Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Defense Threat Reduction Agency	Date: March 2024
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602718BR *I COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	1,106.623	186.813	208.870	174.955	-	174.955	180.404	185.863	185.744	189.555	Continuing	Continuing
RA: *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*	428.263	29.047	37.218	21.986	-	21.986	22.538	26.949	23.627	24.113	Continuing	Continuing
RD: *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	326.950	109.737	119.670	106.576	-	106.576	107.899	107.340	109.484	111.675	Continuing	Continuing
RG: *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	186.425	30.311	30.871	28.193	-	28.193	29.028	31.788	32.423	33.104	Continuing	Continuing
RR: *CWMD TEST AND EVALUATION*	164.985	17.718	21.111	18.200	-	18.200	20.939	19.786	20.210	20.663	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) Counter Weapons of Mass Destruction (CWMD) Applied Research program element funds the application and advancement of basic scientific knowledge to develop novel materials, devices, systems, and methods supporting next generation concepts and technologies, to include advances in Weapons of Mass Destruction (WMD) surveillance, detection, defeat, prevention, nonproliferation, counter proliferation, consequence management, and treaty verification.

This Applied Research portfolio is aligned with strategic planning objectives and Science and Technology (S&T) investment direction established annually by DTRA, which directly support policy and planning guidance from the Executive Office of the President, the Department of Defense (DoD), and the broader WMD threat reduction community.

The portfolio advances DTRA's CWMD mission by balancing the following: invest in DTRA's applied research capabilities and increase the CWMD technology base to maximize future pay-off; capitalize on opportunities to deliver innovative, cost-effective solutions to technical challenges that must be resolved prior to system-specific technology investigations and development; and ensure applied research efforts are directly aligned to the mission-specific capability requirements of DTRA, the Military Departments, Combatant Commanders, other DoD and federal agencies, and international partners.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Defense Threat Reduction Agency	Date: March 2024
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602718BR *I COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEAR CH*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	191.632	208.870	212.096	-	212.096
Current President's Budget	186.813	208.870	174.955	-	174.955
Total Adjustments	-4.819	0.000	-37.141	-	-37.141
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.764	0.000			
• Return to OSD for DCAA IT SBIR/STTR	-0.055	-	-	-	-
• Realignments	0.000	0.000	-28.907	-	-28.907
• Program Adjustment	-	-	-8.234	-	-8.234

Change Summary Explanation

The decrease from the previous President's Budget reflects a program adjustment in Projects RD, RG, and RR to fund higher Departmental priorities and the following realignments:

1) From Project RA in this Program Element (PE) to Project RA in PE 0603160BR for the CWMD Information Integration Cell (CIIC) for CWMD situational awareness,
2) From DTRA's Operation and Maintenance (O&M) account to Project RA in this PE for advanced information technology engineering and component architecture development and integration,
3) From Project RD in this PE to Project RD in PE 0603160BR for the progression of nuclear survivability technologies to advanced technology development,
4) From RDT&E in this PE to DTRA's O&M account for higher Agency priorities, and
5) From Project RA in PE 0603160BR to Project RD in this PE for CWMD modeling and simulation.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency			Date: March 2024
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	Project (Number/Name) RA / *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
RA: *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*	428.263	29.047	37.218	21.986	-	21.986	22.538	26.949	23.627	24.113	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Counter Weapons of Mass Destruction (CWMD) Cross-Cutting Technical and Information Sciences project develops concepts and technologies in the areas of high-speed information processing, modeling and simulation, signal detection, and data-driven decision analysis in support of the Defense Threat Reduction Agency's (DTRA's) technical reach-back teams. This project develops and maintains continuously improving collaborative architectures and Weapons of Mass Destruction (WMD) modeling and simulation codes that drive an integrated suite of decision support tools serving the Combatant Commands, other Department of Defense (DoD) agencies, and national and international CWMD partners. This effort also funds research activities that benefit the public through analysis and engagement to reduce and counter threats posed by WMD via the Strategic Trends Research Initiative (STRI). STRI cultivates national and international research community partnerships across domains, bringing scientific, technical, and social science experts together to help understand and anticipate WMD capabilities and threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	29.047	37.218	21.986
Description: Project RA develops concepts and technologies in the areas of high-speed information processing, modeling and simulation, signal detection, and data-driven decision analysis. ***FY 2024 Plans:*** - Use new and emergent advanced modeling and simulation tools and development activities to develop and deliver one new, integrated CWMD modeling capability to support in theater operational planning. - Expand development capabilities within the development, security, and operations (DevSecOps) pipeline and move to a more automated, secure, agile, and efficient System Development Life Cycle (SDLC); combine containerized technology environments enabling customer to package application development of all of its dependencies and process together with DoD approved Cloud solution to create hybrid, on premise/Cloud solutions to meet DTRA mission needs and DoD software development mandates; increase the security posture of the DTRA Experimentation Lab-Unclassified (DEL-U) enclave by meeting DISA Risk Management Framework and Continuous Monitoring measurements to ensure DTRA maintains Authority To Operate (ATO); implement automated security and monitoring measures in DEL-Classified enclave to meet Agency requirements for the Annual Security Review (ASR) and upcoming ATO (FY2024/25). - Provide ready access to the DoD High-Performance Computing Modernization Program (HPCMP) resources enabling researchers across the entire RD application spectrum to rapidly perform the detailed computer simulations integral to the successful execution of the Agency’s R&D Mission; enable performance engineers and DTRA application teams to collaborate,			

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
modernize, and optimize the heavily used High Fidelity (HF) computer codes for existing and future High-Performance Computing (HPC) architectures. - Facilitate international S&T cooperation with partners from 14+ countries, contributing to new U.S. CWMD capabilities, improved ally CWMD capability, and RDT&E cost sharing; conduct technology demonstration events for multiple CCMDs, helping to match developmental CWMD capabilities with critical warfighter needs. - Sponsor projects with DoD academic organizations, Federally Funded Research and Development Centers (FFRDCs), and U.S. think-tanks to gather insights on CMWD challenges for the Warfighter and refine strategic dialogues/symposia/fora to accommodate year-upon-year learning and advancement on anticipated future battlespace challenges. - Generate timely and actionable recommendations on countering and mitigating current and future WMD trends and challenges. - Conduct timely and relevant strategic studies and dialogues with international partners to facilitate year-upon-year learning on anticipated future challenges. - Refine strategic research projects to improve tangible outcomes and actionable recommendations for future activities to deter and counter WMD threats. - Provide in-depth research and analysis to anticipate, assess, and address key challenges related to strategic stability, strategic competition, multipolar escalation dynamics, limited WMD development and use, and other WMD threat trends by leveraging expert community resources. - Sponsor external research on strategic WMD and emerging threat topics and execution of bilateral, trilateral, and multilateral strategic dialogues with allies/partners.			
FY 2025 Plans: - Expand and modernize container technology capabilities integrated with cybersecurity framework methodologies (Zero Trust) within the DTRA Experimentation Lab's (DEL's) development, security, and operations (DevSecOps) pipeline. This will enable a more secure, agile, and efficient System Development Life Cycle coupled with DoD Enterprise Cloud Environment (DECE) to create a hybrid on-premise/Cloud solution to meet DTRA mission needs and DoD software development mandates. - Increase security modernization of the DEL unclassified and DEL classified enclaves meeting DISA-mandated Risk Management Framework and Continuous Monitoring (CM) measurements for an Authority To Operate (ATO), to include robust Zero Trust and Comply-to-Connect solutions. - Provide ready access to the DoD High Performance Computing Modernization Program (HPCMP) resources enabling researchers to rapidly perform detailed computer simulations integral to the successful execution of the Agency's R&D Mission. - Enable performance engineers and DTRA application teams to collaborate, modernize and optimize the heavily used High Fidelity (HF) computer codes for existing and future High-Performance Computing (HPC) architectures. - Provide advanced information technology engineering and component architecture development and integration. - Identify legacy code for application modernization for more productive provisioning of HPC assets.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RA / *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Facilitate technical exchanges with partners in 14+ countries and with all geographic and functional Combatant Commands to improve understanding of and refine requests to align developmental CWMD capabilities with critical warfighter needs. - Conduct technology demonstration events for at least two Combatant Commands to showcase capability solutions addressing critical theater CWMD requirements in cooperation with key U.S allies and increase early joint force operational input to CWMD capability development. - Generate timely and actionable recommendations on countering and mitigating current and future WMD trends and challenges. - Conduct timely and relevant strategic studies and dialogues with international partners to facilitate year-upon-year learning on anticipated future challenges. - Refine strategic research projects to improve tangible outcomes and actionable recommendations for future activities to deter and counter WMD threats. - Provide in-depth research and analysis to anticipate, assess, and address key challenges related to strategic stability, strategic competition, multipolar escalation dynamics, limited WMD development and use, and other WMD threat trends by leveraging expert community resources. - Sponsor external research on strategic WMD and emerging threat topics and execution of bilateral, trilateral, and multilateral strategic dialogues with allies/partners.			
FY 2024 to FY 2025 Increase/Decrease Statement: The decrease from FY 2024 to FY 2025 reflects net realignments: 1) From this project to Project RA in Program Element 0603160BR for the CWMD Information Integration Cell (CIIC) to provide visualization, simulation, data analysis, and decision support capabilities for CWMD situational awareness, 2) From DTRA's Operation and Maintenance (O&M) account to this project for advanced information technology engineering and component architecture development and integration, and 3) From this project to DTRA's O&M account for higher Agency priorities.			
Accomplishments/Planned Programs Subtotals	29.047	37.218	21.986

