Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	241.344	383.410	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	624.754
H18: *Weapons & Munitions Technologies*	-	20.886	18.229	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	39.115
H19: *Asymmetric & Counter Measure Technologies*	-	3.198	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.198
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*	-	204.000	343.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	547.000
H28: *Warheads/Energetics Technologies*	-	13.260	22.181	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	35.441

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.

In FY18/FY19 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
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*

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

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	41.455	40.444	46.783	-	46.783
Current President's Budget	241.344	383.410	0.000	-	0.000
Total Adjustments	199.889	342.966	-46.783	-	-46.783
• Congressional General Reductions	-0.022	-0.034			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	204.000	343.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.039	-			
• SBIR/STTR Transfer	-1.050	-			
• Adjustments to Budget Years	-6.078	-	-46.783	-	-46.783

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*		
Congressional Add: *Program Increase*	18.000	25.000
Congressional Add: *Extended Range Cannon Artillery*	20.000	20.000
Congressional Add: *Sensor Fuzed Munition*	20.000	20.000
Congressional Add: *Laser Weapons Accuracy*	15.000	23.000
Congressional Add: *Defense Against Small UAS*	20.000	30.000
Congressional Add: *120 mm Cannon Fired Guided Missile*	10.000	50.000
Congressional Add: *Weapons Effectiveness in Urban Engagement*	15.000	15.000
Congressional Add: *Armament Systems Integration*	20.000	20.000
Congressional Add: *Armament Systems Concepting*	20.000	20.000
Congressional Add: *Adv Processing of Insensitive Energ Mats*	6.000	20.000
Congressional Add: *Hybrid Projectile Tech*	5.000	10.000
Congressional Add: *Composite Barrel Tech*	10.000	10.000
Congressional Add: *Railgun Weapon Tech*	25.000	-
Congressional Add: *Enhanced Extended Range Artillery System*	-	67.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
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 2018	FY 2019
Congressional Add: *Novel Printed Armaments Compnents*	-	13.000
Congressional Add Subtotals for Project: H1A	204.000	343.000
Congressional Add Totals for all Projects	204.000	343.000

Change Summary Explanation

FY18 increase related to congressional adds totaling $204 Million
FY19 increase related to congressional adds totaling $343 Million
FY20 decrease related to Science and Technology financial restructuring

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
H18: *Weapons & Munitions Technologies*	-	20.886	18.229	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	39.115

