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

<b>Appropriation/Budget Activity</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / <i>COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	1,027.974	399.961	406.721	400.947	-	400.947	411.296	415.179	409.317	418.185	Continuing	Continuing
RA: <i>CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES</i>	199.216	76.268	78.991	86.415	-	86.415	90.571	88.687	89.660	92.136	Continuing	Continuing
RD: <i>NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT</i>	195.133	53.969	60.249	51.697	-	51.697	52.341	54.236	53.596	54.667	Continuing	Continuing
RG: <i>CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT</i>	633.455	265.085	257.951	254.610	-	254.610	260.476	264.328	260.045	265.246	Continuing	Continuing
RR: <i>CWMD TEST AND EVALUATION</i>	0.170	4.639	9.530	8.225	-	8.225	7.908	7.928	6.016	6.136	Continuing	Continuing

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

The Advanced Technology Development portfolio is aligned with National and DoD strategic objectives and with Science and Technology (S&T) investment direction established annually by the Defense Threat Reduction Agency (DTRA). The objectives directly support policy and planning guidance from the Executive Office of the President, the Department of Defense (DoD), and the broader Weapons of Mass Destruction (WMD) threat reduction community.

The portfolio advances the Countering WMD (CWMD) mission by selecting advanced technology development initiatives that meet the following criteria: (1) efforts are clearly defined and directly linked to mission-specific capability requirements of DTRA, the Military Departments, Combatant Commanders, other DoD and federal agencies, and international partners; (2) preliminary assessments of subsystems and components offer the highest potential for technological feasibility, operability, and producibility upon transition out of S&T research; (3) activities demonstrate cost effectiveness or cost reduction potential of technologies during field testing or simulation at scale.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	409.862	395.721	407.669	-	407.669
Current President's Budget	399.961	406.721	400.947	-	400.947
Total Adjustments	-9.901	11.000	-6.722	-	-6.722
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	11.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.812	0.000			
• SBIR/STTR Transfer	-10.713	0.000			
• Realignment	-	-	-6.722	-	-6.722

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

**Project: RD: *NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT***

Congressional Add: *Data-Driven Methods of Nuclear Weapon Discovery*

Congressional Add Subtotals for Project: RD

	<b>FY 2022</b>	<b>FY 2023</b>
	4.000	0.000
Congressional Add Subtotals for Project: RD	4.000	0.000
	4.000	6.000
	2.500	0.000
	0.000	5.000
Congressional Add Subtotals for Project: RG	6.500	11.000
Congressional Add Totals for all Projects	10.500	11.000

**Project: RG: *CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT***

Congressional Add: *Detection and Tracking Technology*

Congressional Add: *Reduced Order Models*

Congressional Add: *Advanced Manufacturing of Energetics*

Congressional Add Subtotals for Project: RG

Congressional Add Totals for all Projects

**Change Summary Explanation**

The decrease in FY 2024 from the previous President's Budget is due to decreased investment in Projects RA: CWMD Cross-Cutting Technical and Information Sciences, RD: Nuclear Technologies and Capabilities Development, and RR: CWMD Test and Evaluation to fund increased investment in 1) Project RR: CWMD Test and Evaluation in PE 0603176BR, 2) Project RD: Nuclear Technologies and Capabilities Development in PEs 0602718BR and 0605000BR, and 3) Project RA: CWMD Cross-Cutting Technical and Information Sciences in PE 0604551BR.

**UNCLASSIFIED**

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<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RA / CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
RA: CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES	199.216	76.268	78.991	86.415	-	86.415	90.571	88.687	89.660	92.136	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The CWMD Cross-Cutting Technical and Information Sciences project provides technical expertise through continuous reach-back and quick reaction support to the United States and its allies across the Countering Weapons of Mass Destruction (CWMD) mission space. The project performs continuous modeling of ad hoc computational analyses on the consequences of Weapons of Mass Destruction (WMD) in consultation with military and civilian planners, warfighters, and first responders. The project also supports international CWMD cooperation by developing technologies and concepts suitable for foreign release.

