Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Defense Threat Reduction Agency	Date: March 2023
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 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	915.573	191.050	191.632	208.870	-	208.870	212.096	206.741	202.757	206.871	Continuing	Continuing
RA: *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*	382.969	45.294	32.140	37.218	-	37.218	37.914	29.639	30.543	31.213	Continuing	Continuing
RD: *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELEOPMENT*	229.184	97.766	106.095	119.670	-	119.670	120.980	122.543	119.240	121.625	Continuing	Continuing
RG: *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	155.280	31.145	30.277	30.871	-	30.871	31.589	32.220	31.788	32.423	Continuing	Continuing
RR: *CWMD TEST AND EVALUATION*	148.140	16.845	23.120	21.111	-	21.111	21.613	22.339	21.186	21.610	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 2024 Defense Threat Reduction Agency	Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	197.011	192.162	205.414	-	205.414
Current President's Budget	191.050	191.632	208.870	-	208.870
Total Adjustments	-5.961	-0.530	3.456	-	3.456
• 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	-0.812	0.000			
• SBIR/STTR Transfer	-5.149	0.000			
• Realignments	-	0.000	3.456	-	3.456
• FFRDC	-	-0.530	-	-	-

Change Summary Explanation

The increase in FY 2024 from the previous President's Budget is due to the net impact of 1) increased investment in Project RD: Nuclear Technologies and Capabilities Development for nuclear survivability funded by decreased investment in Project RD in PE 0603160BR and 2) the realignment of resources from from Project RR: Countering WMD Test and Evaluation to Project RU: Basic Research for Countering WMD in PE 0601000BR.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency			Date: March 2023
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 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
RA: *CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES*	382.969	45.294	32.140	37.218	-	37.218	37.914	29.639	30.543	31.213	Continuing	Continuing

A. Mission Description and Budget Item Justification

The 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 Countering WMD (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 2022	FY 2023	FY 2024
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	45.294	32.140	37.218
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 2023 Plans:*** - Develop new and emergent advanced modeling and simulation tools, applications and other development activities to develop two, and deliver one new, integrated CWMD modeling capabilities to support in theater operational planning. - Develop analytics using machine and deep learning to provide geospatial prediction analysis and behavior variance for CWMD pattern-of-life analysis. - Develop processing algorithms using artificial intelligence and machine learning to tip and cue analysts for CWMD threat network analysis. - Provide strategic, urgent Counter-Threat capability development for urgent and emergent theater needs, with focus on detector and sensor design, data analysis and storage, search capabilities, defeat pathways, and continuous test site technical advancement. - Develop data integration, analysis and visualization solutions in support of CCMDs, Special Operations Forces, and other mission partners. Incorporate new technologies to increase the scalability, reusability, and transferability of data science capabilities developed across commands/units supported.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 2022	FY 2023	FY 2024
- Apply advanced analytics to develop novel capabilities for illuminating and disrupting procurement and proliferation networks and coordinating CWMD operations. Will transition at least two operational prototypes to supported commands/units or advanced developers. - Conduct studies to understand and explore the Chemical, Biological, Radiological, and Nuclear spectrum and enabling technology challenges facing our warfighters in the next five to ten years. ***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 SecDevOps 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, modernize, and optimize the heavily used High Fidelity (HF) computer codes for existing and future 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, 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 2022	FY 2023	FY 2024
- 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 2023 to FY 2024 Increase/Decrease Statement:*** The increase from FY 2023 to FY 2024 funds 1) high performance computing code modernization; 2) advanced modeling and simulation tools to develop and deliver a new integrated CWMD modeling capability in support in theater operational planning; 3) increased capacity to leverage and evaluate department capabilities to develop innovative and agile new technologies to counter the full spectrum of weapons of mass destruction; and 4) Quick Reaction Capability requirements and additional information technology engineering efforts directly in support of the Agency's CWMD mission.			
Accomplishments/Planned Programs Subtotals	45.294	32.140	37.218

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 33/0603160BR/RA: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	76.268	78.991	86.415	-	86.415	90.571	88.687	89.660	92.136	Continuing	Continuing
• 105/0604551BR/RA: *CATAPULT INFORMATION SYSTEM*	6.979	7.130	8.328	-	8.328	7.475	7.625	7.777	7.933	Continuing	Continuing
• 144/0605502BR/ RA: *SMALL BUSINESS INNOVATION RESEARCH*	16.870	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 2024 Defense Threat Reduction Agency			Date: March 2023
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 DEVELEOPMENT*	

