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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Office of the Secretary Of Defense **Date:** March 2023

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603000D8Z I <i>Joint Munitions Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	29.706	34.065	37.706	-	37.706	35.224	30.816	24.434	24.983	Continuing	Continuing
077: <i>Enhanced Munitions Advanced Technology</i>	-	29.706	34.065	37.706	-	37.706	35.224	30.816	24.434	24.983	Continuing	Continuing

**Note**

New Start (Y/N): No

**A. Mission Description and Budget Item Justification**

This program supports the Department's initiatives to Deter Aggression, and Defend the Homeland.

This program advances, demonstrates and transitions joint, pervasive munitions enhancing technologies (warheads, propulsion systems, advanced lethality mechanisms, fuzes and fuze components, and targeting). The goal is to demonstrate joint advanced technologies that increase and improve the performance, lethality, range, reliability, safety, and survivability for existing and inform development of future weapons systems. The program strategically develops and demonstrates advanced munitions technologies that ensure warfighter technical superiority and enable outcomes in the Joint fight. The program technology objectives include: high-speed weapon delivery, longer-range precision effects, networked and collaborative systems of systems, agility at the engagement level, increased capacity/affordable munitions, survivability during deployment and target engagement, and open systems architecture. This program's Joint Munitions Advanced Technologies are vital to guide, coordinate and maximize DoD and Service S&T munitions investments into follow-on system demonstration and integration activities.

The program prioritizes investments from a Joint Service perspective and demonstrates technologies that inform capabilities, thus maximizing efficiencies and ensuring the development of technologies with the broadest applicability to ensure good stewardship of taxpayer dollars. This munitions Science and Technology (S&T) program focuses on enhancements in weapon speed, range, and lethality.

In order to maintain superiority against near peer adversaries, there is an urgent need to provide U.S. warfighters with augmented or new capabilities to ensure technical superiority. The program follows a threat/opportunity analysis to develop kinetic capabilities that enable scenario-based effects from a Joint Fight perspective by exploring technological advances that are beyond Service investment risk acceptance and target asymmetric advantage. The goal is to enable military dominance to ensure effective deterrence of adversary aggression.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	30.140	34.065	38.823	-	38.823
Current President's Budget	29.706	34.065	37.706	-	37.706
Total Adjustments	-0.434	0.000	-1.117	-	-1.117
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.429	-			
• Program Adjustments	-0.005	-	-1.117	-	-1.117

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

**Project:** 077: *Enhanced Munitions Advanced Technology*

Congressional Add: *Energetics Revitalization*

	<b>FY 2022</b>	<b>FY 2023</b>
Congressional Add Subtotals for Project: 077	6.927	-
Congressional Add Totals for all Projects	6.927	-

**Change Summary Explanation**

FY 2024 reduction of \$1.117 is comprised of a realignment of \$1.268 million to support the Historically Black Colleges and Universities/Minority Serving Institutions program, which is a priority of the Under Secretary of Defense for Research and Engineering (USD(R&E)), \$0.061 million to support departmental priorities and an economic assumption of \$0.212.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Office of the Secretary Of Defense										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 0400 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603000D8Z / Joint Munitions Advanced Technology				<b>Project (Number/Name)</b> 077 / Enhanced Munitions Advanced Technology			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
077: Enhanced Munitions Advanced Technology	-	29.706	34.065	37.706	-	37.706	35.224	30.816	24.434	24.983	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Enhanced Munitions Advanced Technology effort will demonstrate advanced technologies and perform associated research that will improve the performance, range, and lethality of existing and future weapons systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing broadly applicable munitions in the concept and development stages. Matured and demonstrated Enhanced Munitions technology can be transitioned, thereby decreasing the Program Executive Office's (PEO) program costs and schedule risk, facilitating spin-offs to other munitions within their portfolios. Technologies demonstrated seek to improve the performance, lethality, and range of weapons to ensure the U.S. is not outgunned and outranged on the battlefield of the future.

This program exploits developments in machine learning, artificial intelligence, quantum computing, and advanced material technologies and applies them to enable next generation kinetic weapons capabilities in the areas of advanced propulsion, warhead effects, enabling fuze technologies, and pioneering targeting technologies with a specific focus on enhancing kinetic weapons lethality, range and resultant effects. The program informs technology investments with broad applicability across across the Department. Investments are informed by threat-opportunity based analyses that focus on developing weapons systems for technological dominance to enable military objectives in Joint Force campaign scenarios. Technology roadmaps for munition technical areas will guide investments consistent with the DoD National Defense Strategy and inform Service technology investments. The program will establish a Department-wide/Industry/Academia Public-Private-Partnership (PPP) collaboration that mitigates stakeholder identified deficiencies to coordinate and accelerate munitions technology development, demonstration, and transition.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> Enhanced Munitions Advanced Technology	22.779	23.065	22.706
<p><b>Description:</b> Enhanced Munitions Advanced Technology focuses on the following key areas:</p> <ul style="list-style-type: none"> <li>- Munitions Versatility: Combined and Collaborative Kinetic Effects</li> <li>- Munitions Readiness: Modularity, Advanced Manufacturing and Materials</li> <li>- Munitions Efficiency: Weapon Survivability</li> <li>- Munitions Effectiveness:                             <ul style="list-style-type: none"> <li>• Munitions Kinetic and Tailorable Lethality Effects</li> <li>• Propulsion Systems</li> <li>• Target Detection and Burst Point Control</li> </ul> </li> </ul>			
<b>FY 2023 Plans:</b>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<ul style="list-style-type: none"> <li>- Complete advanced technology design of Solid Fuel Ramjet missile motor and case assemblies to support an extended range air to ground missile system, and fabricate for a maximum range test.</li> <li>- Complete design and fabrication of hardware and scale up selected propellant for a full-size test of an improved missile boost motor demonstrator for extended range in cruise missiles.</li> <li>- Complete fabrication and deployment of inlet design and down-selection testing of nozzle design for a modular propulsion system for air to ground system with improved range and speed.</li> <li>- Initiate high resolution height of burst radar work leveraging Multiple Input Multiple Output (MIMO) technology currently used in communication and automotive industries by upscaling to handle closing velocities up to Mach 5.</li> <li>- Continue future miniature precision munitions work by completing space claims for fuzing, seeker/sensor, guidance and warhead and initiating integration efforts.</li> <li>- Complete the characterization of Exploding Foil Initiator designs incorporating a Direct Header Deposition (DHD) design to demonstrate superior extreme environment survivability over the current state of the art.</li> <li>- Develop and demonstrate feasibility of cooperative munitions technology incorporating communication and networking impacting guidance, target detection to enhance multiple weapons effectiveness.</li> </ul> <p><b>FY 2024 Plans:</b></p> <ul style="list-style-type: none"> <li>- Begin executing technology development through Public-Private Partnership (PPP) involving Department-wide/Industry/Academia collaboration that accelerates the transition and application of emergent advanced munitions materials and capabilities.</li> <li>- Develop high energy fuel formulations and variable nozzle technologies for ramjet propulsion to increase future missile range and speed.</li> <li>- Continue developing munitions precision placement and fuzing technologies to enhance lethal effects in same or smaller munitions form factor.</li> <li>- Complete development of high resolution height of burst radar using Multiple Input Multiple Output (MIMO) technology.</li> <li>- Develop advanced miniature fuzing and modular thermal battery systems for improved performance, reduced SWaP, and improved producibility</li> <li>- Develop advanced energetics - alternate production methods, virtual testing and qualification, and for application in higher performance (range, speed lethality) munitions.</li> </ul> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease of \$0.359 between FY2023 and FY 2024 reflects minor deviations in budget priorities.</p>				
<p><b>Title:</b> High Reliability Cluster Munition</p> <p><b>Description:</b> Execute enhanced area effects munitions technology development with transition into weapon demonstrators.</p> <p><b>FY 2023 Plans:</b></p>		-	11.000	15.000

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2022	FY 2023	FY 2024
<ul style="list-style-type: none"> <li>- Conduct system level weapon area effects analyses.</li> <li>- Develop robust and efficient communications and power distribution between the munition’s main fuze and individual submunitions.</li> <li>- Model and design optimized distributed munition expulsion, dispersion, and stabilization.</li> <li>- Develop precision submunition target detection and optimized warhead output.</li> <li>- Execute plans and projects through Joint Service and Industry team. Identify and coordinate Service demonstration and transition paths for High Reliability Cluster Munition.</li> </ul> <p><b>FY 2024 Plans:</b></p> <ul style="list-style-type: none"> <li>- With a focus on modular architecture for maximum applicability across the Joint Service, continue to develop missile technology using submunitions and sensor fused weapons that deliver distributed area effects against widely-dispersed, moving, and/or poorly located targets.</li> <li>- Begin evaluating technologies to optimize distributed munitions expulsion and dispersion against operationally relevant target scenarios.</li> <li>- Continue development and testing of precision target detection and advanced energetics/warhead technologies to enhance lethality.</li> </ul> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase of \$4.000 between FY 2023 and FY 2024 will allow High Reliability Cluster Munition Kinetic effects and payload dispense technologies development to optimize defeat of future pacing targets set as identified in operationally relevant Joint Campaign scenarios.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	22.779	34.065	37.706

	FY 2022	FY 2023
<b>Congressional Add:</b> Energetics Revitalization	6.927	-
<b>FY 2022 Accomplishments:</b> Program increase will be used to accelerate modernization of energetic materials research, development and manufacturing. Energetic materials are Defense unique ingredients critical to all kinetic weapons systems. This effort will develop and demonstrate new energetics manufacturing capabilities focused on enhancing production efficiency, speed, and reducing single source risk to meet future warfighter and national security needs.		
<b>Congressional Adds Subtotals</b>	6.927	-

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

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

**Remarks**

**D. Acquisition Strategy**

N/A