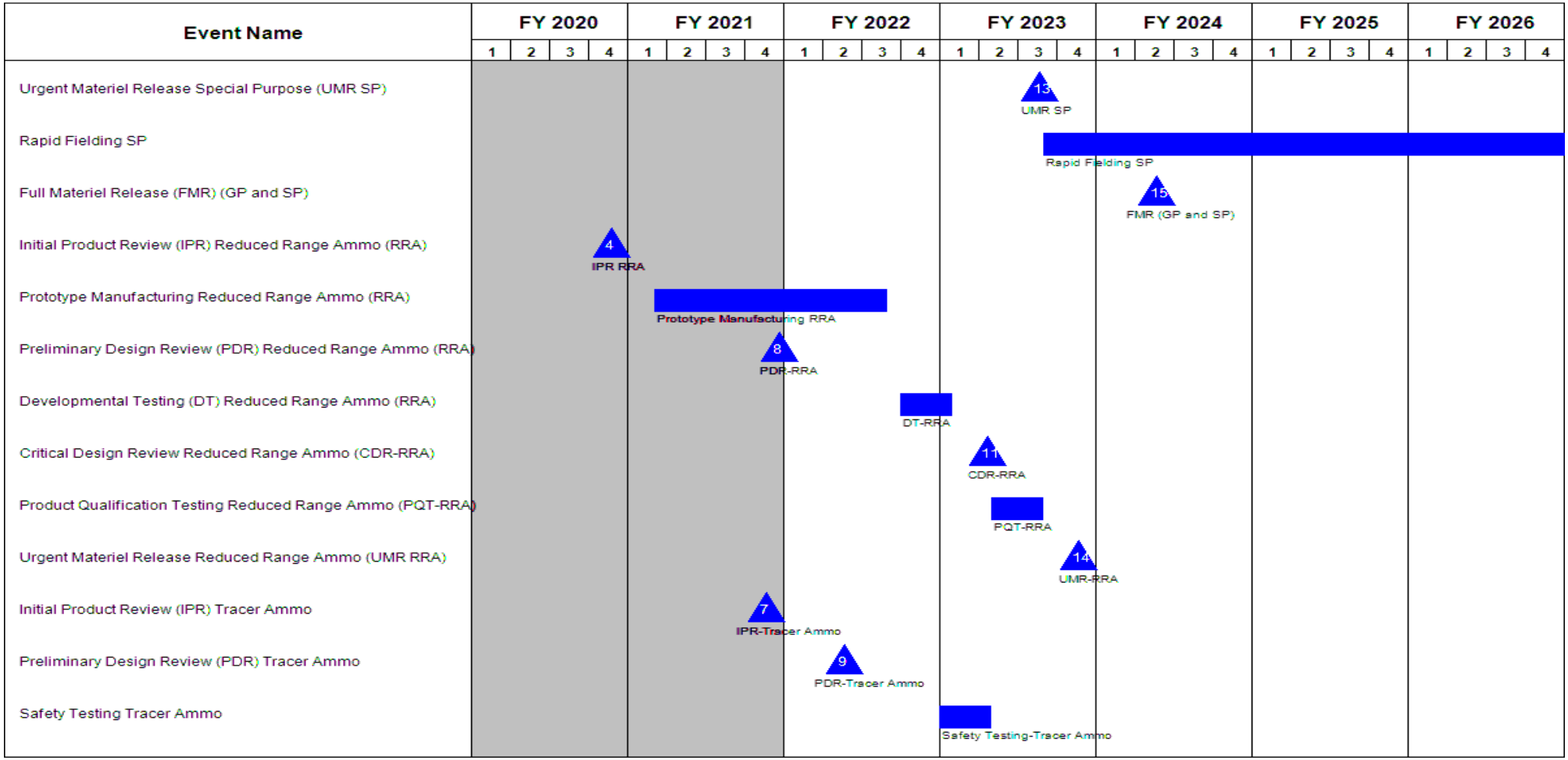