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• BA3/35/0603160BR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	70.234	86.415	82.711	0.000	82.711	76.041	76.146	86.289	88.165	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RA / *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• BA4/107/0604551BR: *CATAPULT*	6.953	8.328	7.475	0.000	7.475	7.625	7.777	7.933	8.100	Continuing	Continuing
• BA6/172/0605502BR: *SMALL BUSINESS INNOVATION RESEARCH*	16.591	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency			Date: March 2024
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	Project (Number/Name) RD / *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
RD: *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	326.950	109.737	119.670	106.576	-	106.576	107.899	107.340	109.484	111.675	Continuing	Continuing

A. Mission Description and Budget Item Justification

Nuclear Technologies and Capabilities Development encompasses the following related areas:

Research, development, test, and evaluation (RDT&E) to identify, develop, and exploit signatures associated with nuclear threats in support of U.S. capabilities that detect and interdict such threats; and locate, identify, and track special nuclear material and improve detection factors such as range, time, sensitivity, and accuracy to enhance Service and Special Mission Unit capabilities. These efforts support Department of Defense (DoD) requirements for countering terrorism, counterproliferation, nonproliferation, countering rogue states, and homeland defense.

RDT&E to systematically study signatures associated with adversary nuclear programs and nuclear detonations to gain knowledge or understanding necessary to: determine technical capabilities needed to improve DoD contingency planning activities; improve DoD situational awareness on the nuclear battlefield; and improve capabilities to attribute the source of a nuclear detonation.

Research and develop innovative technologies for the protection of mission-essential personnel, critical military and national defense capabilities, and associated control and support systems during a nuclear event. Research under this project supports the mission critical systems identified under DoD Instruction 3150.09, Chemical, Biological, Radiological, and Nuclear Survivability Policy. System vulnerability research develops nuclear assessment capabilities to support operational planning, weapons effects predictions, and strategic system design. This activity also provides the DoD's nuclear design and protection standards for new and existing systems, e.g., command and control facilities and aircraft. Key systems include the Nuclear Command and Control System, the net-centric thin-line, and both military and civilian satellites and associated support systems. Experimental capabilities research provides the warfighter with unique x-ray, gamma ray, and electromagnetic pulse (EMP) test capabilities in support of system survivability development, certification, and sustainment. These efforts also support international collaboration, user groups, case study reviews, and the Joint Atomic Information Exchange Group. The human survivability effort conducts research to develop and validate mortality and morbidity models associated with radiological and nuclear weapon effects.

