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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Defense Threat Reduction Agency **Date:** April 2022

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603160BR / <i>Counter Weapons of Mass Destruction Advanced Technology Development</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	696.649	331.325	409.862	395.721	0.000	395.721	407.669	417.369	419.816	414.431	Continuing	Continuing
RA: <i>CWMD Cross-Cutting Technical and Information Sciences</i>	148.257	50.959	84.660	78.991	0.000	78.991	84.775	86.706	84.214	84.684	Continuing	Continuing
RD: <i>Nuclear Technologies and Capabilities Development</i>	148.546	46.587	54.417	60.249	0.000	60.249	59.722	61.765	62.800	63.855	Continuing	Continuing
RG: <i>Counter WMD Technologies and Capabilities Development</i>	399.686	233.769	266.262	246.951	0.000	246.951	253.002	258.835	262.652	258.335	Continuing	Continuing
RR: <i>CWMD Test and Evaluation</i>	0.160	0.010	4.523	9.530	0.000	9.530	10.170	10.063	10.150	7.557	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Technology Development portfolio is aligned with National and DoD strategic objectives as well as 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. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	356.659	399.362	0.000	0.000	0.000
Current President's Budget	331.325	409.862	395.721	0.000	395.721
Total Adjustments	-25.334	10.500	395.721	0.000	395.721
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-16.465	-			
• SBIR/STTR Transfer	-8.869	-			
• Adjustments to Budget Year	-	-	395.721	0.000	395.721

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

Project: RG: *Counter WMD Technologies and Capabilities Development*

Congressional Add: *Strategic Systems Defeat (SSD)*

Congressional Add: *Detection and Tracking Technology*

Congressional Add: *Reduced Order Models*

Congressional Add Subtotals for Project: RG

Congressional Add Totals for all Projects

	FY 2021	FY 2022
	0.000	4.000
Congressional Add Subtotals for Project: RD	0.000	4.000
	5.000	0.000
	0.000	4.000
Congressional Add Subtotals for Project: RG	5.000	6.500
Congressional Add Totals for all Projects	5.000	10.500

Change Summary Explanation

FY 2023 funds increase because the FY 2022 President's Budget request did not include out-year funding. In FY 2021, DTRA reprogrammed funding for higher Departmental priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Defense Threat Reduction Agency										Date: April 2022		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603160BR / Counter Weapons of Mass Destruction Advanced Technology Development					Project (Number/Name) RA / CWMD Cross-Cutting Technical and Information Sciences		
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
RA: CWMD Cross-Cutting Technical and Information Sciences	148.257	50.959	84.660	78.991	0.000	78.991	84.775	86.706	84.214	84.684	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, and leverages research performed by the Project on Advanced Systems and Concepts for CWMD at the Naval Postgraduate School. The project also supports international CWMD cooperation by developing technologies and concepts suitable for foreign release.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	50.959	84.660	78.991	0.000	78.991
Description: 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.					
FY 2022 Plans:					
- Conduct Research and Development to maintain DTRA's cutting edge 24/7 technical reach back assistance capability, decision support and planning support to Combatant Commands (CCMDs), Services, interagency and other government customers in support of immediate missions and operational environments.					
- Provide critical training support in CWMD-relevant models to strategic partner community.					
- Provide Quick Reaction Capability to urgent warfighter requirements based on new or emerging gaps.					
- Provide best-of-breed applied research from elsewhere in the portfolio to develop prototypes for fielding with unique strategic customers to meet requirements aligned with the current National Defense Strategy (NDS).					
- Apply Artificial Intelligence/Machine Learning (AI/ML) technology advances (from academia, industry, and other government organizations) to CWMD/ Counter Threat Network (CTN)-specific problem sets.					
- Provide CCMDs with operational prototypes of tools for CWMD data integration, analysis, and visualization.					

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Defense Threat Reduction Agency		Date: April 2022
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / <i>Counter Weapons of Mass Destruction Advanced Technology Development</i>	Project (Number/Name) RA / <i>CWMD Cross-Cutting Technical and Information Sciences</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>- Develop and sustain advanced information technology capabilities enabling CWMD situational understanding and leverage advanced data science techniques to improve threat analysis to better inform operational planning.</p> <p>FY 2023 Base Plans:</p> <ul style="list-style-type: none"> - 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 NDS. <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: The decrease from FY 2022 to FY 2023 is due primarily to the net impact of 1) increased investment in Hazardous Prediction and Assessment Capabilities (HPAC) and 2) the realignment of resources from quick reaction capabilities to fund higher Agency priorities.</p>					
Accomplishments/Planned Programs Subtotals	50.959	84.660	78.991	0.000	78.991

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• 13/0602134BR: <i>Improvised Threat Reduction Applied Research</i>	2.449	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.449

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / Counter Weapons of Mass Destruction Advanced Technology Development	Project (Number/Name) RA / CWMD Cross-Cutting Technical and Information Sciences
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 25/0602718BR: Counter Weapons of Mass Destruction Applied Research	36.288	48.112	32.670	0.000	32.670	39.918	40.914	32.639	33.543	Continuing	Continuing
• 98/0604134BR: Counter Improvised- Threat Technology Demonstration, Prototype Development and Testing	6.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.833
• 105/0604551BR: Catapult	0.000	7.166	7.130	0.000	7.130	7.328	7.475	7.625	7.777	Continuing	Continuing
• 159/0605502BR: Small Business Innovation Research	14.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603160BR / Counter Weapons of Mass Destruction Advanced Technology Development					Project (Number/Name) RD / Nuclear Technologies and Capabilities Development		
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
RD: Nuclear Technologies and Capabilities Development	148.546	46.587	54.417	60.249	0.000	60.249	59.722	61.765	62.800	63.855	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)

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: RD: Nuclear Technologies and Capabilities Development	46.587	50.417	60.249	0.000	60.249

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>Description: Project RD develops, integrates and transitions radiation detection technologies, as well as 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.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Develop Synthetic Aperture Radar (SAR) Sensor Characterization Device capability, data analysis and algorithm development, and other Combatant Command countering nuclear threat network (CNTN) capabilities. - Support the design and operation of at least four DoD nuclear wargames and exercises with subject matter expertise, existing tools, and integrated initial MINES software capabilities. - Test and evaluate the Integration of improved contamination identification and avoidance capabilities into Service sensor networks and command and control systems. - Provide prototype electromagnetic pulse (EMP) sensor(s) for use on the battlefield enabling warfighter situational awareness of EMP effects. - Conduct technical demonstration of integrated sensor network capable of detecting, identifying and providing early warning of radiological hazards. - Develop and test prototype test articles for the integration of the Vehicle Integrated Platform Enhanced Radiac (VIPER) into Army Combat vehicles (Army Multipurpose Vehicle Platform). - Develop prototype Vehicle Integrated Platform Enhanced Radiac for aviation platforms. - Demonstrate tools that predict nuclear weapons effects on petroleum and transportation networks, improving nuclear planning and targeting decisions. - Demonstrate improved tool to predict non-ideal nuclear weapons airblast effects on ground maneuver forces, improving operational planning for conventional and nuclear battlefield. - Enhance cloud platform for integrated toolsets for nuclear planning, Nuclear, Chemical, Biological, Radiological, and high Explosive (NCBRE) assessments, and advanced analytics in support of Service and Combatant Command planning and assessments and Conventional Nuclear Integration situational awareness. - Support the DoD Atomic Veteran program by determining radiation exposure levels and managing the Atomic Veterans Service Certificate recognition. - Perform nuclear survivability modeling for effects on humans. <p>FY 2023 Base Plans:</p>					

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> - 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). <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: The increase from FY 2022 to FY 2023 is primarily for increased investment in nuclear survivability with resources realigned from RG-Advanced Energetics. This increase funds new Combatant Command Electromagnetic Pulse (EMP) testing requirements for various battlefield systems, surface vessels, and aircraft.</p>					
Accomplishments/Planned Programs Subtotals	46.587	50.417	60.249	0.000	60.249

	FY 2021	FY 2022
Congressional Add: Data-Driven Methods of Nuclear Weapon Discovery	0.000	4.000

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	FY 2021	FY 2022
FY 2021 Accomplishments: N/A		
FY 2022 Plans: Develop tool to derive nuclear weapons-to-critical-infrastructure coupling parameters from data-driven sources to improve operational planning for conventional and nuclear battlefield activities.		
Congressional Adds Subtotals	0.000	4.000

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 25/0602718BR/RD: <i>Counter Weapons of Mass Destruction Applied Research</i>	83.538	101.229	106.095	0.000	106.095	110.854	112.082	114.321	111.359	Continuing	Continuing
• 129/0605000BR/RD: <i>Counter Weapons of Mass Destruction Systems Development</i>	15.250	14.063	14.403	0.000	14.403	13.414	13.381	13.649	13.922	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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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603160BR / <i>Counter Weapons of Mass Destruction Advanced Technology Development</i>					Project (Number/Name) RG / <i>Counter WMD Technologies and Capabilities Development</i>		
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
RG: <i>Counter WMD Technologies and Capabilities Development</i>	399.686	233.769	266.262	246.951	0.000	246.951	253.002	258.835	262.652	258.335	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Counter WMD Technologies and Capabilities Development encompasses the following areas.

Defeat Technologies researches, develops, integrates, demonstrates, and transitions innovative kinetic and non-kinetic weapon capabilities to expand traditional and asymmetric options available to Combatant Commanders to deny, disrupt, and defeat Weapons of Mass Destruction (WMD) while minimizing collateral effects.

Technology development focuses on the physical or functional defeat of (1) chemical, biological, nuclear, and radiological threat materials, (2) an adversary's ability to deliver the same, as well as (3) the physical and non-physical support networks enabling both. This program achieves these goals through the systematic identification and maturation of technologies capable of defeating WMD agents or agent-based processes, then integrating them into weapons, delivery systems, or rapid WMD elimination capabilities. This effort includes developing specific WMD agent/agent-based process simulants, test infrastructure, and sampling capability required for effective development, testing, and evaluation of next generation capabilities to ensure optimum weapon solutions are achieved. Requirements are delineated in Agency Priority Lists for lethal and non-lethal Countering WMD (CWMD) capability. Based on specified requirements, weapons and capabilities are transitioned to a Service program of record for system acquisition.

Counter emergent threat technologies research develops and transitions a full spectrum of new technologies to counter emergent WMD threats. 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 violent extremist organization 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 capabilities to find, characterize, assess, and plan for the defeat of WMD threats. This research is focused in three areas: (1) WMD battlespace awareness provides warfighters with tools to find, characterize, and assess WMD threats; (2) weapons effects research provides modernized, fast-running, validated CWMD planning tools and integrates modeling and simulation software to optimize the execution of WMD and associated hard target defeat operations; and (3) innovative engineering of select promising technologies discovered under fundamental and basic research to increase the effectiveness of weapons against blast doors and other underground structures for functional defeat of Underground Facilities (UGFs), WMD, and their delivery systems.

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DTRA provides a unique national test bed capability for simulated weapons of mass destruction (WMD) facility characterization, weapon-target interaction, and WMD facility defeat testing. This test bed is capable of responding to operational needs outside of DTRA’s research portfolio and is used by the DoD, Military Services, Combatant Commanders, and other Federal Agencies to evaluate the implications of WMD, conventional weapons, and other special weapons used against U.S. military or civilian systems and targets.

Target assessment technologies research develops, integrates, tests, demonstrates, and transitions processes and technologies providing advanced capabilities in the areas of WMD target assessment, automated advanced targeting development (A2TD), facility defeat, and full dimensional defeat. This research develops analytical tools and processes required to: (1) find and characterize WMD targets and associated hard and deeply buried targets (HDBTs); and (2) assess the results of physical and functional defeat mechanisms (such as direct attack). The A2TD initiative seeks to apply emerging computer assisted technologies to automate target characterization for hard targets and WMD targets. The end result will be faster and more efficient characterization of important hard targets and WMD targets. The facility defeat project develops, validates, and employs processes and software for characterization and defeat of command specified hard targets in conjunction with Defense Intelligence Agency (DIA) analysis. The full dimensional defeat project 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 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>Title: RG: Counter WMD Technologies and Capabilities Development</p> <p>Description: Project RG develops advanced technologies and weapon concepts and validates their applicability to CWMD.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Develop and transition next generation agent defeat capabilities utilizing enhanced energetics, advanced manufacturing techniques and tactics that improve performance and lethality and reduce production time and cost. - 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 capability to rapidly support technical requirements through RDT&E of current and emerging WMD threats to operational forces. - Conduct research and development of dual-use threat components for test and evaluation in support of CCMDs, network disruption capability, and RDT&E of current and emerging WMD threats to operational force. 	228.769	259.762	246.951	0.000	246.951

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>- Develop quick reaction capabilities (QRCs) in support of geographic Combatant Commands (CCMD) and in collaboration with Other Governmental Agencies (OGA) to detect, locate, track, characterize and counter threats in the areas of counter proliferation (CP) and counter weapons of mass destruction (CWMD).</p> <p>FY 2023 Base Plans:</p> <ul style="list-style-type: none"> - 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. - 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)) - Initiate development of new tools to auto-generate customizable briefing materials for visualization to support target validation authority and CCMD's intent. - Complete modularization of IMEA code and move to cloud computing/storage, multi-platform user environment support, full spectrum module archival/transition. - Complete IMEA capability to model cityscapes for target characterization. - Deliver Auto-Weaponing System (AWeS) guided weaponing tool utilizing neural networks for integration and distribution through IMEA. - Integrate Multi-Hit on multiple aim points for bunkers and tunnel solution recommendations into IMEA. - Conduct research and development to integrate sensor feeds directly to the Targeting Weaponing Assistance Cell (TWAC) software for neural network analysis. - Deliver TWAC targeting recommendation packages and conduct training activities as requested by Combatant Commands - 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). - Support Combatant Commands with CWMD targeting and operational planning activities while identifying warfighting capability gaps. - Develop and test small unmanned aerial systems (UAS) for autonomous technical reconnaissance of a WMD target in denied area. - Demonstrate next-generation sensor for radio-nuclide (RD) data collection in collaboration with the Department of Energy. - Develop offensive counter-proliferation, counter-WMD technologies in support of Combatant Command requirements. 					

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / <i>Counter Weapons of Mass Destruction Advanced Technology Development</i>	Project (Number/Name) RG / <i>Counter WMD Technologies and Capabilities Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> - Develop WMD pathway defeat technologies, as well as threat-specific test articles and analyses. - Develop lighter, smaller, more effective breaching capabilities. - Develop and test structural, reactive materials and advanced agent defeat concepts to improve the capability to defeat and/or neutralize WMD-related targets. <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: The decrease from FY 2022 to FY 2023 is primarily due to decreased investment in counterterrorism activities in this project. Resources were realigned to higher priority efforts, including Nuclear Survivability in Project RD to meet new Combatant Command requirements for Electromagnetic Pulse (EMP) testing for various battlefield systems, surface vessels, and aircraft. Additionally, resources were realigned to DTRA's Operation and Maintenance account to fund Combatant Command requirements for threat analysis.</p>					
Accomplishments/Planned Programs Subtotals	228.769	259.762	246.951	0.000	246.951

	FY 2021	FY 2022
<p>Congressional Add: Strategic Systems Defeat (SSD)</p> <p>FY 2021 Accomplishments: - Design, develop, test, and deliver five Hand Emplaced Form Factor (HEFF) sensors that can perform a classified Combatant Command mission identified in an approved and validated Joint Staff Joint Emergent Operational Needs Statement (JEON) for a Combatant Command as well as a new, emergent classified requirement from a second Combatant Command.</p> <p>- Design, develop, and assess "brassboard" prototyping efforts for next-gen SSD sensing capabilities leveraging DARPA developed technologies, and for participation in Missile Defense Agency's Left-Through-Right-of-Launch (LTRI) wargame campaign.</p> <p>FY 2022 Plans: N/A</p>	5.000	0.000
<p>Congressional Add: Detection and Tracking Technology</p> <p>FY 2021 Accomplishments: N/A</p> <p>FY 2022 Plans: - Develop a taggant system to track WMD items of interest through covert means.</p>	0.000	4.000
<p>Congressional Add: Reduced Order Models</p>	0.000	2.500

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	FY 2021	FY 2022
FY 2021 Accomplishments: N/A		
FY 2022 Plans: - Develop and implement 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.		
Congressional Adds Subtotals	5.000	6.500

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 25/0602718BR/RG: <i>Counter Weapons of Mass Destruction Applied Research</i>	20.752	29.359	30.277	0.000	30.277	30.871	31.589	32.220	31.788	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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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
RR: CWMD Test and Evaluation	0.160	0.010	4.523	9.530	0.000	9.530	10.170	10.063	10.150	7.557	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 proliferant 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. This capability does not exist anywhere else within the DoD and supports the counter proliferation pillar of the National Strategy to Counter WMD.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: RR: CWMD Test and Evaluation	0.010	4.523	9.530	0.000	9.530
Description: 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.					
FY 2022 Plans: -Conduct two test events that incorporate WMD threats on unmanned systems across multiple domains (land, air, sea) that further incorporate automated and autonomous capabilities. - 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. - Integrate algorithms developed in FY 2021 to develop a multi-phenomenology-based tool deliverable to a Combatant Command (CCMD) as a means for future development of early detection and countermeasures for specific threats in their AOR.					
FY 2023 Base Plans: - 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.					

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Provide test articles, bunker and building construction, data acquisition systems, test optics, and data analysis. - 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. - 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. - 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). - Develop/validate models for blast propagation through failing walls (both light and heavy walls) for standard US inventory-sized weapons (500#, 1000#, 2000# GBU); understand the blast and fragment environment in adjacent room for equipment damage estimates. FY 2023 OCO Plans: N/A FY 2022 to FY 2023 Increase/Decrease Statement: The increase from FY 2022 to FY 2023 funds 1) data architecture signatures technology for tracking of special nuclear materials, and 2) necessary upgrades to national test bed capabilities in support of DTRA's countering WMD test and evaluation activities with resources realigned from Project RA - CWMD Cross-Cutting Technical and Information Sciences in PE 0602718BR.					
Accomplishments/Planned Programs Subtotals	0.010	4.523	9.530	0.000	9.530

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 25/0602718BR: <i>Counter Weapons of Mass Destruction Applied Research</i>	18.426	18.311	23.120	0.000	23.120	23.771	23.973	24.699	23.546	Continuing	Continuing

Remarks

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D. Acquisition Strategy
N/A