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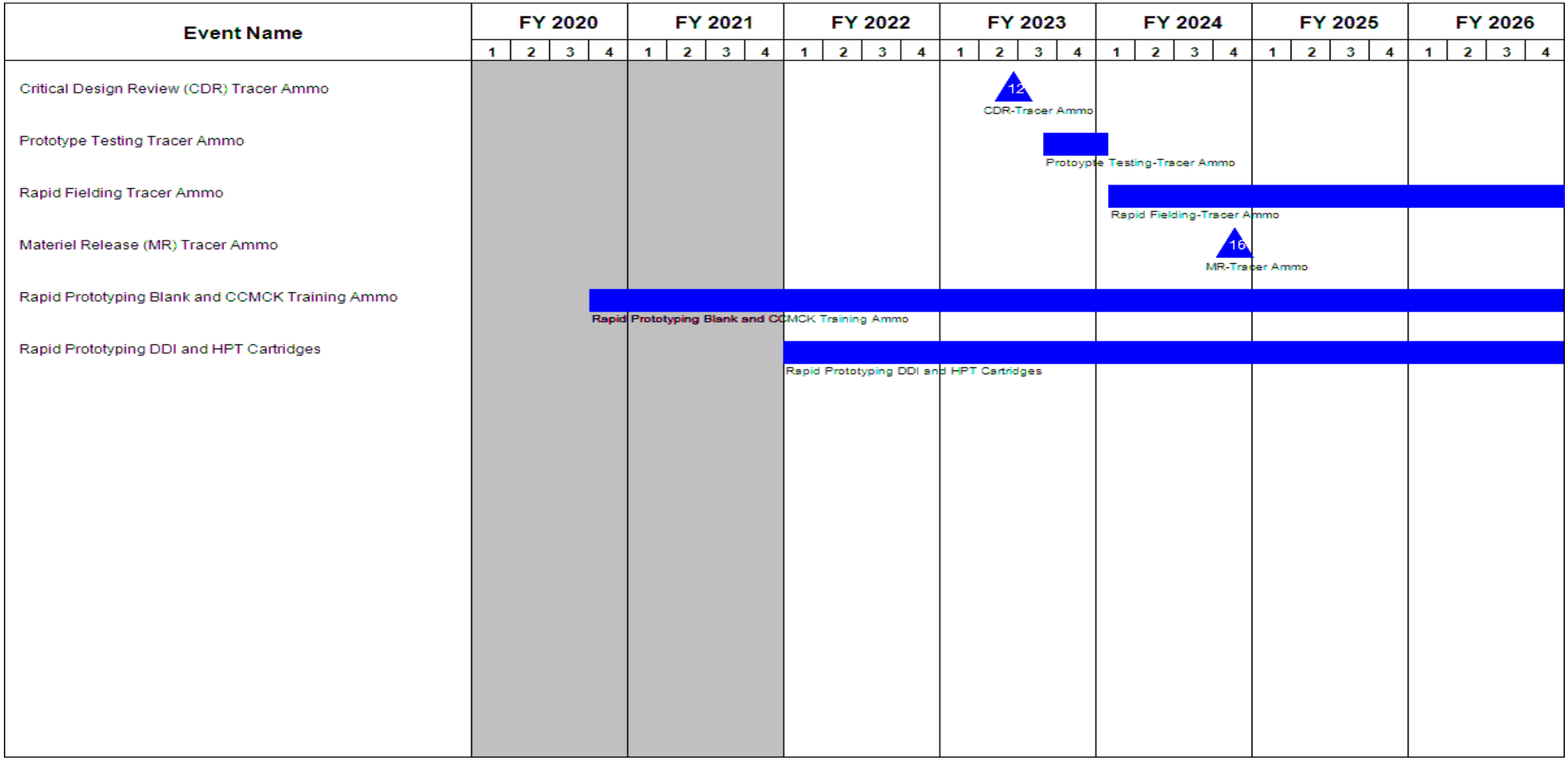