Research and develop modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions; consolidate validated modeling tools for integrated functionality; predict system responses to nuclear and radiological weapons producing electromagnetic, thermal, blast, shock, and radiation environments; provide detailed adversary nuclear infrastructure characterization to enhance counterforce operations and hazard effects; and, develop foreign nuclear weapon outputs.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RD / *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

Delivers integrated applications, data analysis, and cloud-ready Artificial Intelligence (AI)-enhanced capabilities, using a cross-cutting platform supporting the full spectrum of nuclear operations, wargaming, and assessments. Provides timely electronic access to Nuclear Testing Archives supporting validation of the effectiveness of the Nuclear Deterrent and survivability of U.S. military assets without a return to nuclear testing.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: RD: Nuclear Technologies and Capabilities Development	109.737	119.670	106.576
Description: Project RD develops direct and indirect technologies for the detection of radiation and non- radiative signatures associated with nuclear threats, and advances warfighter capabilities to rapidly locate, characterize, and counter such threats. ***FY 2024 Plans:*** - Prototype search capabilities to increase document recognition by ~167%, photography by ~150%, and film by 400%, over the FY 2023 baseline metrics, enabling greater accessibility for nuclear technologies Subject Matter Experts (SMEs). - Integrate a computational methodology to estimate vehicle-specific radiation protection factors to assess personnel survivability. - Use the Mission Impacts of Nuclear Events (MINES) software to support design/execution of nuclear play in 10 DoD exercises (including 2 Title X), 1 North Atlantic Treaty Organization (NATO) or United Kingdom war-game/exercise, and 1 nuclear war-game for Combatant Commands (CCMDs). - Complete analysis of high-explosive experiment at Balapan nuclear testing site; deliver advanced models of yield estimation in extreme topography. - Develop electronics to replace Geiger tubes for high-dose rate applications to reduce the size, weight, power, and increase the actionable information available to end-users during Conventional Nuclear Integration (CNI) warfighting. - Transition improved electronics from applied research to prototyping and evaluate emerging National Nuclear Security Administration (NNSA) developed scintillators to reduce the size, weight, power, and cost, while increasing the performance of radiation detection systems; evaluate non-radiation approaches to detecting and geo-locating nuclear weapons or delivery systems. - Develop near-field technologies to improve real-time assessments of the geo-location, height-of-burst, and other characterization data from a nuclear explosion during battlefield operations. - Deliver improved multi-physics / multi-regime algorithms to bridge modeling gaps in time and burst altitude, and add additional EMP models to contribute to Nuclear Command, Control and Communications (NC3) modernization efforts, USAF Ground Based Strategic Deterrent, and USN Strategic Systems Programs (SSP) modernization - Deliver updated economic, social, communications, and electrical power impact models for significant nuclear weapons environments. - Deliver improved nuclear weapons environment model that reduces uncertainty of fratricide on military systems. - Deliver improved thermal radiation environment model valid across a broader range of weapon employment scenarios, geographies, and atmospheric conditions.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RD / *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Deliver air blast models jointly with the UK appropriate for non-ideal environments. - Deliver improved nuclear weapons environment model for nuclear fire ignition and spread in urban areas accounting for building types, with initial atmospheric conditions from DoD-approved numerical weather model forecasts. - Nuclear Survivability (NS) Military Standards (MIL-STDs) and Military Handbooks (MIL-HDBKs) for Space and Missiles (NTSI): Final coordination of Nuclear Space Environments MIL-STD, Phase 1 of the Comprehensive Endo-/Exo-Atmospheric Nuclear Environment Standard (CANES) revision. - Support Nuclear Weapons Effects survivability testing at the National Ignition Facility; execute experiments for complex surfaces and optimization of sources; and support 41 weeks of strategic user testing at the West Coast Facility. - Transition scintillation hardware-in-the-loop from prototype to user test capability, demonstrate modular electromagnetic pulse capability on warfighter asset and begin transition from prototype to user test capability, and research on characterization and mitigation of prompt neutron and gamma dose rate effects. - Deliver version 6.0 of Testable Hardware Toolkit and support over 40+ customers with training and requests; conduct response validation test campaign, and conduct large solar cell experiment on Quad Eagle. - Demonstrate the full operating capability of Quad Eagle X-ray Simulator to the Test and Evaluation (T&E) community and conduct a Critical Design Review of Pithon II data sources to modernize diagnostics for use in future test events. - Publish Ground Systems Hardening MIL-STD and MIL-HDBK-4023 (Surface Vessel EMP Hardening).			
