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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)	R-1 Program Element (Number/Name) PE 0603313A / Missile and Rocket Advanced Technology
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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	-	92.404	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	92.404
206: Missile Simulation	-	2.412	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.412
263: Future Msl Tech Integr(FMTI)	-	36.269	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	36.269
704: Advanced Missile Demo	-	18.723	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.723
NA6: Missile and Rocket Initiatives (CA)	-	35.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	35.000

Note

In Fiscal Year 2020 (FY20) this Program Element (PE) was realigned with continuity of effort to the following PEs:

- ? 0603462A Next Generation Combat Vehicle Advanced Technology
- ? 0603464A Long Range Precision Fires Advanced Technology
- ? 0603465A Future Vertical Lift Advanced Technology
- ? 0603466A Air and Missile Defense Advanced Technology

A. Mission Description and Budget Item Justification

This PE matures, fabricates, and demonstrates advanced rocket, missile, interceptor, and guided munition technologies to enhance weapon system lethality, survivability, agility, deployability, and affordability. Project 206 develops high fidelity simulations for advanced tactical missiles and interceptors. Project 263 demonstrates missile and interceptor systems with capabilities to provide protection against rockets, artillery, and mortars; provide precision weapons for small units in close combat; provide precision long-range fires; and provide minimum smoke propulsion for aviation missiles. Project 704 demonstrates the capability to detect and track rocket, artillery, mortar, and unmanned air vehicles threats. Project NA6 is a congressional increase Project.

Work in this PE is complimentary to PE 0602303A (Missile Technology) and is fully coordinated with PE 0602618A (Ballistics Technology), PE 0602624A (Weapons and Munitions Technology), PE 0603003A (Aviation Advanced Technology), PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603125A (Combating Terrorism Technology Development), PE 0603270A (Electronic Warfare Technology), PE 0603734A (Military Engineering Advanced Technology), and PE 0708045A (End Item Industrial Preparedness Activities).

In FY20 this PE is being eliminated, with continuity of effort realigned to other PEs as part of a strategic financial restructuring of the Science and Technology (S&T) portfolio. All FY20 adjustments align program requirements with Army Modernization priorities in support of the National Defense Strategy.

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

UNCLASSIFIED

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>
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The work in this PE is performed by the United States Army Futures Command.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	94.561	0.000	0.000	-	0.000
Current President's Budget	92.404	0.000	0.000	-	0.000
Total Adjustments	-2.157	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.157	-			

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: NA6: *Missile and Rocket Initiatives (CA)*

Congressional Add: *Program increase - cybersecurity and supply chain risk management*

Congressional Add: *Program increase - cyber security*

Congressional Add: *Program increase - tactically mobile, shoot-on-the-move SHORAD demonstration*

Congressional Add Subtotals for Project: NA6

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	10.000	-
	15.000	-
	10.000	-
Congressional Add Subtotals for Project: NA6	35.000	-
Congressional Add Totals for all Projects	35.000	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) 206 / <i>Missile Simulation</i>
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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
<i>206: Missile Simulation</i>	-	2.412	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.412

Note
 In Fiscal Year 2020 (FY20 this Project was being realigned to:
 Program Element (PE) 0603464A Long Range Precision Fires Advanced Technology:
 * Project AF4 Missile Simulation Advanced Technology

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced modeling and simulation technologies for missile design and analysis. Evaluation of missile technology by means of modeling and simulation provides a cost-effective method that supports missile maturation throughout the weapon system life cycle. This Project permits a reduction in the number of flight tests required for programs of record as well as improves the confidence of flight test readiness and probability of flight test success.

This Project support efforts in 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. FY20 realignments are due to financial restructuring in support of Army Modernization Priorities.

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

	FY 2019	FY 2020	FY 2021
Title: Missile Simulation	2.412	-	-
Description: This effort matures and demonstrates advanced analysis and high fidelity modeling and simulation technologies for advanced missiles and interceptor design and analysis. Evaluation of missile technology through modeling and simulation provides a cost-effective method to support missile maturation throughout the weapon system life cycle. This effort shortens component design timelines, reduces integration activities, enables a reduction of flight tests required for programs of record and improves the confidence of flight test readiness and the probability of flight test success.			
Accomplishments/Planned Programs Subtotals	2.412	-	-

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) 263 / <i>Future Msl Tech Integr(FMTI)</i>
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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
263: <i>Future Msl Tech Integr(FMTI)</i>	-	36.269	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	36.269