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
RD: *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELEOPMENT*	229.184	97.766	106.095	119.670	-	119.670	120.980	122.543	119.240	121.625	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 2024 Defense Threat Reduction Agency		Date: March 2023
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 DEVELEOPMENT*

Delivers integrated applications, data analysis, and cloud-ready AI-enhanced capabilities, cross-cutting platform supporting 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 2022	FY 2023	FY 2024
Title: RD: Nuclear Technologies and Capabilities Development	97.766	106.095	119.670
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 2023 Plans:*** - Conduct technical demonstration of radiological-nuclear (RN) Virtual Reality/Augmented Reality (VR/AR) capabilities. - Investigate autonomous operations and swarming applications for radiation sensors on unmanned platforms. - Mature advanced search and discovery (ASD) of archived nuclear documents using AI/ML algorithms to support increased user portal retrieval capability of information from documents (25%), photographs (10%), and films (2%) to enable nuclear survivability and effects algorithm programs with higher fidelity data. - Enhance Nuclear, Chemical, Biological, Radiological, High Explosives (NCBRE) Artificial Intelligence/Machine Learning Environment (NAIMLE) data curation and operability specific to RN data types; integration of container development between working data models related to nuclear missions - Integrate 3D effects model supporting aviation assets in theater nuclear planning tool to improve nuclear planning capability for U.S. Army and CCMDs. - Deliver tools for visualization of data feeds to meet warfighter needs and for sharing data with foreign partners (Supporting Nuclear Enterprise Threat Characterization and Nuclear Enterprise Threat Isolation). - Facilitate three nuclear war-games design and operation with Mission Impacts of Nuclear Events (MINES); Support five DoD nuclear war-games and exercises design and operation with SME, existing tools, and MINES capabilities; Sponsor/host two nuclear war-games with updated MINES capabilities. - Initiate x-ray development to optimize key performance parameters on new Quad Eagle Simulator; enable growth and continued availability of DTRA's capabilities. - Develop EMP Planning Tools (Electromagnetic Reliability & Effects Prediction (EMREP) v9, STRATCOM Support equipment, Nuclear Battlefield Test Support). - Conduct EMP modular expansion and data demonstration, scintillation Hardware-in-the-Loop (HWIL) production/certification demonstrations, modeling and experimentation to characterize dose rate, and neutron effects. ***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 SMEs.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 DEVELEOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- 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 NATO or UK war-game/exercise, and 1 nuclear war-game for 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. - 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 Nuclear Survivability (CANES) Environment MIL-STD 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 DEVELEOPMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- 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 2023 to FY 2024 Increase/Decrease Statement:*** The increase from FY 2023 to FY 2024 is due to 1) increased investment in nuclear survivability for nuclear weapons effects modeling and simulation (M&S), targeting, and consequence-of-execution in response to increased demand and 2) increased investment in nuclear wargaming support and assessments with a renewed emphasis on Great Power Competition.			
Accomplishments/Planned Programs Subtotals	97.766	106.095	119.670

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 33/0603160BR/RD: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	53.969	60.249	51.697	-	51.697	52.341	54.236	53.596	54.667	Continuing	Continuing
• 134/0605000BR/RD: *COUNTER WEAPONS OF MASS DESTRUCTION SYSTEMS DEVELOPMENT*	13.695	14.403	14.414	-	14.414	14.341	14.569	16.922	17.260	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 2024 Defense Threat Reduction Agency			Date: March 2023
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 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
RG: *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT*	155.280	31.145	30.277	30.871	-	30.871	31.589	32.220	31.788	32.423	Continuing	Continuing

