Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army											Date: February 2020	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602624A *I Weapons and Munitions Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	-	379.833	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	379.833
H18: *Weapons & Munitions Technologies*	-	15.291	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.291
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*	-	343.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	343.000
H28: *Warheads/Energetics Technologies*	-	21.542	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.542

Note

In Fiscal Year (FY) 2020, this Program Element (PE) is realigned with continuity of effort to the following PEs:
* PE 0602141A Lethality Technology
* PE 0602143A Soldier Lethality Technology
* PE 0602145A Next Generation Combat Vehicle Technology
* PE 0602147A Long Range Precision Fires Technology
* PE 0602148A Future Vertical Lift Technology

A. Mission Description and Budget Item Justification

This PE investigates, designs and evaluates enabling technologies to develop lethal weapons and munitions with increased performance and the potential for lower weight, reduced size, and improved affordability. Project H18 focuses on weapons and munitions development. Project H19 researches technologies to maintain and enhance weapons lethality. Project H28 evaluates munition components such as fuzes, power, warheads with tailorable effects, and munition energetic materials.

Work in this PE is related to, and fully coordinated with, PE 0602303A (Missile Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602782A (Command, Control, Communications Technology), and PE 0603004A (Weapons and Munitions Advanced Technology). Beginning in FY20, work in this PE is related to, and fully coordinated with PE 0602147A (Long Range Precision Fires Technology), PE 0602145 (Next Generation Combat Vehicle Technology),PE 0602148 (Future Vertical Lift Technology), PE 0602143A (Soldier Lethality Technology), PE0602141A (Lethality Technology), and PE0602146A (Network C3I Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

The work in this PE is performed by the United States Army Futures Command (AFC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602624A *I Weapons and Munitions Technology*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	383.410	0.000	0.000	-	0.000
Current President's Budget	379.833	0.000	0.000	-	0.000
Total Adjustments	-3.577	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.525	-			
• SBIR/STTR Transfer	-1.052	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*		
Congressional Add: *Program Increase*	25.000	-
Congressional Add: *Extended Range Cannon Artillery*	20.000	-
Congressional Add: *Sensor Fuzed Munition*	20.000	-
Congressional Add: *Laser Weapons Accuracy*	23.000	-
Congressional Add: *Defense Against Small UAS*	30.000	-
Congressional Add: *120 mm Cannon Fired Guided Missile*	50.000	-
Congressional Add: *Weapons Effectiveness in Urban Engagement*	15.000	-
Congressional Add: *Armament Systems Integration*	20.000	-
Congressional Add: *Armament Systems Concepting*	20.000	-
Congressional Add: *Adv Processing of Insensitive Energ Mats*	20.000	-
Congressional Add: *Hybrid Projectile Tech*	10.000	-
Congressional Add: *Composite Barrel Tech*	10.000	-
Congressional Add: *Enhanced Extended Range Artillery System*	65.914	-
Congressional Add: *Novel Printed Armaments Components*	13.000	-
Congressional Add: *FY 2018 NDAA SEC 825 MDAP Cost Overrun*	1.086	-
Congressional Add Subtotals for Project: H1A	343.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602624A *I Weapons and Munitions Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Congressional Add Totals for all Projects	343.000	-

Change Summary Explanation

Funds reprogrammed out for higher priority Army requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602624A / *Weapons and Munitions Technology*	Project (Number/Name) H18 / *Weapons & Munitions Technologies*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
H18: *Weapons & Munitions Technologies*	-	15.291	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.291

Note

In Fiscal Year (FY) 2020 this Project will realign to:
Program Element (PE) 0602145A Next Generation Combat Vehicle Technology
* Project BK5 Adv Direct In-Direct Armament Sys (ADIDAS) Tech
PE 0602147A Long Range Precision Fires Technology
* Project AG4 Extended Range Artillery Munition Suite Technology
* Project AG6 Energetic Materials and Advanced Processing Techno
* Project BN5 Fuze and Power for Munitions
PE 0602148A Future Vertical Lift Technology
* Project AK6 Advanced Rotorcraft Armaments Protection System Te

A. Mission Description and Budget Item Justification

This Project designs, investigates, and evaluates component technologies to enable affordable precision munitions as well as provide increased lethality and performance with reduced logistics and advanced direct/indirect fire capabilities for Soldier, ground vehicle and aviation platforms.