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Rapid Prototyping Effort	1	2019	3	2023
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
Live Fire Test and Evaluation (LFT&E)	2	2021	3	2021
Prototype & Manufacturing Integration (GP & SP)	4	2021	2	2023
Urgent Materiel Release General Purpose (UMR GP)	4	2022	4	2022
Rapid Fielding GP	4	2022	4	2027
Production Qualification Test Special Purpose (PQT SP)	1	2023	2	2023
Urgent Materiel Release Special Purpose (UMR SP)	3	2023	3	2023
Rapid Fielding SP	3	2023	4	2027
Full Materiel Release (FMR) (GP and SP)	2	2024	2	2024
Initial Product Review (IPR) Reduced Range Ammo (RRA)	4	2020	4	2020
Prototype Manufacturing Reduced Range Ammo (RRA)	1	2021	3	2022
Preliminary Design Review (PDR) Reduced Range Ammo (RRA)	4	2021	4	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Developmental Testing (DT) Reduced Range Ammo (RRA)	4	2022	1	2023
Critical Design Review Reduced Range Ammo (CDR-RRA)	2	2023	2	2023
Product Qualification Testing Reduced Range Ammo (PQT-RRA)	2	2023	3	2023
Urgent Materiel Release Reduced Range Ammo (UMR RRA)	4	2023	4	2023
Initial Product Review (IPR) Tracer Ammo	4	2021	4	2021
Preliminary Design Review (PDR) Tracer Ammo	2	2022	2	2022
Safety Testing Tracer Ammo	1	2023	2	2023
Critical Design Review (CDR) Tracer Ammo	2	2023	2	2023
Prototype Testing Tracer Ammo	3	2023	1	2024
Rapid Fielding Tracer Ammo	1	2024	4	2027
Materiel Release (MR) Tracer Ammo	4	2024	4	2024
Rapid Prototyping Blank and CCMCK Training Ammo	4	2020	4	2026
Rapid Prototyping DDI and HPT Cartridges	1	2022	4	2026

Note

Special Purpose (SP)
General Purpose (GP)
Close Combat Mission Capability Kit (CCMCK)
Drill Dummy Inert (DDI)
High Pressure Test (HPT)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
S36: *Precision Guidance Kit*	-	29.245	32.147	35.537	-	35.537	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development effort will qualify state of the art technologies for a course correcting fuze that provides precision accuracy at extended ranges for current and future 155 millimeter (mm) 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. LR-PGK will support projectile operation in Global Positioning System (GPS) degraded environments and compatibility with Army Modernization objectives under the Long Range Precision Fires Cross Functional Team's (LRPF CFT) new long range cannon, Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). The ERCA and its new long range projectiles require the LR-PGK to meet lethality requirements. Fiscal Year (FY) 2022 funding supports the fabrication of LR-PGK qualification test hardware and completion of guided flight testing with the XM1113ER projectile, XM655E1 Supercharge propellant and the ERCA weapon platform and accomplishes a system Critical Design Review (CDR) in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Long Range-Precision Guidance Kit (LR-PGK) Development	29.245	32.147	35.537
Description: The LR-PGK development effort will qualify state of the art technologies for operation in GPS degraded environments as well as ensure compatibility with the Extended Range Cannon Artillery (ERCA) weapon and projectiles to meet Army Modernization objectives under the Long Range Precision Fires Cross Functional Team (LRPF CFT). ***FY 2021 Plans:*** EMD activities including prototype development, build and test activities as well as tactical guided flight testing in the threat environment. ***FY 2022 Plans:*** EMD activities including prototype testing, tactical guided flight testing in the threat environment, and fabrication of qualification test hardware. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 increase to support Army modernization requirements to achieve lethality at 70 kilometers (km) with precision accuracy by FY 2023. Additional Development/Operational testing costs are required to qualify the capability within the ERCA system of systems.			
Accomplishments/Planned Programs Subtotals	29.245	32.147	35.537