Note

In Fiscal Year (FY) 2020 this Project is being realigned to:
 PE 0603462A Next Generation Combat Vehicle Advanced Technology:
 * Project BG7 Ground System Active Defense (GSAD) Advanced Tech
 Program Element (PE) 0603464A Long Range Precision Fires Advanced Technology:
 * Project AE8 Land-Based Anti-Ship Missile (LBASM) Advanced Tech
 * Project AE9 Low-Cost Tact Ext Range Missile (LC-TERM) Adv Tech
 * Project AH3 Single Multi-Mission Attack Missile Adv Tech

A. Mission Description and Budget Item Justification

This Project matures, fabricates, and demonstrates advanced missile and interceptor technologies, such as seekers, guidance and controls, propulsion, and airframes. The project goal is to reduce the life-cycle costs and cost per kill of precision guided missiles and interceptors.

This Project support efforts in the Army Science and Technology Lethality and Ground Maneuver portfolios.

This Project matures technologies from Program Element (PE) 0602303A (Missile Technology) and directly supports systems managed by the Program Executive Officer for Missiles and Space. Work in this Project is in collaboration with PE 0602618A (Ballistics Technology), PE 0602624A (Weapons and Munitions Technologies), PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology) and PE 0708045A (End Item Industrial Preparedness Activities).

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)

Title: Low Cost Tactical Extended Range Missile	FY 2019	FY 2020	FY 2021
Description: This effort focuses on maturation, fabrication, and demonstration of technologies for low-cost precision fires missile capable of deep strike engagements. The aim is to provide extended range and expanded target set capability through advanced propulsion, new payload technology, and maintain effectiveness in Global Positioning System (GPS) challenged environments through new and novel navigation technologies. This effort supports the Army need for developing capability enablers in the area of Extended Range Precision Fires.	9.470	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020		
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) 263 / <i>Future Msl Tech Integr(FMTI)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Title: Active Protection System Interceptor Demonstration Description: This effort matures, integrates and demonstrates modular hard-kill Active Protection System (APS) technologies with the Hit Avoidance Architecture and APS Common Controller and matures modeling and simulation for system integration and demonstration. Specifically the hard-kill APS portion and modeling and simulation efforts will be addressed by the United States (U.S.) Army Aviation and Missile Research, Development and Engineering Center (AMRDEC). This effort supports the Army's APS program to mature and demonstrate APS technologies to reduce vehicle weight while reducing reliance on armor through the use of other means such as sensing, warning, hostile fire detection, and active countermeasures to achieve increased protection against current and emerging threats. This effort supports the development of an APS Common Architecture enabling adaptable APS solutions that can be integrated across Army vehicle platforms as required.		3.516	-	-
Title: Affordable Extended Range Precision Missile Demonstration Description: This effort focuses on the maturation, fabrication, integration, hardware-in-the-loop (HWIL) test, and flight demonstration of technology for an affordable discriminate extended range precision missile to include critical component technologies such as advanced propulsion, seekers, fire control, datalink, guidance and controls, and maneuverable airframes.		7.700	-	-
Title: Close Combat Weapons Technology Description: This effort addresses close combat weapon systems trade studies, and technology maturation and demonstration for a next generation close combat precision missile system for dismounted and mounted maneuver.		5.572	-	-
Title: Multi-Domain Lethality Demonstration Description: This effort focuses on the maturation, fabrication, integration, HWIL development and test, and flight demonstration of critical missile technology that supports Multi-Domain Battle Concept/Cross-Domain Fires and Manned-Unmanned Teaming (MUM-T) System of Systems. The objective is to develop capability for missile systems to destroy enemy air defenses in the land and the maritime domains. This effort will develop and demonstrate appropriate sensor and payload component technologies for engaging and destroying maritime- and land-based air defense systems; integrate these component technologies into prototype missile hardware; and demonstrate hardware in a relevant flight environment.		9.977	-	-
Title: FY 2018 NDAA SEC 825 MDAP Cost Overrun Description: FY 2018 NDAA SEC 825 MDAP Cost Overrun		0.034	-	-
Accomplishments/Planned Programs Subtotals		36.269	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) 263 / <i>Future Msl Tech Integr(FMTI)</i>

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

Remarks

D. Acquisition Strategy
N/A

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>				Project (Number/Name) 704 / <i>Advanced Missile Demo</i>			
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
704: <i>Advanced Missile Demo</i>	-	18.723	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.723

Note

In Fiscal Year (FY) 2020 this Project is being realigned to:
 Program Element (PE) 0603465A Future Vertical Lift Advanced Technology:
 * Project AK5 Multi-Role Small Guided Missile Advanced Tech
 PE 0603466A Air and Missile Defense Advanced Technology:
 * Project AC8 Low Cost Extended Range Air Defense Adv Tech

A. Mission Description and Budget Item Justification

This Project matures advanced missile system concepts and related hardware to enhance weapon system lethality, survivability, agility, versatility, deployability, and affordability for defense against future air and ground, armored and non-armored threats.

This Project support efforts in the Army Science and Technology Lethality portfolio.

Work in this Project is in collaboration with PE 0602624A (Weapons and Munitions Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. FY20 realignments are due to financial restructuring in support of Army Modernization Priorities.

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

	FY 2019	FY 2020	FY 2021
Title: Counter Rockets, Artillery, Mortars (RAM), Unmanned Aerial Systems (UAS), and Cruise Missile Tracking and Fire Control	2.273	-	-
Description: This effort matures and demonstrates system technology to provide 360 degree, near hemispherical coverage for tracking and intercept of UAS and/or Cruise Missile threats. This effort matures fire control methodology for engagement of threat UAS and/or Cruise Missile to generate firing solutions and determine interceptors available for an air defense mission. These efforts will be evaluated through Hardware-in-the-Loop (HWIL) experiments and multiple interceptor flights. Effort will also mature tactical launcher configurations and designs for alternative mission profiles. The technologies demonstrated will be applicable to the Indirect Fire Protection Capability (IFPC) and other Air and Missile Defense programs.			
Title: Low-cost Extended Range Air Defense	7.991	-	-
Description: This effort matures key technologies of a lower-cost interceptor system with a low- to medium-altitude, medium- to long-range capability. This effort will enable lower cost interceptor integration into a net-enabled Air and Missile Defense Task Force for the protection of high value assets. Technologies will address the defeat of air defense threats such as Unmanned Aerial			

UNCLASSIFIED

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) 704 / <i>Advanced Missile Demo</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
System (UAS) and Cruise Missile threats with secondary capabilities against Large Caliber Rockets (LCR), Short Range Ballistic Missiles (SRBM), and Tactical Air-to-Surface Missiles (TASMS).				
Title: Seeker and Guidance Technology for Air Defense Description: This effort focuses on the maturation, integration, and fabrication of seeker and guidance technologies supporting air defense missile systems. Technologies addressed enable the defeat of multiple air defense threats such as Rockets, Artillery, and Mortars, UAS, and Cruise Missile threats with secondary capabilities against LCRs, SRBMs, and TASMs.		6.537	-	-
Title: Multi-Role Missile Demonstration Description: This effort focuses on the maturation, fabrication, integration, hardware-in-the-loop (HWIL) development and test, and flight demonstration of critical technology that supports an open systems architecture to enable modular designs of guided and unguided missiles for smaller and lighter missile options with multi-role engagement capabilities reducing the life cycle cost for missiles. Critical component technologies include advanced propulsion, payload (lethal and non-lethal), seekers, fire control, datalink, guidance and controls, and maneuverable airframes. This effort matures and demonstrates technology from PE 0602303A (Missile Technology).		1.922	-	-
Accomplishments/Planned Programs Subtotals		18.723	-	-
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy N/A				

UNCLASSIFIED

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603313A / <i>Missile and Rocket Advanced Technology</i>	Project (Number/Name) NA6 / <i>Missile and Rocket Initiatives (CA)</i>
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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
<i>NA6: Missile and Rocket Initiatives (CA)</i>	-	35.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	35.000

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Missile and Rocket advanced technology development.

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

	FY 2019	FY 2020
<i>Congressional Add:</i> Program increase - cybersecurity and supply chain risk management	10.000	-
<i>FY 2019 Accomplishments:</i> Program increase - cybersecurity and supply chain risk management		
<i>Congressional Add:</i> Program increase - cyber security	15.000	-
<i>FY 2019 Accomplishments:</i> Program increase - cyber security		
<i>Congressional Add:</i> Program increase - tactically mobile, shoot-on-the-move SHORAD demonstration	10.000	-
<i>FY 2019 Accomplishments:</i> Program increase - tactically mobile, shoot-on-the-move SHORAD demonstration		
Congressional Adds Subtotals	35.000	-

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

N/A

Remarks

D. Acquisition Strategy

N/A