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

	FY 2022	FY 2023	FY 2024
<b>Title:</b> RA: CWMD Cross-Cutting Technical and Information Sciences	76.268	78.991	86.415
<b>Description:</b> Project RA develops modeling and simulation capabilities and provides technical reachback support to maintain and increase decision advantages for the United States and its allies through improved situational understanding across the complete CWMD mission space.			
<b>FY 2023 Plans:</b>			
- Develop tools to improve CWMD situational awareness capabilities integration into Android/web based environments supporting the warfighter.			
- Provide 24/7 technical reachback assistance, decision support and planning support to CCMD, Service, interagency and other government customers to support immediate mission and operational environments.			
- Provide critical training support in CWMD-relevant models to over 500 strategic partner community students.			
- Anticipate responding to over 1250 requests for information/assistance with over 95% timeliness in responses.			
- Facilitate technical exchanges with partners in at least 14 countries, and with all geographic and functional CCMDs, to improve understanding of and refine requirements. Will conduct at least one CCMD technology demonstration event to showcase and deliver capability solutions to theater customers to meet critical CWMD requirements.			
- Leverage applied research from within the broader portfolio to develop prototypes for fielding and testing, then will transition them to partner organizations with unique strategic customers to meet requirements aligned with the current National Defense Strategy.			
<b>FY 2024 Plans:</b>			

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RA / CWMD CROSS-CUTTING TECHNICAL AND INFORMATION SCIENCES

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>- Provide 24/7 technical reachback assistance, decision support and planning support to CCMD, Service, interagency and other government customers to support immediate mission and operational environments; respond to over 1200 requests for information/assistance with over 95% timeliness in responses.</p> <p>- Develop data integration, analysis and visualization solutions in support of CCMDs, Special Operations Forces, and other mission partners; apply advanced analytics to develop novel capabilities for illuminating and disrupting procurement and proliferation networks and coordinating CWMD operations; transition operational prototype applications/processes to supported commands/units or sustainment programs.</p> <p>- Develop and deliver critical technical capabilities responsive to urgent, emergent theater requirements in support of critical strategic partners via non-traditional, efficient acquisition pathways; deliver timely technical capabilities in response to emergent needs that would otherwise not be met in the required timeline.</p> <p>- Enhance and integrate toolset for capturing, documenting, decomposing, and prioritizing DTRA RDT&amp;E activities, including the identification and de-confliction of redundancies across DTRA, greater DoD and broader government CWMD capability development activities.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase from FY 2023 to FY 2024 funds quick reaction capabilities in response to emergent threats posed by highly competitive security environments characterized by diverse and dynamic weapons of mass destruction (WMD) risks across multiple domains. While the threat posed by Russia is acute, China – through rapid strategic military expansion, pursuit of advanced technical capabilities, and an aggressive regional posture – is the pacing challenge. DTRA’s R&amp;D efforts under this program will leverage cross-departmental capabilities to develop innovative and agile new technologies to counter the full spectrum of emergent WMD threats identified by combatant commands and services.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	76.268	78.991	86.415

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 23/0602718BR/RA: COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH	45.294	32.140	37.218	-	37.218	37.914	29.639	30.543	31.213	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

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 144/0605502BR/ RA: SMALL BUSINESS INNOVATION RESEARCH	16.870	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	16.870	16.870

**Remarks**

**D. Acquisition Strategy**

Assessment and selection of best performer for developmental requirements to meet specific military capability needs.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Defense Threat Reduction Agency										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 0400 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT				<b>Project (Number/Name)</b> RD / NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
RD: NUCLEAR TECHNOLOGIES AND CAPABILITIES DEVELOPMENT	195.133	53.969	60.249	51.697	-	51.697	52.341	54.236	53.596	54.667	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

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, counter proliferation, 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 development 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.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> RD: Nuclear Technologies and Capabilities Development	49.969	60.249	51.697

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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**B. Accomplishments/Planned Programs (\$ in Millions)**

**Description:** Project RD develops, integrates and transitions radiation detection technologies, and systems, tools, techniques, and procedures that take advantage of non-radiation based signatures, in order to advance warfighter capabilities to rapidly detect, localize, characterize, and interdict nuclear and radiological threats.

**FY 2023 Plans:**

- Provide USSTRATCOM with Nuclear Capability Services (NuCS) integration of five improved Enhanced Consequence Analysis (ECA) models.
- Deliver improved nuclear weapons environment model that accounts for nuclear fire ignition in thick fuels.
- Conduct test at the Large Blast Thermal Simulator (LBTS) to quantify combined air blast and thermal effects.
- Deliver improved nuclear weapons environment models that reduces uncertainty from nuclear ground shock.
- Deliver ECA logistics and petroleum transmission models that account for impacts of significant nuclear weapons environments.
- Begin standard development for Military Standard (MIL-STD) for DoD Battlefield Systems.
- Publish updated nuclear survivability standards for Military Handbook (MIL-HDBK), Surface Vessels.
- Develop nuclear survivability (NS) standards for MIL-STDs and MIL-HDBK for Space and Missiles; prepare final coordination of MIL-STD 3053; conduct initial MIL-STD 3054 revision coordination.
- Conduct EMP Technology and Vulnerability Assessments for VC-25B, Ground-Based Strategic Deterrent (GBSD - Minuteman replacement), and FFG-62 support.
- Demonstrate platform agnostic sensors networked within military command systems; integrate edge data processing for radiological-nuclear (RN) assessments across all echelons; provide prototype 3D mapping capability for the Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV).

**FY 2024 Plans:**

- Develop AI/ML capability to ingest and analyze sensor feeds into DoD C2 systems for situational awareness, risk mitigation planning, and assessment tools.
- Deliver Mission Impacts of Nuclear Events (MINES) support of the analysis and assessment of CCMD OPLANs, COA development, and CONOPs; leverage Artificial Intelligence/Machine Learning (AI/ML) and Augmented Reality/Virtual Reality (AR/VR) to increase nuclear environment visualization.
- Complete laboratory testing of next-generation radionuclide particulate monitoring system and prototype field mass-spectrometry analysis system; operational test and evaluation (OT&E) of field X-ray/gamma analysis system.
- Transition modular radiation detection systems to meet the needs of Explosive Ordnance Disposal, Special Operations Forces, National Guard Bureau, 20th CBRNE, and DTRA Technical Support Groups (TSGs), while ensuring every system is interoperable with the widely used Tactical Assault Kit (TAK) ecosystem.

FY 2022	FY 2023	FY 2024

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<ul style="list-style-type: none"> <li>- Support end-user early operational assessments and transition activities to ensure prototype capabilities meet the minimum criteria to be inserted into a program-of-record or for direct procurement.</li> <li>- Transition the Dose Rate Application to DTRAT/TSG and Service end-users, complete transition of VIPER to Army Multi-Purpose Vehicle (AMPV), and begin transitioning VIPER into CH-47 Chinook, UH-60 Black Hawk, and UH-72 Lakota airborne platforms to include airworthiness certifications.</li> <li>- Perform environmental testing on the Vehicle Mounted Radiation Detection System (VMRDS) and fix any weaknesses in the system in preparation for transition to National Guard Civil Support Teams.</li> <li>- Collaborate with the Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense's CBRN Sensory Integration on Robotic Platforms for the Chemical Biological Incident Response Force (CBIRF) program to integrate state-of-the-art radiation detection systems on the Nuclear, Biological, Chemical Reconnaissance Vehicle (NBCRV) Skyraider Unmanned Aerial System (UAS).</li> <li>- Demonstrate nuclear weapon effects capabilities in a relevant cloud environment for evaluation by Enhanced Consequence Analysis (ECA), MINES, and the Nuclear, Chemical, Biological, Radiological, and high Explosive (NCBRE) Analysis Toolset (NATs) and continue development and verification and validation (V&amp;V) of capabilities as prioritized by end users.</li> <li>- Demonstrate waste water and agricultural models that account for impacts of significant nuclear weapons environments.</li> <li>- Deliver updated nuclear effects damage calculator for Army maneuver planning.</li> <li>- Improve operational USSTRATCOM nuclear planning tools.</li> <li>- Publish two updated nuclear weapons effects chapters.</li> <li>- Expand the historical nuclear testing archive at Defense Threat Reduction Information Analysis Center (DTRIAC).</li> </ul> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease from FY 2023 to FY 2024 is due to the net impact of decreased investment in radiation detection and nuclear test personnel review and increased investment in nuclear wargaming with renewed emphasis on Great Power Competition and nuclear and radiological effects in this program element.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	49.969	60.249	51.697

	<b>FY 2022</b>	<b>FY 2023</b>
<b>Congressional Add:</b> Data-Driven Methods of Nuclear Weapon Discovery	4.000	0.000
<b>FY 2022 Accomplishments:</b> - Developed tool to derive nuclear weapons-to-critical-infrastructure coupling parameters from data-driven sources to improve operational planning for conventional and nuclear battlefield activities.		

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	<b>FY 2022</b>	<b>FY 2023</b>
- Developed and verified new models that simulate the impacts of high-altitude nuclear detonations on networked infrastructures to be run on classified DoD networks for operational planners. <i>FY 2023 Plans:</i> N/A		
<b>Congressional Adds Subtotals</b>	4.000	0.000

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

<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 23/0602718BR/RD: COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH	97.766	106.095	119.670	-	119.670	120.980	122.543	119.240	121.625	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**

Assessment and selection of best performer for developmental requirements to meet specific military capability needs.

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<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
RG: CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT	633.455	265.085	257.951	254.610	-	254.610	260.476	264.328	260.045	265.246	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Counter WMD Technologies and Capabilities Development project develops advanced technologies and weapon concepts and validates their applicability to CWMD. Research 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.

Enable rapid capability delivery supports urgent warfighter operational requirements in countering WMD and emerging threats, often below the level of armed conflict. This research develops and delivers urgent CWMD capabilities to provide Combatant Commands a competitive advantage against WMD-capable adversaries with a focus on innovative, agile, achievable, and effective technology solutions for DoD sensitive and classified programs, Combatant Command hybrid warfare support, and competition below the level of armed conflict.

Counter emergent threat technologies research develops and transitions a full spectrum of new technologies to counter emergent WMD threats providing combatant commanders improved offensive capabilities in support of near-peer emerging threats and counter-proliferation missions that combat weapons of mass destruction. This research supports the U.S. Special Operations Command (USSOCOM) in two areas: (1) counter proliferation research is a collaborative effort to develop advanced, warfighter-unique technologies to defeat WMD development and acquisition pathways, to include defeat of the devices themselves, while minimizing risks to U.S. forces; and (2) counter emerging threats concepts and technologies to integrate and synchronize activities that prevent violent extremist organizations and rogue nation states from developing, acquiring, proliferating, or using WMD. This effort supports Commander, USSOCOM responsibilities under the Chairman, Joint Chiefs of Staff Unified Command Plan.

Counterforce technologies research develops, integrates, demonstrates, and transitions advanced sensors, surveillance, and target defeat planning technologies to enable the warfighter to hold WMD-related targets at risk. There are three core research efforts in this project: Technical Reconnaissance; Countering WMD (CWMD) weapons effects; and, Applied CWMD Computational, Physical and Life Science Research.

Target assessment technologies research develops, applies, and transitions processes and technologies providing advanced capabilities in the areas of Nuclear Advanced Automated Target Development (N-A2TD), WMD Targets Immersive Mission Planning (TIMP), and Full Dimensional Defeat Enterprise (FDDE). N-A2TD automates intelligence input to provide more realistic target input parameters incorporating 3-D models. WMD-TIMP provides an interactive virtual reality platform

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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for mission planning that mitigates impact of characterization uncertainty by allowing mission planners to execute multiple planning iterations with varied uncertainty parameters. FDDE aims to develop an enterprise capability for finding and identifying a facility, characterizing its function and physical layout, determining current or future vulnerabilities to available defeat mechanisms, planning and executing an attack, assessing damage, and denying reconstitution efforts. The dynamic capabilities encompassed in this effort provide Combatant Commands (CCMDs) and the intelligence community tools and processes needed to hold at risk high value hard targets and WMD targets possessed by adversaries.

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

	FY 2022	FY 2023	FY 2024
<p><b>Title:</b> RG: Counter WMD Technologies and Capabilities Development</p> <p><b>Description:</b> Project RG develops advanced technologies and weapon concepts and validates their applicability to CWMD.</p> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Improve Integrated Munitions Effects Assessment (IMEA) capability by integrating data model for more accurate modeling of buildings, bunkers, and tunnels used for storage of WMD.</li> <li>- Develop application interfaces for core IMEA functionality to interface with other targeting tools (e.g. Joint Targeting Toolbox (JTT), Digital Image Exploitation Engine (DIEE)), and intelligence databases (Modernized Intelligence Database (MIDB) and Machine-Assisted Analysis Rapid-Repository System (MARS))</li> <li>- Initiate development of new tools to auto-generate customizable briefing materials for visualization to support target validation authority and CCMD's intent.</li> <li>- Complete modularization of IMEA code and transition to cloud computing/storage to support a multi-platform user environment capable of full-spectrum module archival/transition.</li> <li>- Complete IMEA capability to model cityscapes for target characterization.</li> <li>- Deliver Auto-Weaponing System (AWeS) guided weaponing tool utilizing neural networks for integration and distribution through IMEA.</li> <li>- Integrate Multi-Hit on multiple aim points for bunkers and tunnel solution recommendations into IMEA.</li> <li>- Conduct research and development to integrate sensor feeds directly to the Targeting Weaponing Assistance Cell (TWAC) software for neural network analysis.</li> <li>- Deliver TWAC targeting recommendation packages and conduct training activities as requested by Combatant Commands</li> <li>- Provide TWAC systems engineering and integration support for both internal DTRA and external organizations with efforts related to CWMD and Hardened and Deeply Buried Targets (HDBT).</li> <li>- Support Combatant Commands with CWMD targeting and operational planning activities while identifying warfighting capability gaps.</li> <li>- Develop and test small unmanned aerial systems (UAS) for autonomous technical reconnaissance of a WMD target in denied area.</li> </ul>	258.585	246.951	254.610