FY 2025 Plans: - Implement Mission Impacts of Nuclear Events Software (MINES) for adjudication of nuclear play in four Service, four Combatant Command, two Joint Staff, four DTRA, two US Forces Korea, and four Five Eyes (FVEY)/North Atlantic Treaty Organization (NATO) wargames and exercises. - Complete prototype for next-generation radionuclide particulate collection and analysis system for the International Monitoring System for greater awareness of nuclear testing activities in denied areas. - Deliver improved nuclear weapons environment models that improve vulnerability assessments, reduce uncertainty of fratricide and thermal effects on military systems, and reduce uncertainty from nuclear ground shock. - Deliver improved structure damage models from nuclear air blast insults. - Deliver improved lower-altitude nuclear disturbed environment tools and additional EMP models to contribute to Nuclear Command, Control and Communications (NC3) modernization efforts, USAF Ground Based Strategic Deterrent, and USN Strategic Systems Programs (SSP) modernization. - Deliver Electromagnetic Reliability and Effects Prediction (EMREP) toolsets with relevant test data for technical reachback, exercise support, and data visualization of unhardened EMP effects to support nuclear verification and survivability. - Complete Phase 2 of the Comprehensive Endo-/Exo-Atmospheric Nuclear Environment Standard			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RD / *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
(CANES) Nuclear Survivability Military Standards (MIL-STD) revision in support of acquisition programs survivability certification and compliance efforts. - Support Nuclear Weapons Effects survivability testing at the National Ignition Facility (NIF); execute experiments for the optimization of X-ray, neutron, and combined environment sources for strategic testing at the NIF; and support 41 weeks of strategic user testing and 14 weeks of development testing at the West Coast Facility. - Demonstrate operating capability of Pithon II X-ray Simulator and transition to test and evaluation warfighter community; demonstrate mixed gas and multishell nozzle cold x-ray generation platforms on Quad Eagle. - Transition prototype sensors to replace Geiger tubes for high-dose rate applications to reduce the size, weight, power, and increase the actionable information available to end-users during Conventional Nuclear Integration (CNI) warfighting. - Develop a prototype Cadmium Zinc Telluride (CZT)-based multi-function diagnostics tool and perform early operational assessments with end-users to reduce the size, weight, and power, while increasing performance of radiation sensors. - Develop novel nuclear search algorithms, including those that use novel machine learning approaches to improve threat identification software. - Integrate new capabilities into the Comprehensive Nuclear Effects Model (CNEM) to improve the model's underground facility response to nuclear strike, model fire ignition and spread from nuclear strike. - Integrate new capabilities into the Comprehensive Nuclear Effects Model (CNEM) to improve the model's underground facility response to nuclear strike, model fire ignition and spread from nuclear strike. - Integrate nuclear incident analytic outputs with command and control (C2) and geospatial systems in a chemical, biological, radiological, and nuclear (CBRN) warning and reporting networks testbed to provide enhanced situational awareness in support of Conventional Nuclear Integration. Analytics to include yield, height of burst (HOB), near-real time hazard prediction and decision support outputs. - Improve Over the Horizon Arms Control (OTHAC) capability, replacing Arms Control Enterprise System (ACES) with a modern application hosted on the Nuclear, Chemical, Biological, Radiological, and high Explosive (NCBRE) Analysis Toolset (NATs) platform in support of arms control monitoring modernization. - Expand and advance Optical Character Recognition (OCR) and multimedia (video) Artificial Intelligence/Machine Learning (AI/ML) methods to increase discoverability of the Defense Threat Reduction Information Analysis Center (DTRIAC) multimedia collection to support research in the DoD nuclear weapons community. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease from FY 2024 to FY 2025 reflects the net impact of 1) the transition of nuclear survivability activities to Project RD in Program Element 0603160BR due to the progression of these technologies to the advanced technology development phase, and			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RD / *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
2) decreased investment in nuclear technologies integration and nuclear survivability activities to fund higher priority Departmental requirements, and 3) increased investment in nuclear detection, assessments, and nuclear and radiological effects.			
Accomplishments/Planned Programs Subtotals	109.737	119.670	106.576