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• E99251: *LONG-RANGE PRECISION GUIDANCE KIT (LR-PGK)*	-	-	24.677	-	24.677	-	-	-	-	-	-

Remarks

A Procurement of Ammunition, Army (PAA) funding for Long Range-Precision Guidance Kit (LR-PGK), Standard Study Number (SSN) E99251, was established for this effort to transition to deliver Safety Release quantities for First Unit Issued (FUI) in support of the Extended Range Cannon Artillery (ERCA) Increased Range Operational Assessment as well as future Urgent Material Release (UMR) and Full Material Release (FMR) quantities.

D. Acquisition Strategy

Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development efforts are focused on addressing performance in Global Positioning System (GPS) degraded environments as well as ensuring compatibility with the Army's new long range 155mm cannon and projectiles, which are scheduled to be fielded in the same timeframe as LR-PGK. The initial contracting strategy included 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 2018 through FY 2019. Down-select to one system contractor, BAE Systems, occurred in March 2020 for continuation through Engineering Manufacturing Development (EMD) and qualification with an FY 2022 award for Safety Release quantities for First Unit Issued (FUI) of Extended Range Cannon Artillery (ERCA) Increased Range Operational Assessment. Subsequent Urgent Materiel Release (UMR) deliveries will occur from 2023 through 2024. Qualification efforts will take place in 2023 through 2025 to support Milestone C. The Program will transition to a Federal Acquisition Regulation (FAR) based production contract after Milestone C for Low Rate Initial Production (LRIP) in FY 2025 and Full Rate Production (FRP) in FY 2026.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total 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	13.995	0.022	Dec 2019	0.030	Oct 2020	0.100	Oct 2021	-		0.100	0.000	14.147	14.067
		Subtotal	13.995	0.022		0.030		0.100		-		0.100	0.000	14.147	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DOTC - LR-PGK Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology (DOTC) - BAE Systems : Minneapolis, MN	-	22.329	Mar 2020	19.955	Mar 2021	29.000	Nov 2021	-		29.000	0.000	71.284	33.046
DOTC - LR-PGK GPS System Maturation - L3 IEC	MIPR	DOD Ordnance Consortium (DOTC) - L3 - IEC : Various	13.667	3.745	Apr 2020	6.342	Dec 2020	-		-		-	0.000	23.754	10.551
		Subtotal	13.667	26.074		26.297		29.000		-		29.000	0.000	95.038	N/A

Remarks

FY 2022 increase to support Army modernization requirements to achieve lethality at 70km with precision by FY 2023.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	38.548	3.009	Nov 2019	4.470	Dec 2020	4.037	Oct 2021	-		4.037	0.000	50.064	41.412

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			38.548	3.009		4.470		4.037		-		4.037	0.000	50.064	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total 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	2.178	0.140	Nov 2020	-		-		-		-	0.000	2.318	2.896
System Development Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	10.442	-		1.350	Mar 2021	2.400	Mar 2022	-		2.400	0.000	14.192	10.442
Subtotal			12.620	0.140		1.350		2.400		-		2.400	0.000	16.510	N/A

Remarks

FY 2022 increase due to additional test activities to support Army modernization requirements to achieve lethality at 70km with precision by FY 2023.

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	78.830	29.245		32.147		35.537		-		35.537	0.000	175.759	N/A

Remarks

Defense Ordnance Technology Consortium (DOTC)
Long Range-Precision Guidance Kit (LR-PGK)
Engineering and Manufacturing Development (EMD)
Army Test and Evaluation Command (ATEC)

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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*