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Defense Threat Reduction Agency		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RG / CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<ul style="list-style-type: none"> <li>- Demonstrate next-generation sensor for radio-nuclide (RD) data collection in collaboration with the Department of Energy.</li> <li>- Develop offensive counter-proliferation, counter-WMD technologies in support of Combatant Command requirements.</li> <li>- Develop WMD pathway defeat technologies, and threat-specific test articles and analyses.</li> <li>- Develop lighter, smaller, more effective breaching capabilities.</li> <li>- Develop and test structural, reactive materials and advanced agent defeat concepts to improve the capability to defeat and/or neutralize WMD-related targets.</li> </ul> <p><b>FY 2024 Plans:</b></p> <ul style="list-style-type: none"> <li>- Provide offensive counter proliferation/CWMD facility defeat and critical node disruptive technologies.</li> <li>- Conduct USSOCOM SOF specific counter proliferation RDT&amp;E to execute system integration and system demonstration for counter proliferation/CWMD technologies. Execute system test, evaluation, and development of tactics, techniques, and procedures.</li> <li>- Provide diagnostic and defeat RDT&amp;E against emergent CWMD requirements for specific Explosive Ordnance Disposal (EOD) render safe operations.</li> <li>- Purchase additional access denial test articles with advanced development (specifically for Active Denial for Targets Right of the Line (ADTROL): seeker, warhead, communications). Conduct preliminary aircraft integration of ADTROL.</li> <li>- Conduct field testing of advanced sensor prototypes in collaboration with Air Force Technical Applications Center (AFTAC) for dual-use applications. Develop and deliver enhanced capability to perform magnetic characterization for time-sensitive targets.</li> <li>- Develop models to simulate combined kinetic and non-kinetic effects for WMD targets. Implement improvements for robust collateral damage estimates and uncertainty bounds.</li> <li>- Initiate Adversarial Weapons Asset Protection Toolkit (AWAPT) development for near-peer threat.</li> <li>- Develop and transition technology required to meet urgent CCMD needs for planned hybrid-warfare missions to counter WMD.</li> <li>- Mature the Full Dimensional Defeat Enterprise (FDDE) organization, functionality, and cross-functional CWMD Technical Assistance Group (TAG) to effectively utilize the agent-based modeling approach to system of systems analysis of WMD targets.</li> <li>- Expand functional agent libraries and facility templates, including larger system of facilities and cross-domain targeting.</li> <li>- Provide Analysis of Effect on WMD network domains, including consequences actions.</li> <li>- Develop models, leveraging legacy models, to create a 3-D immersive virtual reality environment for iterative mission planning.</li> <li>- Verification and validation of Nuclear-Automated Advanced Target Development (N-A2TD) prototype that provides more realistic target input parameters for more extensive and faster analytical results.</li> <li>- Deliver TWAC targeting recommendation packages and conduct training activities as requested by Combatant Commands.</li> </ul> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b></p>			

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

<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RG / CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2022	FY 2023	FY 2024
The decrease from FY 2023 to FY 2024 reflects non-recurring increases for congressional adds in FY 2023 for Detection and Tracking Technology and Advanced Manufacturing of Energetics.			
<b>Accomplishments/Planned Programs Subtotals</b>	258.585	246.951	254.610