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• BA3/35/0603160BR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	64.264	51.697	76.899	0.000	76.899	75.475	74.596	72.108	73.717	Continuing	Continuing
• BA5/139/0605000BR: *COUNTER WEAPONS OF MASS DESTRUCTION SYSTEMS DEVELOPMENT*	14.044	14.414	14.841	0.000	14.841	15.069	17.522	17.860	18.323	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency			Date: March 2024
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	Project (Number/Name) RG / *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
RG: *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	186.425	30.311	30.871	28.193	-	28.193	29.028	31.788	32.423	33.104	Continuing	Continuing

A. Mission Description and Budget Item Justification

Counter Weapons of Mass Destruction (CWMD) Technologies and Capabilities Development encompasses the following areas:

Defeat Technologies supports Combatant Commands through research, development, and transition of offensive weapons and other capabilities to counter Weapons of Mass Destruction (WMD) while mitigating collateral contamination effects. Technology development focuses on the physical or functional defeat of WMD threat materials, an adversary's ability to deliver the same, and the physical and nonphysical support networks enabling both. It does so through the systematic identification and maturation of technologies capable of defeating WMD agents or agent-based processes and selecting technologies for integration into weapons, delivery systems, or rapid WMD elimination capabilities. This effort includes developing specific WMD agent/agent-based process simulants, sub-scale test infrastructure, and sampling capability required for effective development, testing, and evaluation of next-generation CWMD capabilities. The project places a high priority on understanding, characterizing, and validating potential weapon effects within mathematical confidence as it relates to the unintended release of hazardous threat materials. Energetics research develops materials and weapon design technology providing defeat capabilities for engaging hard and deeply buried targets that are beyond current high explosive blast/fragmentation warhead technology. Technologies with the potential for weapon and capability integration are transitioned to Budget Activity (BA) 3, Advanced Technology Development (ATD) efforts. On a limited basis, technology test data is shared with coalition partners.