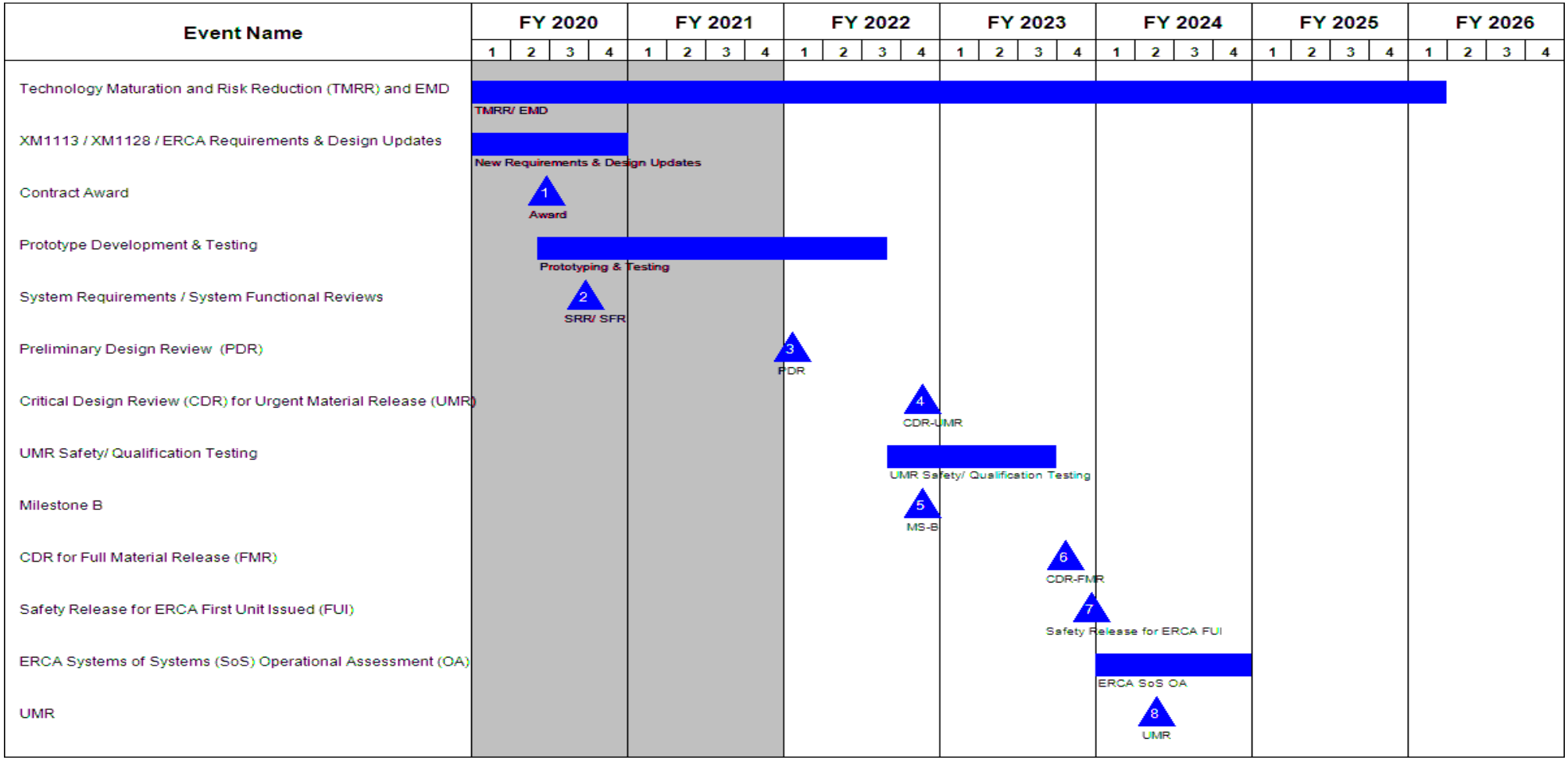