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 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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Novel Propulsion Technology for the Future	3.429	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.			
FY 2019 Plans: Investigate alternative processing methods amenable to achieving high-energy formulations in spheroidal and/or pancake geometries in conjunction with development of high-energy propellant formulations; will investigate processing methods, material synthesis and formulation to support development of encapsulated propellant, which could result in improved stability/			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
sensitivity and combustion profiles without sacrificing combustion performance; Validate the optimized electrode configuration and formulation for electrically controlled energetic materials (ECEM). ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602147A (Long Range Precision Fires Technology) / Project AG6 (Energetic Materials and Advanced Processing Techno) in FY20 as part of the financial restructuring.			
Title: Advanced Weapons Technology ***Description:*** This effort investigates innovative weapon technologies such as recoil energy mitigation, affordable precision, extended range/guided technologies, and advanced propellant for future medium caliber direct fire systems that could provide similar or greater lethality than current systems.	0.824	-	-
Title: Affordable Precision Technologies ***Description:*** This effort investigates technologies that provide affordable precision capabilities for projectiles fired into Global Positioning System (GPS) denied environments. ***FY 2019 Plans:*** Investigate the optimal architecture for an Automatic Target Recognition (ATR) capable Precision Guided Munition (PGM); Include initial system trade studies, modeling of various seeker types on candidate indirect fire platform systems and experimental assessments of high risk critical components. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort realigned to PE 0602147A (Long Range Precision Fires Technology) / Project AG4 (Extended Range Artillery Munition Suite Technology) in FY20 as part of the financial restructuring.	3.015	2.586	-
Title: Extended Range Indirect Fire Weapon Technology ***Description:*** This effort initially investigates and determines the viability of candidate extended range indirect fire weapon technologies that facilitate light weight armaments with launch velocities resulting in ranges of 70km and beyond with emerging ammunition. Technologies will be applied at the system and sub-system level to address technology gaps.	2.783	-	-
Title: Long Range Gun Technology Development ***Description:*** This effort investigates and develops candidate extended range artillery weapon system and projectile technologies that increase the range up to 2x with increased precision.	1.500	-	-
Title: Fuze and Power Technologies for Munitions	2.080	1.029	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
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. ***FY 2019 Plans:*** Will advance the capability of state of the art in fuze proximity sensors to track targets in order to improve burst point accuracy and countermeasure robustness; will maximize usage of all real time battlefield targeting data and integrate with fuze setters, fuze sensors, power sources, component protective technologies and unique fuze ignition schemes to design and develop extremely reliable and versatile fuzes; will investigate these new fuze designs to support hypersonics, autonomous fuzing for varied targets as well as Counter-Unmanned Aerial Systems. These technologies will continue to leverage the Office of the Secretary of Defense (OSD) Joint Munitions Program TCG - 5 and TCG-10 and the OSD Joint Fuze Technology Program. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602147A (Long Range Precision Fires Technology) / Project BN5 (Fuze and Power for Munitions) in FY20 as part of the financial restructuring.			
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. ***FY 2019 Plans:*** This effort will begin to validate the tactical designs for all concepts, and will investigate incorporating additional features into the design of critical components; will improve insensitive munitions (IM) performance as well as investigate and determine what other technologies could be incorporated into the materiel solutions as a potential improvements. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This effort is completed in FY19.	6.431	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. ***FY 2019 Plans:***	0.824	1.463	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
Will design and develop hardware and mature algorithms and concepts validated in the prior year to a breadboard state; will utilize hardware and software in the loop testbed to validate collaboration across multiple munitions in flight. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602147A (Long Range Precision Fires Technology) / Project AG4 (Extended Range Artillery Munition Suite Technology) in FY20 as part of the financial restructuring.			
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. ***FY 2019 Plans:*** Will investigate integrated armament and advanced protection designs for FVL offensive and defensive applications; will design critical component technologies in order to develop advanced lethality and survivability capabilities in fire control, weapon systems, munitions and countermeasures; will investigate system architecture solutions for an integrated armament and advanced protection system. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602148A (Future Vertical Lift Technology) / Project AK6 (Advanced Rotorcraft Armaments Protection System Te) in FY20 as part of the financial restructuring.	-	4.453	-
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. ***FY 2019 Plans:*** Will investigate RF seeker component technologies with a focus on projectile payload performance, size, weight, power, and gun launch survivability; will perform systems engineering and detailed performance analyses to determine the trade space when integrating these RF seeker technologies in gun-launched environments. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort realigned to PE 0602147A (Long Range Precision Fires Technology) / Project AG4 (Extended Range Artillery Munition Suite Technology) in FY20 as part of the financial restructuring.	-	1.463	-
Title: ARCHER	-	2.925	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
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. ***FY 2019 Plans:*** Will investigate and mature command guided, medium caliber projectile designs on a tactical turret platform; will research and develop novel warhead and projectile stabilization architectures; will conduct lab experiments to mature designs of projectile critical components; will validate reliability, functionality and performance of various projectile component technologies; will research the target defeat effectiveness of material solutions for various concepts and develop algorithms based on armament system requirements. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This effort is completed in FY19.			
Title: FY 2019 SBIR / STTR Transfer ***Description:*** FY 2019 SBIR / STTR Transfer ***FY 2019 Plans:*** FY 2019 SBIR / STTR Transfer ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 SBIR / STTR Transfer	-	0.438	-
Accomplishments/Planned Programs Subtotals	20.886	18.229	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army					Date: March 2019							
Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602624A / *Weapons and Munitions Technology*				Project (Number/Name) H19 / *Asymmetric & Counter Measure Technologies*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
H19: *Asymmetric & Counter Measure Technologies*	-	3.198	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.198