A. Mission Description and Budget Item Justification

Counter WMD 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 combat 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 combating emerging WMD threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: RG: Counter WMD Technologies and Capabilities Development	31.145	30.277	30.871
Description: Project RG uses applied research to develop counter WMD technologies and capabilities. ***FY 2023 Plans:*** - Develop, test, and evaluate specialized capabilities to protect against and defeat WMD though diagnostics and characterization of Agent Defeat Modeling and Simulation Baseline (ADMB). - Conduct lab-scale tests and large/full-scale test event to validate source term prediction capabilities for ADMB. - Conduct small and mid-scale tests to verify weapons effects phenomenology (WEP) models (e.g. over-burial and penetration).			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 2022	FY 2023	FY 2024
- Begin to explore a Cloud Based Solution transition and continue multi-dimensional upgrades into the Vulnerability Assessment and Protection Option (VAPO) Platform. - Complete partnership with U. S. Army Engineer Research and Development Center (ERDC) and the United Kingdom (UK) to deliver a VAPO capability allowing end users to perform an assessment of aerial delivered threats and weapons. - Initiate combined effects model development with completion of Hi-Fi calculations. - Explore existing Artificial Intelligence/Machine Learning (AI/ML) advancements for weapons effects phenomenology RDT&E application. - Program, plan, and manage Explosive Ordnance Disposal (EOD) diagnostics and defeat projects and deliver technologies. - Program, plan, and manage low-visibility and breaching projects and deliver technologies. - Provide Systems Engineering and Integration support for internal DTRA programs and provide subject matter expertise to external organizations with efforts related to CWMD and hard and deeply buried target (HDBT) defeat. - Deliver Targeting Recommendation Packages and conduct training activities as requested by the CCMDs. - Support weapons effects testing programs and weapons development activities in support of Combatant Command CWMD requirements. ***FY 2024 Plans:*** - Complete validation and accreditation of ADMB for agent defeat and release models to improve collateral effects prediction for CWMD targeting. - Integrate patterns of life algorithms programs that provide support to USSOCOM analysts in the field with automated tools. - Deliver text analytics capabilities to develop knowledge graphs which provide indications and warning of WMD information, products, or technologies that could be directly misapplied to pose a significant chemical/biological WMD threat. - Conduct studies to fundamentally support Next Generation Agent Defeat capabilities in support of strategic weapons capabilities to hold WMD targets at risk while minimizing collateral effects. - Complete rapid prototyping and rapid fielding of CWMD Applique Kit (V2) for U.S. Army Small Multi-Purpose Equipment Transport (SMET) in support of United States Army Special Operations Command Request for Support. - Develop first generation WMD defeat and internal dispersion neural network models to provide delivery of optimized attack planning leveraging neural networks focusing on strategic near-peer targets. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase from FY 2023 to FY 2024 is due to inflation.			
Accomplishments/Planned Programs Subtotals	31.145	30.277	30.871

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 33/0603160BR/RG: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	265.085	257.951	254.610	-	254.610	260.476	264.328	260.045	265.246	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 2024 Defense Threat Reduction Agency			Date: March 2023
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 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
RR: *CWMD TEST AND EVALUATION*	148.140	16.845	23.120	21.111	-	21.111	21.613	22.339	21.186	21.610	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Countering WMD Test and Evaluation project provides a unique national test capability for simulated WMD facilities and processes. This capability provides 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 2022	FY 2023	FY 2024
Title: RR: Countering WMD Test and Evaluation	16.845	23.120	21.111
Description: Project RR provides a unique national test bed capability for the study of weapon-target interaction, simulated WMD facility characterization and defeat testing, and evaluation of asymmetric threats observed in theater to evaluate the implications of WMD and other special weapon use against U.S. military and civilian assets. Additionally, Project RR develops instrumentation and identifies unique threat signatures that can support early detection and development of countermeasures to support Combatant Command needs.			
FY 2023 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. - Remediate and restore existing test bed articles to continue support across the CWMD spectrum. - 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. - 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 2022	FY 2023	FY 2024
- Maintain ability to execute RDT&E testing at Kirtland AFB, the White Sands Missile Range (WSMR), and the Nevada National Security Site. ***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. - 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 2023 to FY 2024 Increase/Decrease Statement:*** The decrease from FY 2023 to FY 2024 is due to decreased investment in some test articles and infrastructure upgrades to fund the expansion of post-doctoral expertise and basic research activities in the University Research Alliances (URAs) in PE 0601000BR.			
Accomplishments/Planned Programs Subtotals	16.845	23.120	21.111

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 33/0603160BR/RR: *COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT*	4.639	9.530	8.225	-	8.225	7.908	7.928	6.016	6.136	Continuing	Continuing
• 34/0603176BR/RR: *ADVANCED CONCEPTS AND PERFORMANCE ASSESSMENT*	0.000	6.505	7.990	-	7.990	7.962	7.934	7.102	7.244	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2024 Defense Threat Reduction Agency		Date: March 2023
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 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

Remarks

D. Acquisition Strategy

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