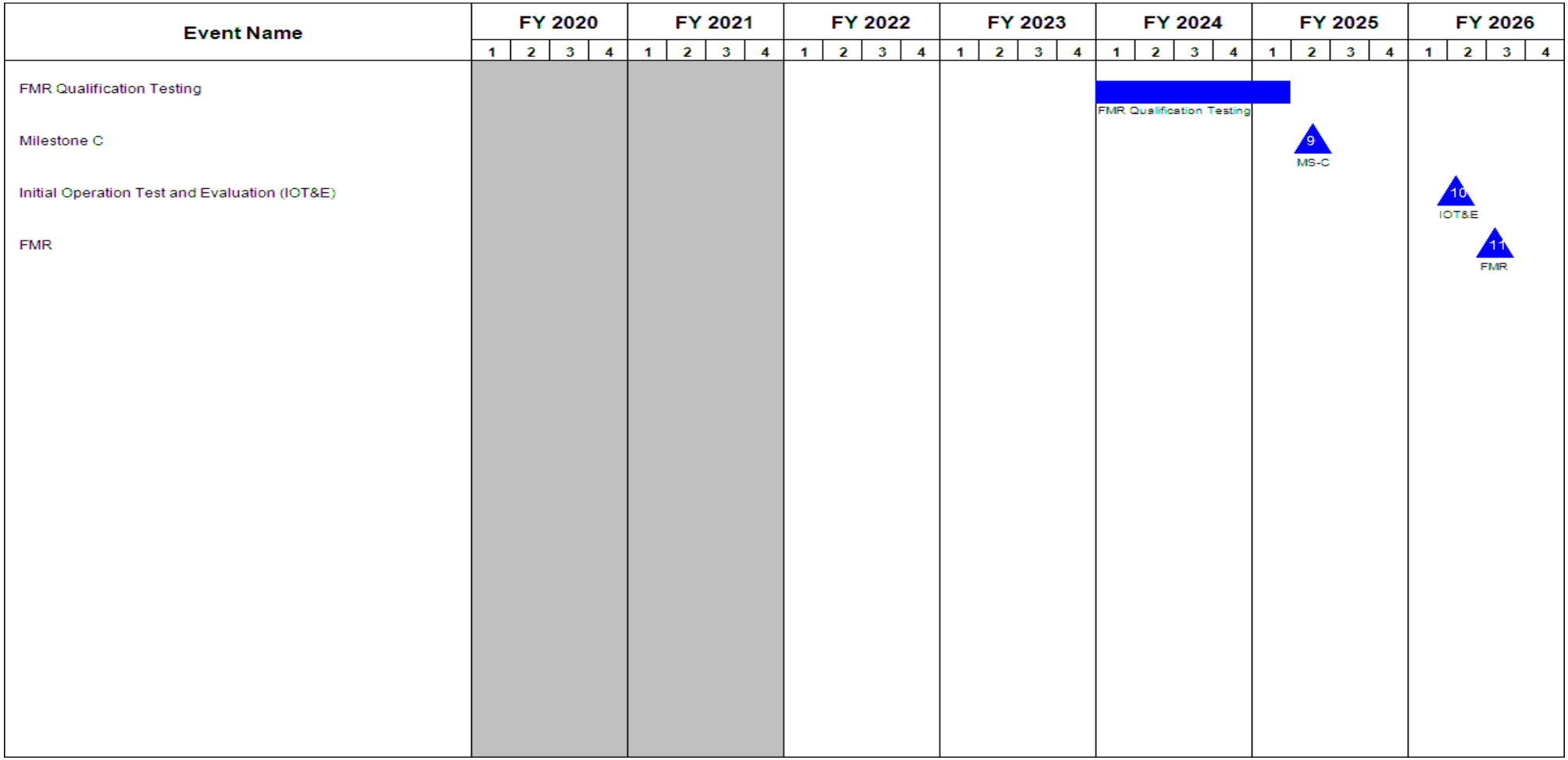