Note

In Fiscal Year (FY) 2020 this Project will realign to:
Program Element (PE) 0602141A Lethality Technology
* Project AI1 Advanced terrain Shaping Technology
PE 0602143A Soldier Lethality Technology
* Project AY8 Small Arms Fire Control Technology
PE 0602145A Next Generation Combat Vehicle Technology
* Project BK3 Next Gen Intelligent Fire Control (NG-IFC) Tech

A. Mission Description and Budget Item Justification

This Project designs and develops technologies to support advanced fire control for indirect fires such as efforts to maintain the lethality and overmatch of United States (US) weapons against current and future threat systems. Work in this Project is related to, and fully coordinated with, efforts in Projects H18 and H28 (also in PE 0602624A), PE 0602618A (Ballistics Technology), and Projects 232 and L94 in PE 0603004A (Weapons and Munitions Advanced Technology).

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 2018	FY 2019	FY 2020
Title: Enhanced Fire Control for Indirect Fires	3.198	-	-
Description: This effort evaluates the applicability and integration of state-of-the-art acquisition and engagement technologies for data and image processing, weapon orientation sensors and methodologies to enhance fire control capability, and therefore weapon effectiveness, at various ranges and under battlefield conditions. Investigates components and architectures that will reduce size, weight, power and cost (SWaP-C), and increase commonality and operation across direct and indirect fire control systems.			
Accomplishments/Planned Programs Subtotals	3.198	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602624A / *Weapons and Munitions Technology*	**Project (Number/Name)** H19 / *Asymmetric & Counter Measure Technologies*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army												Date: March 2019
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
H1A: *WEAPONS & MUNITIONS TECH PROGRAM INITIATIVE (CA)*	-	204.000	343.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	547.000

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 2018	FY 2019
Congressional Add: Program Increase ***FY 2018 Accomplishments:*** Program Increase ***FY 2019 Plans:*** Program Increase	18.000	25.000
Congressional Add: Extended Range Cannon Artillery ***FY 2018 Accomplishments:*** Extended Range Cannon Artillery ***FY 2019 Plans:*** Extended Range Cannon Artillery	20.000	20.000
Congressional Add: Sensor Fuzed Munition ***FY 2018 Accomplishments:*** Sensor Fuzed Munition ***FY 2019 Plans:*** Sensor Fuzed Munition	20.000	20.000
Congressional Add: Laser Weapons Accuracy ***FY 2018 Accomplishments:*** Laser Weapons Accuracy ***FY 2019 Plans:*** Laser Weapons Accuracy	15.000	23.000
Congressional Add: Defense Against Small UAS ***FY 2018 Accomplishments:*** Defense Against Small UAS ***FY 2019 Plans:*** Defense Against Small UAS	20.000	30.000
Congressional Add: 120 mm Cannon Fired Guided Missile	10.000	50.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019
FY 2018 Accomplishments: 120 mm Cannon Fired Guided Missile ***FY 2019 Plans:*** 120 mm Cannon Fired Guided Missile		
Congressional Add: Weapons Effectiveness in Urban Engagement ***FY 2018 Accomplishments:*** Weapons Effectiveness in Urban Engagement ***FY 2019 Plans:*** Weapons Effectiveness in Urban Engagement	15.000	15.000
Congressional Add: Armament Systems Integration ***FY 2018 Accomplishments:*** Armament Systems Integration ***FY 2019 Plans:*** Armament Systems Integration	20.000	20.000
Congressional Add: Armament Systems Concepting ***FY 2018 Accomplishments:*** Armament Systems Concepting ***FY 2019 Plans:*** Armament Systems Concepting	20.000	20.000
Congressional Add: Adv Processing of Insensitive Energ Mats ***FY 2018 Accomplishments:*** Adv Processing of Insensitive Energ Mats ***FY 2019 Plans:*** Adv Processing of Insensitive Energ Mats	6.000	20.000
Congressional Add: Hybrid Projectile Tech ***FY 2018 Accomplishments:*** Hybrid Projectile Tech ***FY 2019 Plans:*** Hybrid Projectile Tech	5.000	10.000
Congressional Add: Composite Barrel Tech ***FY 2018 Accomplishments:*** Composite Barrel Tech ***FY 2019 Plans:*** Composite Barrel Tech	10.000	10.000
Congressional Add: Railgun Weapon Tech ***FY 2018 Accomplishments:*** Railgun Weapon Tech	25.000	-
Congressional Add: Enhanced Extended Range Artillery System	-	67.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019
FY 2019 Plans: Enhanced Extended Range Artillery System		
Congressional Add: Novel Printed Armaments Compnents	-	13.000
FY 2019 Plans: Novel Printed Armaments Compnents		
Congressional Adds Subtotals	204.000	343.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
H28: *Warheads/Energetics Technologies*	-	13.260	22.181	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	35.441