	FY 2022	FY 2023
<p><b>Congressional Add:</b> Detection and Tracking Technology</p> <p><b>FY 2022 Accomplishments:</b> - Developed a taggant system to track WMD items of interest through covert means. - Delivered a proof-of-concept integrated system consisting of a seismic based UGS, sUAS, taggant and application device.</p> <p><b>FY 2023 Plans:</b> - Develop a prototype system to Detect, Tag and Track (DTT) mobile targets by placing a taggant on the mobile target to enable continuous tracking integrating unattended ground sensors (UGSs) that detect a target and subsequent intelligence, surveillance, reconnaissance (ISR) assets that attempt to find the target after a sensor detection report.</p>	4.000	6.000
<p><b>Congressional Add:</b> Reduced Order Models</p> <p><b>FY 2022 Accomplishments:</b> - Developed and implemented methodologies for Model Order Reduction (MOR) using data-driven (machine learning) Reduced Order Model (ROM) techniques on legacy code data, observation data, and first principles code simulation data to reduce run times for Counter WMD Modeling and Simulation tools.</p> <p><b>FY 2023 Plans:</b> N/A</p>	2.500	0.000
<p><b>Congressional Add:</b> Advanced Manufacturing of Energetics</p> <p><b>FY 2022 Accomplishments:</b> N/A</p> <p><b>FY 2023 Plans:</b> - Design and develop novel Energetic Materials (EM) using advanced manufacturing techniques, such as Additive Manufacturing (AM), to combine Reactive Materials (RM) and known energetics into new materials whose scalable productions can be demonstrated.</p>	0.000	5.000
<b>Congressional Adds Subtotals</b>	6.500	11.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Defense Threat Reduction Agency		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RG / CWMD TECHNOLOGIES AND CAPABILITIES DEVELOPMENT

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

<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 23/0602718BR/RG: COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH	31.145	30.277	30.871	-	30.871	31.589	32.220	31.788	32.423	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Assessment and selection of best performer for developmental requirements to meet specific military capability needs.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Defense Threat Reduction Agency										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 0400 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT				<b>Project (Number/Name)</b> RR / CWMD TEST AND EVALUATION			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
RR: CWMD TEST AND EVALUATION	0.170	4.639	9.530	8.225	-	8.225	7.908	7.928	6.016	6.136	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**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 proliferative 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)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> RR: CWMD Test and Evaluation	4.639	9.530	8.225
<p><b>Description:</b> This project employs technology development, modeling-and-simulation, and analysis support tools to meet Combatant Command requirements and anticipated threats. DTRA provides timely acquisition and delivery of solutions that respond to asymmetric threat requirements and gaps.</p> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Provide end-to-end test event planning, management, execution, and analysis supporting DoD, federal agencies', and friendly nations' programs to counter proliferation and defeat WMD.</li> <li>- Provide test articles, bunker and building construction, data acquisition systems, test optics, and data analysis.</li> <li>- Conduct test events, in conjunction with Combatant Commands and Services, that incorporate WMD threats on unmanned systems across multiple domains (land, air, and sea) that further incorporate automated and autonomous capabilities.</li> <li>- Document unique signatures of threat of unmanned systems operating at different levels of automation and autonomy and make available through DTRA's data architecture system to the broader USG community.</li> <li>- Conduct testing to understand blast propagation and associated wall damage from an internal explosion; develop simplified internal detonation and dispersion model for blast propagation through failing walls; update/validate blast propagation models in Integrated Munitions Effects Assessment (IMEA) and Vulnerability Assessment and Protection Option (VAPO).</li> </ul>			

PE 0603160BR: COUNTER WEAPONS OF MASS DESTRUCTION  
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Defense Threat Reduction Agency		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0400 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603160BR / COUNTER WEAPONS OF MASS DESTRUCTION ADVANCED TECHNOLOGY DEVELOPMENT	<b>Project (Number/Name)</b> RR / CWMD TEST AND EVALUATION

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
- Develop/validate models for blast propagation through failing walls (both light and heavy walls) for standard U.S. inventory-sized weapons (500#, 1000#, 2000# GBU); understand the blast and fragment environment in adjacent room for equipment damage estimates.  <b>FY 2024 Plans:</b> - Develop intuitive, visual browser access to data and improve reliability of infrastructure services for assembly of large data sets for AI/ML development. - Generate data using software models to reduce cost and schedule of Test & Evaluation activities. - Provide end-to-end test event planning, management, execution, and analysis supporting DoD, federal agencies', and friendly nations' programs to counter proliferation and defeat WMD.  <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease from FY 2023 to FY 2024 is due to the realignment of resources within Project RR from PE 0603160BR to PE 0603176BR to fund system instrumentation, stabilization, and graphical user interface updates to better support customers in the areas of counter WMD and emerging threats.			
<b>Accomplishments/Planned Programs Subtotals</b>	4.639	9.530	8.225

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 23/0602718BR/RR: COUNTER WEAPONS OF MASS DESTRUCTION APPLIED RESEARCH	16.845	23.120	21.111	-	21.111	21.613	22.339	21.186	21.610	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

**Remarks**

**D. Acquisition Strategy**

N/A