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** S36 / *Precision Guidance Kit*



Note

LR-PGK is pursuing a Safety Release to support ERCA IR System of Systems Operational Assessment. Follow-on Urgent Material Release (UMR) and Full Material Release (FMR) of LR-PGK will be qualified for future fielding. Milestone C and IOT&E scheduled for FY 2026 due to additional testing required for FMR qualification.

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Technology Maturation and Risk Reduction (TMRR) and EMD	1	2019	1	2026
XM1113 / XM1128 / ERCA Requirements & Design Updates	1	2019	4	2020
Contract Award	2	2020	2	2020
Prototype Development & Testing	2	2020	3	2022
System Requirements / System Functional Reviews	3	2020	3	2020
Preliminary Design Review (PDR)	1	2022	1	2022
Critical Design Review (CDR) for Urgent Material Release (UMR)	4	2022	4	2022
UMR Safety/ Qualification Testing	3	2022	3	2023
Milestone B	4	2022	4	2022
CDR for Full Material Release (FMR)	4	2023	4	2023
Safety Release for ERCA First Unit Issued (FUI)	4	2023	4	2023
ERCA Systems of Systems (SoS) Operational Assessment (OA)	1	2024	4	2024
UMR	2	2024	2	2024
FMR Qualification Testing	1	2024	1	2025
Milestone C	2	2025	2	2025
Initial Operation Test and Evaluation (IOT&E)	2	2026	2	2026
FMR	3	2026	3	2026

Note

Engineering and Manufacturing Development (EMD)

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) XT2 / *40mm Door Breach*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
XT2: *40mm Door Breach*	-	-	2.912	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project XT2, 40mm Door Breach has no Fiscal Year (FY) 2022 funding request and transitioned to procurement as a result of completing all EMD activities in FY 2021.

A. Mission Description and Budget Item Justification

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 DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. In FY 2022 there is no funding request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: 40mm LV DB, XM1167	-	2.912	-
Description: Engineering and Manufacturing Development (EMD) Activities.			
FY 2021 Plans: FY 2021 activities include DT&E efforts.			
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2022 decrease in funding is the result of completing all EMD activities.			
Accomplishments/Planned Programs Subtotals	-	2.912	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The DB cartridge development consists of characterization testing of multiple designs provided by industry which will be used to further inform a future down-select to a single design that will be taken through DT&E. Following DT&E, the program will proceed to Milestone C. After Milestone C, the program will enter into Low Rate Initial

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** XT2 / *40mm Door Breach*

Production (LRIP) and conduct Final Hazard Classification (FHC) testing. The program will use the results of DT&E, LRIP and FHC testing to achieve Type Classification and Full Materiel Release in FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) XT2 / *40mm Door Breach*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Low Velocity (LV) Door Breach XM1167 Test Materials	C/CPFF	TBS : TBS	-	-		0.830	May 2021	-		-		-	0.000	0.830	-
		Subtotal	-	-		0.830		-		-		-	0.000	0.830	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV Door Breach XM1167 - Combat Capabilities Development Command - Armaments Center (CCDC-AC)	MIPR	Picatinny Arsenal : NJ	-	-		0.497	May 2021	-		-		-	0.000	0.497	-
		Subtotal	-	-		0.497		-		-		-	0.000	0.497	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV Door Breach XM1167 Developmental Test & Evaluation	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		1.585	May 2021	-		-		-	0.000	1.585	-
		Subtotal	-	-		1.585		-		-		-	0.000	1.585	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		2.912		-		-		-	0.000	2.912	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** XT2 / *40mm Door Breach*

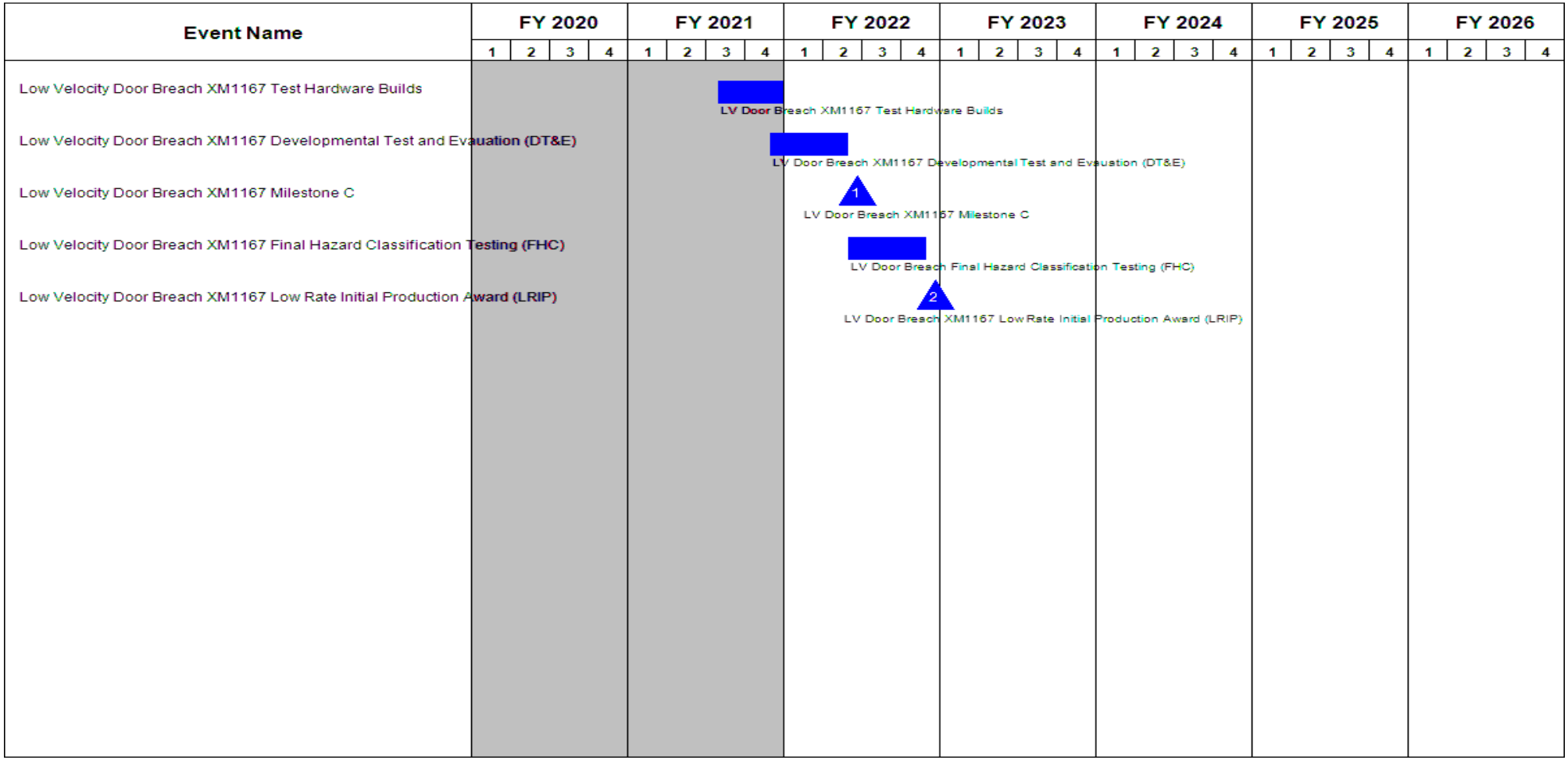


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** XT2 / *40mm Door Breach*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Low Velocity Door Breach XM1167 Test Hardware Builds	3	2021	4	2021
Low Velocity Door Breach XM1167 Developmental Test and Evauation (DT&E)	4	2021	2	2022
Low Velocity Door Breach XM1167 Milestone C	2	2022	2	2022
Low Velocity Door Breach XM1167 Final Hazard Classification Testing (FHC)	2	2022	4	2022
Low Velocity Door Breach XM1167 Low Rate Initial Production Award (LRIP)	4	2022	4	2022