Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Office of the Secretary Of Defense	Date: April 2022
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603225D8Z *I Joint DOD DOE Munitions Technology Development*

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	18.809	19.003	18.898	0.000	18.898	19.457	19.847	20.264	20.668	Continuing	Continuing
225: *Joint DOD DOE Munitions*	-	18.809	19.003	18.898	0.000	18.898	19.457	19.847	20.264	20.668	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 Prevail in Conflict, Defend the Homeland, Build Sustainable and Long-Term Advantage, and Build a Resilient Joint for and Defense Ecosystem.

The Department of Defense (DoD)/Department of Energy (DOE) Joint Munitions Technology Development Program (JMP) enables military superiority by setting and driving the critical path for cutting-edge capability-driven munitions science and technology (S&T) to equip the Joint Force for the future fight. The JMP portfolio comprises essential cross-cutting and foundational S&T investments that enable Future Force operational capabilities in the near, mid, and far term. In setting the technical direction for the DoD, the Joint DoD/DOE Munitions Program performs S&T to advance the state of the art for non-nuclear munitions technology in the focus areas of decision tools, delivery, munition controls, lethal effects, and readiness.

A Memorandum of Understanding signed in 1985 by the DoD and DOE provides the basis for the cooperative effort. Through this interdepartmental cooperation and joint investment (DOE matches the DoD's investment at 1:1), DoD leverages the DOE's substantial investments in intellectual capital and highly specialized skills, advanced scientific equipment and facilities, and computational tools not available within the DoD, bolstering good stewardship of taxpayer dollars. The portfolio is monitored by a panel of Tri-Service Senior Executive Service-nominated subject matter experts who conduct rigorous technical and programmatic review to prioritize essential investments. The technology, resources, and capabilities return for DoD in this program is estimated at two to three times its investment.

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B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	18.861	19.063	0.000	0.000	0.000
Current President's Budget	18.809	19.003	18.898	0.000	18.898
Total Adjustments	-0.052	-0.060	18.898	0.000	18.898
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.048	-			
• Other Reprogramming	-0.004	-	-	-	-
• FFRDC	-	-0.060	-	-	-
• Adjustments to Budget Year	-	-	18.246	-	18.246
• Economic Assumption	-	-	0.652	-	0.652

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President’s Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Office of the Secretary Of Defense			Date: April 2022
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603225D8Z / *Joint DOD DOE Munitions Technology Development*	Project (Number/Name) 225 / *Joint DOD DOE Munitions*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
225: *Joint DOD DOE Munitions*	-	18.809	19.003	18.898	0.000	18.898	19.457	19.847	20.264	20.668	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Projects within the Joint Munitions Technology Development Program (JMP) portfolio enable capability advancements in: higher speed and hypersonic delivery, counter unmanned aerial systems, microelectronics, longer range precision effects, networked and collaborative systems of systems, agility at the engagement level, logistics in contested environments, increased capacity/affordable mass, survivability during deployment and target engagement, rapid technology refreshes/adaptation to changing threats, post-launch re-programming, open systems architectures, and weapon cyber-resiliency. JMP investments may be leverageable for nuclear deterrence, space, quantum science, and 5G, but the portfolio does not specifically focus on these capability areas.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Joint DoD/DOE Munitions Technology Development	18.809	19.003	18.898

Description: DoD/DOE Munitions Technology Development focuses on the following key areas: (1) the development of in silico decision tools for munition design and in-theater function; (2) innovation of munitions delivery technology to include weapon bodies, propulsion systems, propellants, and environment/target hardening; (3) development of state-of-the-art munition controls for fuzing, microelectronics, power, sensors, kill chains, and survivable components; (4) design of lethal effects through explosive, formulation, warhead, and target damage innovations; and (5) development and transition of decisive readiness technology for munitions through the full munitions lifecycle (design through end-of-life). The JMP is organized accordingly with five Technical Coordinating Groups (TCGs), Decision Tools, Delivery, Munition Controls, Lethal Effects, and Readiness.

FY 2022 Plans:

In FY 2022, the portfolio will address priority DoD S&T capability advancements and leverages DOE investment.

• The Decision Tools focus area will a) employ machine learning code development to support lethality assessments/ weaponeering models, b) accelerate decision tool codes with faster processing, c) demonstrate improved munitions and subsystems modeling and simulation in complex shock environments, and d) deliver improved material model packages for hard and deeply buried targets.
• The Delivery focus area will: a) deliver integrated warhead cases for high speed perforation/penetration into buildings, light bunkers, and maritime targets, and b) fabricate and test materials for hypersonics.
• Munition Controls will a) demonstrate design improvement for a novel supercapacitor, b) optimize explosive-train design in the presence of competing system requirements, c) deliver a transformer component in a relevant form factor, d) demonstrate

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
survivability of a capacitor for miniaturized fuzing, e) demonstrate development of a component for hardened electronic, verify a GPS-denied navigation solution, and f) advance and transition sensor technology battery innovations. • Lethal Effects will a) demonstrate explosive volume reduction using additive manufacturing, b) demonstrate increase in kinetic energy for an additively manufactured subsystem, c) deliver a characterization dataset for novel energetics, d) predict effects of gun launch on energetics, e) validate materials and diagnostics for improved energetics, f) deliver a database for warhead materials, g) improve energetic systems performance, h) deliver a model to predict temperature effects on lethal systems, i) validate an arena-test alternative, and j) produce a dataset for enhanced target damage. • Readiness will: a) baseline additively manufactured parts for qualification standards, b) deliver test method for a power system failure mode analysis, and c) identify mechanism for adhesive failures in components. ***FY 2023 Plans:*** In FY 2023, the portfolio will address priority DoD S&T capability advancements and leverages DOE investment. • The Decision Tools focus area will a) experimentally validate a high-fidelity damage model to produce datasets suitable for training machine learning algorithms supporting lethality assessments/weaponeering, b) transfer a high-performance decision tool code to a graphical processing unit platform to accelerate calculation speed, c) apply experimental high-explosives data to simulations and validate predictions for high explosives encountering complex shock environments during employment, and d) develop particle package testing and extraction for accurate prediction of primary and secondary debris flows from weapon-target interactions. • The Delivery focus area will a) validate a multi-fidelity aerodynamic database for relevant weapon geometries and package a predictive code to reduce development and fielding times of advanced flight body geometries. • Munition Controls will a) develop a prototype production process for high energy density supercapacitor and b) demonstrate a hardware component capable of a single-radar mode for a GPS-denied navigation solution. • Lethal Effects will a) integrate advanced diagnostics into an arena-test alternative to improve munitions effectiveness measurements, and b) validate machine-learning approach for designing energetic material prototype production. • Readiness will a) determine local corrosion disparities between conventional and additively-manufactured parts in operational use, b) validate a test method for a power system failure mode analysis, and c) develop, verify, and validate a predictive model for adhesive failures in components. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** There is no significant change between FY 2022 and FY 2023.			
Accomplishments/Planned Programs Subtotals	18.809	19.003	18.898

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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A