Note

In Fiscal Year (FY) 2020 this Project will be funded in:
Program Element (PE) 0602141A Lethality Technology
* Project AH9 Advanced Warheads Technology
PE 0602147A Long Range Precision Fires Technology
* Project AG6 Energetic Materials and Adv Processing Tech
* 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 2018	FY 2019	FY 2020
Title: Scalable Warhead Technology	5.211	5.830	-
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.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
Will mature and down select various warhead components (mini SC liners, mini explosively formed penetrator (EFPs) and multi-EFPs) for insertion into follow-on Advanced Technology Development efforts; validate effectiveness of selected concepts against simulated and actual threats. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Effort ends in FY19			
Title: Advanced Energetics (formerly named Explosives Research) ***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. ***FY 2019 Plans:*** Will mature technologies focused in nano-energetics designs for use in melt-cast formulations; will mature the polymer kinetics for amorphous energetics; will investigate next-generation melt-cast and cast-cure ingredients for higher energy formulations; will investigate reaction kinetics for ingredient synthesis applicable to advanced flow reactors; will design and develop processing parameters necessary to produce energetic materials for additive manufacturing; will develop novel modeling and simulation tools required to accurately predict energetic materials performance in novel and unique geometries. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602147A (Long Range Precision Fires Technology) / Project AG8 (Energetic Materials and Adv Processing Tech) in FY20 as part of the financial restructuring.	6.001	8.099	-
Title: Tunable Pyrotechnics ***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. ***FY 2019 Plans:*** Will develop an integrated solution for the Dazzler Counter Measure to include new pyrotechnic formulations; will develop and modify ASCM formulations based on static and functional tests to assess viability of technology candidates; will investigate new countermeasure designs in the electromagnetic (EM) spectrum to address emerging threats. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602148A (Future Vertical Lift Technology) / Project AK2 (Aviation Survivability Technology) in FY20 as part of the financial restructuring.	2.048	3.615	-
Title: Advanced Warheads	-	4.023	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 2018	FY 2019	FY 2020
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. ***FY 2019 Plans:*** Will characterize new family of materials for designs of novel micro warheads to achieve fragmentation, EFP and shaped charge effects; will conduct parametric study to establish the performance and lethal effects of novel warhead designs. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** This research effort was realigned to PE 0602141A (Lethality Technology) / Project AH9 (Advanced Warheads Technology) in FY20 as part of the financial restructuring.			
Title: FY 2019 SBIR / STTR Transfer ***Description:*** FY 2019 SBIR / STTR Transfer ***FY 2019 Plans:*** FY 2019 SBIR / STTR Transfer ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 SBIR / STTR Transfer	-	0.614	-
Accomplishments/Planned Programs Subtotals	13.260	22.181	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A