WMD counterforce technologies research develops weapons effects modeling algorithms, full and sub-scale test series required to investigate CWMD weapon effects and sensor performance, and visualization and situational awareness tools to support the next generation Technical Reachback cell. These activities are critical enablers for the development of advanced CWMD planning tools. This effort couples long-range fundamental and applied research with technology development in the physical, life, and computational sciences to support kill chain activities in countering emerging WMD threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: RG: Counter WMD Technologies and Capabilities Development	30.311	30.871	28.193
Description: Project RG uses applied research to develop counter WMD (CWMD) technologies and capabilities.			
FY 2024 Plans: - Modernize and evolve instrumentation and diagnostics capability to support test and evaluation activities across the CWMD spectrum, and develop new methods to address the evolving threats. Includes improving data communications links, enhancing acoustic temperature systems, and networking autonomous underground vehicles (UGVs) with obstacle avoidance capabilities.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RG / *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Remediate and restore existing test bed articles to continue support across the CWMD spectrum. Includes structure demolition and clean-up at White Sands Missile Range (WSMR), New Mexico. - Replicate, test, and evaluate identified threat WMD systems and use tactics, techniques, and procedures to support the development of WMD detection, characterization, and countermeasures documented in Combatant Command (CCMD) requirements. - Perform threat-relevant test and evaluation activities to document unique signatures that identify, characterize, and determine the effectiveness of defeat techniques for WMD proliferation and production facilities, leveraging the Nevada National Security Site, and a novel transportable capability that can replicate specific threats of interest to the CCMDs. - Design and build testbeds in small, mid, and large-scale environments capable of capturing data needed to improve and validate high-fidelity modeling and simulation tools used to predict U.S. weapon and adversary threat effects on facilities of interest.			
FY 2025 Plans: - Continue to advance additive manufacturing capabilities within the Next Generation Defeat portfolio in order to enhance/improve current capabilities. - Research and develop an initial prototype for small-scale testing of a ruggedized/miniaturized high-powered laser to meet the needs of Explosive Ordnance Disposal (EOD) CWMD defeat. - Research and develop an initial prototype for novel 3-D energetics to enable end-users to disrupt upstream WMD. - Develop and improve next generation core Modular Autonomous C-WMD System (MACS) single-platform autonomous navigation as well as multi-agent coordination and data-fusion competencies and core algorithms to enable improved Manned-Unmanned-Teaming (MUM-T). - Finish the final three tests of the Agent Defeat Modeling and Simulation Baseline (ADMB) capstone test series. Perform post-capstone validation of agent release/defeat models and source term generation for collateral effects assessment. - Initiate Legacy Weapons Test Program with focus on pacing and acute time-sensitive mobile WMD threats. - Conduct testing blast response and residual capacity of precast columns, precast beam-column connections, and precast load-bearing walls in collaboration with Singapore. - Accredit and transition Optimized Weapon Load-out (OWL) tool to the Integrated Munitions Effects Assessment (IMEA) Program improving the accuracy and fidelity of weapons effects models to aid targeting decisions against challenging pacing and acute threats. - Deliver improved automated targeting capabilities utilizing continuous machine learning and trained neural networks to automate portions of the targeting process improving lethality against WMD and Hard and Deeply Buried Targets (HDBT). - Continue delivery of real-time mapping and situational awareness innovations for subterranean CWMD operations through Edge-Enhanced Mapping & Positioning System (E2MAPS). - Develop streaming of underground facility schematics to contact lens displays.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RG / *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Develop map compression algorithms for communications-limited operations. - Advance novel map visualizations in augmented reality to reduce incidence of mission errors. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease from FY 2024 to FY 2025 is due to decreased investment in CWMD hard target defeat and WMD counterforce technologies to fund higher priority Departmental requirements.			
Accomplishments/Planned Programs Subtotals	30.311	30.871	28.193