Efforts in this Project support the Army Science and Technology Lethality Portfolio.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy

Funds reprogrammed out for higher priority Army requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Novel Propulsion Technology for the Future	2.849	-	-
Description: This effort explores propellant technologies such as powder coextrusion and grain coatings, while retaining insensitive properties, for employment in gun launch environments as well as directional thrusters including those that deliver a broad spectrum of effects. It also conducts experiments with these propellants to increase the range of artillery and mortar rocket assisted projectiles.			
Title: Affordable Precision Technologies	2.586	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602624A / *Weapons and Munitions Technology*	**Project (Number/Name)** H18 / *Weapons & Munitions Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Description: This effort investigates technologies that provide affordable precision capabilities for projectiles fired into Global Positioning System (GPS) denied environments.			
Title: Fuze and Power Technologies for Munitions ***Description:*** This effort investigates and designs innovative fuze and power technologies for enhanced environment and target sensing/classification, warhead initiation schemes and advanced fuze setting to provide enhanced lethality combined effects on targets and advanced initiation schemes for the next generation munitions.	1.029	-	-
Title: Cluster Munitions Replacement Acceleration ***Description:*** This effort will design and develop the critical components that will aid in the maturation of a materiel solution designed to replace 155mm dual purpose improved conventional munition (DPICM) artillery. The components will include the design, development and component testing of fuzing, warhead and stabilization technologies.	1.023	-	-
Title: Programmable Intelligent Collaborative Engagement Munition ***Description:*** This effort develops, matures and integrates a gun hardened suite of components (software, sensors, navigation and communications) that enable the application of distributed, cooperative and collaborative tactics for munitions.	1.463	-	-
Title: Advanced Rotorcraft Armaments Protection System ***Description:*** The Advanced Rotorcraft Armament and Protection System (ARAPS) effort designs and develops Future Vertical Lift (FVL) technologies for lightweight armament systems and multi-role munitions with enhanced lethality at extended ranges. The effort investigates and determines the feasibility of a holistic fire control system that integrates all aspects of offensive and defensive capabilities for advanced protection and enhanced survivability.	1.953	-	-
Title: Radio Frequency Guided Munition ***Description:*** This effort investigates technologies that provide a Radio Frequency (RF) seeking capability for gun-launched projectiles to enable engagement of RF emitting sources and similar targets of interest.	1.463	-	-
Title: ARCHER ***Description:*** This effort designs and develops advanced fire control algorithms and a multirole warhead guided projectile for area defense against medium (Groups 2 and 3) sized unmanned aerial systems (UAS) and aerial rotary wing platforms, point defense against rocket propelled grenades (RPGs), anti-tank guided missiles (ATGMs), and rocket, artillery, and mortars threats as well as precision fires against dismounts in defilade.	2.925	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602624A / *Weapons and Munitions Technology*	**Project (Number/Name)** H18 / *Weapons & Munitions Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Accomplishments/Planned Programs Subtotals	15.291	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army				Date: February 2020
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602624A / *Weapons and Munitions Technology*	Project (Number/Name) H1A / *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*		

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*	-	343.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	343.000

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Weapons and Munitions Technology applied research.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
Congressional Add: Program Increase ***FY 2019 Accomplishments:*** Program Increase	25.000	-
Congressional Add: Extended Range Cannon Artillery ***FY 2019 Accomplishments:*** Extended Range Cannon Artillery	20.000	-
Congressional Add: Sensor Fuzed Munition ***FY 2019 Accomplishments:*** Sensor Fuzed Munition	20.000	-
Congressional Add: Laser Weapons Accuracy ***FY 2019 Accomplishments:*** Laser Weapons Accuracy	23.000	-
Congressional Add: Defense Against Small UAS ***FY 2019 Accomplishments:*** Defense Against Small UAS	30.000	-
Congressional Add: 120 mm Cannon Fired Guided Missile ***FY 2019 Accomplishments:*** 120 mm Cannon Fired Guided Missile	50.000	-
Congressional Add: Weapons Effectiveness in Urban Engagement ***FY 2019 Accomplishments:*** Weapons Effectiveness in Urban Engagement	15.000	-
Congressional Add: Armament Systems Integration ***FY 2019 Accomplishments:*** Armament Systems Integration	20.000	-
Congressional Add: Armament Systems Concepting	20.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602624A / *Weapons and Munitions Technology*	**Project (Number/Name)** H1A / *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
FY 2019 Accomplishments: Armament Systems Concepting		
Congressional Add: Adv Processing of Insensitive Energ Mats	20.000	-
FY 2019 Accomplishments: Adv Processing of Insensitive Energ Mats		
Congressional Add: Hybrid Projectile Tech	10.000	-
FY 2019 Accomplishments: Hybrid Projectile Tech		
Congressional Add: Composite Barrel Tech	10.000	-
FY 2019 Accomplishments: Composite Barrel Tech		
Congressional Add: Enhanced Extended Range Artillery System	65.914	-
FY 2019 Accomplishments: Enhanced Extended Range Artillery System		
Congressional Add: Novel Printed Armaments Components	13.000	-
FY 2019 Accomplishments: Novel Printed Armaments Components		
Congressional Add: FY 2018 NDAA SEC 825 MDAP Cost Overrun	1.086	-
FY 2019 Accomplishments: FY 2018 NDAA SEC 825 MDAP Cost Overrun		
Congressional Adds Subtotals	343.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602624A / *Weapons and Munitions Technology*	Project (Number/Name) H28 / *Warheads/Energetics Technologies*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
H28: *Warheads/Energetics Technologies*	-	21.542	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.542

Note

In Fiscal Year (FY) 2020 this Project was realigned to:
Program Element (PE) 0602141A Lethality Technology
* Project AH9 Advanced Warheads Technology
PE 0602147A Long Range Precision Fires Technology
* Project AG6 Energetic Materials and Advanced Processing Techno
* Project AG8 Advanced Energetics Technology
PE 0602148A Future Vertical Lift Technology
* Project AK2 Aviation Survivability Technology

A. Mission Description and Budget Item Justification

This Project investigates and designs enabling warhead and energetic technologies such as new propellant techniques, and high-density explosives to produce smaller, lighter, more effective, multi-role warheads, flare and pyrotechnic countermeasures, and novel approaches for ammunition demilitarization and combat in complex environments.

Efforts in this Project support the Army Science and Technology Lethality Portfolio.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Scalable Warhead Technology ***Description:*** This effort designs scalable and adaptive explosives and reactive materials technology for either gun or missile-launched weapons and munitions that can deliver a broad spectrum of effects with reduced collateral damage. In addition, this effort will facilitate the design and development of improved area clearance technologies.	5.830	-	-
Title: Advanced Energetics ***Description:*** This effort develops advanced energetic materials and novel processing techniques for future explosives and propulsion applications that enable an increase in range, lethality, and utility of ammunitions.	8.074	-	-
Title: Tunable Pyrotechnics	3.615	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602624A / *Weapons and Munitions Technology*	**Project (Number/Name)** H28 / *Warheads/Energetics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Description: This effort develops smoke and flare countermeasure for passive protection for ground and air combat platforms, and hand held signals for illumination and signaling. These capabilities will increase warfighter and aircraft survivability.			
Title: Advanced Warheads ***Description:*** This effort explores multiple pathways to enhance lethal efforts for future warheads against emerging peer/near peer target sets. Investigates synergistic effects of novel micro warheads using advance materials.	4.023	-	-
Accomplishments/Planned Programs Subtotals	21.542	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A