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• BA3/35/0603160BR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	251.650	254.610	246.304	0.000	246.304	256.101	260.045	265.246	270.816	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency			Date: March 2024
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	Project (Number/Name) RR / *CWMD TEST AND EVALUATION*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
RR: *CWMD TEST AND EVALUATION*	164.985	17.718	21.111	18.200	-	18.200	20.939	19.786	20.210	20.663	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Countering Weapons of Mass Destruction (CWMD) Test and Evaluation project provides a unique national test capability for simulated Weapons of Mass Destruction (WMD) facilities and processes. This capability provides DTRA's structured and systematic end-to-end test event planning, preparation, management, execution, and data analysis. It also offers test instrumentation (data acquisition systems and optics), scientific analysis and predictions, test article construction, test article/test bed remediation, tunnel mining, architectural and engineering design, systems engineering and integration, and test data management. The project leverages 50 years of expertise in investigating weapons effects and target response across the spectrum of hostile environments that could be created by proliferate nations or terrorist organizations with access to advanced conventional weapons or WMD. Subject matter experts design full and sub-scale testing strategies focusing on weapon-target interaction with fixed soft and hardened facilities to include above ground facilities, cut-and-cover facilities, and deep underground tunnels.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: RR: Countering WMD Test and Evaluation	17.718	21.111	18.200
Description: Project RR provides innovative science and technology to enable the development, evaluation, and validation of capabilities for DTRA, DoD, and federal partners that maintain U.S. superiority in countering weapons of mass destruction (CWMD) and emerging threats, mitigate the risks of technological surprise, and respond to the warfighter's CWMD requirements.			
FY 2024 Plans: - Modernize and evolve instrumentation and diagnostics capability to support test and evaluation activities across the CWMD spectrum, and develop new methods to address the evolving threats. Includes improving data communications links, enhancing acoustic temperature systems, and networking autonomous underground vehicles (UGVs) with obstacle avoidance capabilities. - Remediate and restore existing test bed articles to continue support across the CWMD spectrum. Includes structure demolition and clean-up at WSMR, NM. - Replicate, test, and evaluate identified threat WMD systems and use tactics, techniques, and procedures to support the development of WMD detection, characterization, and countermeasures documented in CCMD requirements. - Perform threat-relevant test and evaluation activities to document unique signatures that identify, characterize, and determine the effectiveness of defeat techniques for WMD proliferation and production facilities, leveraging the Nevada National Security Site, and a novel transportable capability that can replicate specific threats of interest to the CCMDs.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency		Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RR / *CWMD TEST AND EVALUATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Design and build testbeds in small, mid, and large-scale environments capable of capturing data needed to improve and validate high-fidelity modeling and simulation tools used to predict U.S. weapon and adversary threat effects on facilities of interest. ***FY 2025 Plans:*** - Improve efficiency and effectiveness of DTRA's RDT&E programs by procuring and guaranteeing availability of software tools that provide rapid analysis and modeling. - Purchase necessary test and life safety equipment in support of RDT&E programs. - Support test bed construction, geological surveys, and site remediation. - Provide calibration and life cycle management of safety and air sampling monitoring equipment. - Provide testing support for Agent Defeat Modeling and Simulation Baseline (ADMB) efforts to improve modeling capabilities. - Provide integration of fluorescence detection, chemical sensors, and radiological detectors into autonomous unmanned ground vehicle platforms. - Deliver four test campaigns across three novel test activities to refine collection of Tactics, Techniques and Procedures; validate new sensors; and broaden U.S. Government search, collection, and characterization capabilities. - Provide program management, operational/logistics support, and explosives support consisting of test planning, fielding, management, safe execution and results analysis for 100 blast tests. - Support operational and developmental testing at three fixed locations (Kirtland Air Force Base, White Sands Missile Range (WSMR), and the Nevada National Security Site) and maintain an expeditionary capability to enable testing activities at multiple remote locations. - Provide explosives support including planning, operations, explosives development, procurement, explosives safety, operational use, fielding, firing, and disposal of explosives for operational and developmental testing. - Remediate a penetration test target at WSMR to comply with WSMR agreements to remove targets no longer required. - Clean-up and close open pits and remove abandoned cable hazards on the Small and Intermediate Test Beds on WSMR. - Protect the local Albuquerque Community through improvements to the in-house seismic/acoustic laboratory, enabling safe conduct of explosive testing at Kirtland Air Force Base. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease from FY 2024 to FY 2025 is due to decreased investment in test support and assets to fund higher priority Departmental requirements.			
Accomplishments/Planned Programs Subtotals	17.718	21.111	18.200

Exhibit R-2A, RDT&E Project Justification: PB 2025 Defense Threat Reduction Agency			Date: March 2024
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH*	**Project (Number/Name)** RR / *CWMD TEST AND EVALUATION*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• BA3/35/0603160BR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	10.461	8.225	12.130	0.000	12.130	12.530	13.118	13.380	13.661	Continuing	Continuing
• BA3/36/0603176BR: *ADVANCED CONCEPTS AND PERFORMANCE ASSESSMENT*	6.343	7.990	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.495

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs.