Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Defense Threat Reduction Agency											Date: March 2019	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	1,102.363	152.544	155.924	179.096	-	179.096	182.758	186.223	188.871	200.457	Continuing	Continuing
RA: **CWMD Cross-Cutting Technical and Information Sciences*	224.468	40.189	30.603	46.317	-	46.317	48.032	49.312	49.896	58.703	Continuing	Continuing
RD: ***Nuclear Technologies and Capabilities Development*	29.653	13.745	16.860	92.710	-	92.710	93.612	95.541	97.485	99.433	Continuing	Continuing
RE: *Counter-Terrorism Technologies*	0.000	0.693	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.693
RF: *Forensics Technologies*	216.309	6.803	10.257	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	233.369
RG: ****Counter WMD Technologies and Capabilities Development*	96.456	8.483	8.959	22.253	-	22.253	22.958	22.919	23.715	24.190	Continuing	Continuing
RI: *Nuclear Survivability*	159.267	25.545	32.732	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	217.544
RL: *Nuclear & Radiological Effects*	185.241	30.320	29.388	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	244.949
RM: *WMD Counterforce Technologies*	104.355	13.956	12.780	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	131.091
RR: *****CWMD Test and Evaluation*	86.614	12.810	14.345	17.816	-	17.816	18.156	18.451	17.775	18.131	Continuing	Continuing

Note

In program element 0602718BR, DTRA consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects into the renamed RD-Nuclear Technologies and Capabilities Development beginning in FY 2020. Additionally, DTRA consolidated RM-Weapons of Mass Destruction (WMD) Counterforce Technologies into the renamed project RG-Counter WMD Technologies and Capabilities Development.

*Project RA title changes from Information Sciences and Applications to Countering Weapons of Mass Destruction (CWMD) Cross-Cutting Technical and Information Sciences in FY 2020.
**Project RD title changes from Detection Technologies to Nuclear Technologies and Capabilities Development in FY 2020.
***Project RG title changes from Defeat Technologies to Counter WMD Technologies and Capabilities Development in FY 2020.
****Project RR title changes from Countering WMD Test and Evaluation to CWMD Test and Evaluation in FY 2020.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Defense Threat Reduction Agency	Date: March 2019
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*

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, counterproliferation, 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 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.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	157.908	161.151	163.576	-	163.576
Current President's Budget	152.544	155.924	179.096	-	179.096
Total Adjustments	-5.364	-5.227	15.520	-	15.520
• Congressional General Reductions	-	-4.000			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.676	-			
• Realignments	-	-	15.520	-	15.520
• FFRDC	-0.688	-1.227	-	-	-

Change Summary Explanation

The increase in FY 2020 is due to the net effect of increased investment in the CWMD Information Integration Cell addressing higher Combatant Command (CCMD) and Interagency demand for CWMD information sharing and data analysis support, increased investment in the institutionalization of a quick reaction capability to rapidly transition both material and non-material developmental technologies to fielded solutions, increased investment in nuclear detection in order to support battlespace efficacy in terms of situational awareness and interdiction as early as possible along the threat timeline, multi-modal CWMD modeling & simulation capabilities to better inform operational decision makers of WMD defeat options and their effects, test instrumentation and data acquisition systems to

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Defense Threat Reduction Agency	Date: March 2019
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*

remain “cutting edge” in gathering test data for customers, and decreased investment in Counter-small Unmanned Aerial Systems (C-sUAS). There is 9.5% real growth in this program element from the previous President's Budget submission which will be discussed at the R-2a project level.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RA: *CWMD Cross-Cutting Technical and Information Sciences	224.468	40.189	30.603	46.317	-	46.317	48.032	49.312	49.896	58.703	Continuing	Continuing

Note

*Project RA title changes from Information Sciences and Applications to CMWD Cross-Cutting Technical and Information Sciences in FY 2020.

A. Mission Description and Budget Item Justification

The Information Sciences and Applications 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 reachback teams. This project develops and maintains continuously improving collaborative architectures and WMD modeling and simulation codes that drive an integrated suite of decision support tools serving the Combatant Commands, other Department of Defense (DoD) agencies, and national and international CWMD partners. This effort also funds research activities that benefit the public through analysis and engagement to reduce and counter threats posed by WMD via the Project on Advanced Systems and Concepts for Countering WMD (PASCC). PASCC 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 2018	FY 2019	FY 2020
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	40.189	30.603	46.317
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 2019 Plans:*** - Release software update for Force-on-Force Evaluation and Analysis of Key Performance Parameters (FREAK), which provides Integrated Force-on-Force Models for Course of Action Analysis, CONOPS Development, and Sensor Performance Prediction. - Release software update for Virtual Radiation Training through Ubiety System (VIRTUS), which provides a mobile phone based radiation sensor emulator for search training. - Release software update for Android Tactical Assault Kit (ATAK), which incorporates CWMD capabilities into a mobile phone based tactical common operating picture - for customers to support new, emerging and updated modeling and simulation requirements. - Continue to sustain a shared, rapidly configurable computational environment to serve as the common R&D backbone: core analytic tools, shared information, and applications. Provide analytic solutions and shared computations environments to support R&D and operational needs.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
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 2018	FY 2019	FY 2020
- Transition analytic investments, including machine learning, natural language processing, and statistical analytics technologies to the common R&D backbone for agency wide access. - Improve decision making processes and time-to-decision cycles by researching, developing, integrating, deploying, and managing advanced data analytics, data visualizations, and knowledge management capabilities to support DTRA's and associated mission partners'/customers' validated operational capability requirements. - Establish and advise on approaches to leverage cloud-based capabilities to improve data access, interoperability, and policy compliance. Implement and enforce system designs to support compliance with DoD cybersecurity policies. - Further develop and implement a sustainable and scalable analytic capability to discover emerging and disruptive technologies in support of efforts to anticipate and meet new and emerging requirements.			
FY 2020 Plans: - Support select NATO nations' access to a shared WMD and explosives modeling capability as requested by individual nations through the Partnership of Cooperation agreements . - Enhance FREAK cloud architecture to increase availability of chemical/biological personnel casualty and detector models that support Course of Action Analysis, Concept of Operations Development, and Sensor Performance Prediction. - Provide software releases to include DoD customer detector requests for VIRTUS, which provides a mobile phone-based radiation sensor emulator for search training. - Provide increased stand-alone modeling capability for ATAK, which incorporates CWMD capabilities into a mobile phone-based tactical common operating picture, to support new, emerging and updated modeling and simulation requirements. - Transition the Enhanced Mapping and Positioning System (EMAPS) to the Joint Program Executive Office, Chemical and Biological Defense. This system uses LIDAR to automatically create real-time 2D/3D annotated physical maps of areas denied to the Global Positioning System.			
FY 2019 to FY 2020 Increase/Decrease Statement: The increase from FY 2019 to FY 2020 is due to increased investment in a new CWMD Information Integration Cell (CIIC) to for integrated information sharing capabilities to address higher CCMD and Interagency demand for CWMD information sharing and data analysis support, and increased investment to institutionalize a Quick Reaction Capability to rapidly transition both material and non-material developmental technologies to fielded solutions. This aligns with the National Defense Strategy's Level of Effort 3: Reform the Department. Develop acquisition expertise, innovation tools, and agile contract solutions to more effectively deliver capabilities to the warfighter as urgent operational requirements emerge. Additionally, there was increased investment in multi-modal CWMD modeling and simulation capabilities integration of new modeling techniques and capabilities with existing programs and models to leverage the best cutting edge technology for improved CWMD modeling and simulation capabilities in support			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
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 2018	FY 2019	FY 2020
of operational planning and mission requirements to better inform operational decision makers of WMD defeat options and their effects.			
Accomplishments/Planned Programs Subtotals	40.189	30.603	46.317

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RA: *Counter Weapons of Mass Destruction Advanced Technology Development*	17.732	11.286	34.825	-	34.825	30.722	32.739	35.660	37.254	Continuing	Continuing
• 105/0604775BR/RA: *Advanced Component Development and Prototypes*	-	-	14.021	-	14.021	12.564	6.800	6.800	6.700	Continuing	Continuing
• 159/0605502BR/RA: *Small Business Innovation Research*	11.311	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency											Date: March 2019	
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) RD / **Nuclear Technologies and Capabilities Development			
COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RD: **Nuclear Technologies and Capabilities Development	29.653	13.745	16.860	92.710	-	92.710	93.612	95.541	97.485	99.433	Continuing	Continuing

Note

In program element 0602718BR, Defense Threat Reduction Agency's (DTRA) consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects into the renamed RD-Nuclear Technologies and Capabilities Development beginning in FY 2020. There was 1.9% real growth in this project.

**Project RD title changes from Detection Technologies to Nuclear Technologies and Capabilities Development in FY 2020.

A. Mission Description and Budget Item Justification

Nuclear Technologies and Capabilities Development encompasses the following related areas.

1. Research, development, test, and evaluation 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 DoD requirements for countering terrorism, counterproliferation, nonproliferation, countering rogue states, and homeland defense.

2. Research, development, test, and evaluation (RDT&E) to systematically study signatures associated with adversary nuclear programs and nuclear detonations gain knowledge or understanding necessary to determine technical capabilities needed to improve Department of Defense (DoD) contingency planning activities; gain knowledge or understanding necessary to improve DoD situational awareness on the nuclear battlefield; gain knowledge or understanding necessary to improve capabilities to attribute the source of a nuclear.

3. 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 Department of Defense 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 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.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RD / ***Nuclear Technologies and Capabilities Development*

4. 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 2018	FY 2019	FY 2020
Title: RD: Nuclear Technologies and Capabilities Development	13.745	16.860	92.710
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 2019 Plans:*** - Develop a contamination avoidance capability. - Develop wearable neutron detectors made of Boron-Coated Straw in support of the development of modern, novel detector solutions to revolutionize CONOPs. - Develop detailed studies to systematically identify new nuclear threat signatures, breaking down the problem geographically to distinguish between allies and foes, and to determine assets and coverage. - Transition those technologies that demonstrate exceptional capabilities in radiation and nuclear threat detection to advanced technology development. - Develop tools for pre-detonation diagnostics, leveraging high spatial resolution nuclear imagers, multiplicity algorithms, trace analysis tools, and high-fidelity test objects to increase capability to characterize threats. ***FY 2020 Plans:*** - Continue to develop a contamination avoidance capability. - Continue to develop wearable neutron detectors made of Boron-Coated Straw in support of the development of modern, novel detector solutions to revolutionize CONOPs. - Continue to develop detailed studies to systematically identify new nuclear threat signatures, breaking down the problem geographically to distinguish between allies and foes, and to determine assets and coverage. - Continue to develop tools for pre-detonation diagnostics, leveraging high spatial resolution nuclear imagers, multiplicity algorithms, trace analysis tools, and high-fidelity test objects to increase capability to characterize threats. - Continue to transition those technologies that demonstrate exceptional capabilities in radiation and nuclear threat detection to advanced technology development. - Improve DoD decision-making by gaining knowledge to determine how to adapt nuclear sensor capabilities to quickly characterize nuclear explosions on the nuclear battlefield and inform tactical, operational, and strategic military actions. - Systematically study techniques to improve the ability of nuclear modeling codes to support tactical DoD operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RD / ***Nuclear Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- Continue to develop system-generated electromagnetic pulse follow-on efforts and electromagnetic pulse coupling and response efforts to deliver high-fidelity early-time electromagnetic analysis and operational tools for US and Allied nuclear weapon effects stakeholders. - Continue research on improved nuclear battlefield casualty assessment and medical planning for nuclear/radiological events. - Publish updates to Weapons Output eBooks, delivering high-fidelity nuclear source terms and historical test data for use in, and validation of, modern weapon effects codes. - Continue to develop petroleum effects models for nuclear targeting capabilities linking higher order impacts to Political Military Economic Social Infrastructure Information (PMESII) analyses. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 is due to the realignment of Projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects into Project RD-Nuclear Technologies and Capabilities Development as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles. Real growth in this Project is 1.9% and is for increased investment in nuclear detection in order to support battlespace efficacy for situational awareness and interdiction as early as possible along the threat timeline.			
Accomplishments/Planned Programs Subtotals	13.745	16.860	92.710

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RD: *Counter Weapons of Mass Destruction Advanced Technology Development*	21.923	26.021	70.153	-	70.153	64.234	60.840	62.070	61.168	Continuing	Continuing
• 127/0605000BR/RD: *Counter Weapons of Mass Destruction Systems Development*	-	-	7.500	-	7.500	7.650	7.803	7.959	8.118	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RD / ***Nuclear Technologies and Capabilities Development*

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RE / *Counter-Terrorism Technologies*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RE: *Counter-Terrorism Technologies*	0.000	0.693	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.693

A. Mission Description and Budget Item Justification

The Counter-Terrorism Technologies project is an over-arching project that develops and transitions a full spectrum of new technologies to counter emergent Weapons of Mass Destruction (WMD) thus enabling warfighters to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, nuclear production, storage, and weaponization facilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RE: Counter-Terrorism Technologies	0.693	-	-
Description: Project RE provides research and development (R&D) support to Joint U.S. Military Forces, specifically U.S. Special Operations Command (USSOCOM), in the areas of Explosive Ordnance Disposal Device Defeat; Counter WMD technologies for warfighters; the USSOCOM Countering WMD – Terrorism Support program.			
Accomplishments/Planned Programs Subtotals	0.693	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RE: *Counter Weapons of Mass Destruction Advanced Technology Development*	101.737	108.978	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Number of technologies developed and delivered, and/or proof of concept, or successful Military Utility Assessments conducted that increase the potential mission success and reduce the number of current gaps in Special Operations Forces capabilities to counter weapons of mass destruction.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RF / Forensics Technologies	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RF: *Forensics Technologies*	216.309	6.803	10.257	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	233.369

Note

Beginning in FY 2020, efforts in this project are captured under project RD-Nuclear Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Forensics Technologies project develops nuclear forensics technologies providing accurate, rapid, and reliable means to collect, analyze, and evaluate prompt data and debris from a nuclear or radiological event in support of exploitation and attribution efforts. These forensics technologies also enable the Defense Threat Reduction Agency's (DTRA) and its partners to detect, locate, identify, track, and interdict nuclear and radiological threats, including weapons and material and enablers to their acquisition and development. In accordance with Department of Defense Directive S-2060.04, DTRA serves as the U.S. Government lead for National Technical Nuclear Forensics (NTNF) research and development. As the central NTNF coordinator, DTRA works in consultation with partners to develop and improve ground-based capabilities supporting exploitation and attribution missions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RF: Forensics Technologies	6.803	10.257	-
Description: Project RF develops nuclear forensics technologies providing accurate, rapid and reliable means to collect, analyze, and evaluate prompt data and debris from a nuclear or radiological event in support of exploitation and attribution efforts.			
FY 2019 Plans: - Reduce the fixed lab process timeline by 50%, increasing confidence and decreasing technical uncertainties in the materials forensics results. This will be accomplished through expanded interpretability of test results, improvement in quality of ground samples, including complex debris from transient environments, and optimization of current debris analysis constructs. - Evaluate and extract relevant data from historic nuclear tests to help calibrate codes to support device characterization improvements. - Expand signature databases with appropriate information on generic designs, known weapon designs, and known effects. - Increase capability development efforts in ubiquitous networks and airborne platforms to support prompt diagnostics and forensics technology improvements. - Conduct/lead a DoD and interagency end-to-end nuclear forensics process technology demonstration and evaluation of DTRA-developed technologies/methodologies to assess NTNF process improvements. - Identify potential development of a new advanced capability in forensic conclusion confidence, timeliness, and accuracy, and assist in assessing contribution to interagency attribution process and decisions.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
The decrease from FY 2019 to FY 2020 is due to the realignment of Project RF-Forensics Technologies into Project RD-Nuclear Technologies and Capabilities Development as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles.			
Accomplishments/Planned Programs Subtotals	6.803	10.257	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RF: *Counter Weapons of Mass Destruction Advanced Technology Development*	25.535	33.578	-	-	-	-	-	-	-	-	-
• 127/0605000BR/RF: *Counter Weapons of Mass Destruction Systems Development*	6.199	6.163	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RG / ***Counter WMD Technologies and Capabilities Development	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RG: ****Counter WMD Technologies and Capabilities Development*	96.456	8.483	8.959	22.253	-	22.253	22.958	22.919	23.715	24.190	Continuing	Continuing

Note

DTRA consolidated RM-Weapons of Mass Destruction (WMD) Counterforce Technologies into the renamed project RG-Counter WMD Technologies and Capabilities Development beginning in FY 2020. There is -9.5% real growth in this project.

***Project RG title changes from Defeat Technologies to Counter WMD Technologies and Capabilities Development in FY 2020

A. Mission Description and Budget Item Justification

Counter WMD Technologies and Capabilities Development encompasses the following areas.

1. Defeat Technologies develops innovative kinetic and non-kinetic weapon technologies to expand traditional and asymmetric options available to Combatant Commanders to deny, disrupt, and defeat adversarial use of WMD, while minimizing collateral 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. 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.

2. 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. 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. Life sciences research develops technologies to find, locate, mitigate, and defeat WMD using bio-organisms or components.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RG: Counter WMD Technologies and Capabilities Development	8.483	8.959	22.253

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RG / ****Counter WMD Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Description: Project RG develops innovative kinetic and non-kinetic weapons technologies to expand traditional and asymmetric options available to Combatant Commanders to deny, disrupt, and defeat adversarial use of WMD while minimizing collateral effects. ***FY 2019 Plans:*** - Conduct an incremental capability demonstration for an autonomous systems technology update to the Modular Autonomous Counter-WMD System B (MACS-B). - Develop future MACS advanced holistic payloads, refining the concept and conducting technology investigation. - Develop Combined Effects Payload for Access Denial (CEPAD) payload. - Collect signatures on threat-improvised rotary winged and fixed wing IED/sUAS in a lab and field environment. - Provide infrastructure to collect signatures including sensors, lab, and field equipment, collection software and collection tools. - Provide a consolidated C-IED/C-sUAS library including database(s), database access, and database/library management including entry, creation and vetting of information. Analyze C-IED/C-sUAS equipment data, and create/sustain algorithms, databases and tables to monitor the creation and vetting of information. - Monitor exploitation of rotary winged, fixed winged IED/C-sUAS to manage the capability gap (from a technology and database standpoint). ***FY 2020 Plans:*** - Continue to conduct incremental capability demonstrations for an autonomous systems technology update to the Modular Autonomous Counter-WMD System B (MACS-B). - Initiate development of novel, air delivered, incendiary weapon fills for agent defeat. - Continue to develop future MACS advanced holistic payloads, specifically for hard and deeply buried targets. - Continue to provide infrastructure to collect signatures including sensors, lab and field equipment, collection software, and collection tools. - Continue to advance technical capabilities or methods to detect, locate/track, identify, characterize, monitor, assess, plan and protect against, deter, delay, disrupt, neutralize, or destroy WMD through special innovative research targeted at meeting capability gaps in CWMD. - Continue to develop and test structural reactive materials and advanced thermal agent defeat devices to improve the capability to defeat and/or neutralize CWMD-related targets. - Continue to test biocide at larger scale to analyze prompt and persistent effects, improving capability to neutralize or destroy biological weapons or agents.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RG / ****Counter WMD Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
- Continue to develop CWMD weapon effects modeling algorithms and scaled test series leveraging machine learning and optimization for attack planning to investigate CWMD weapon effects and enhance WMD defeat modeling and simulation planning tools.			
FY 2019 to FY 2020 Increase/Decrease Statement: The increase from FY 2019 to FY 2020 is due to the realignment of Project RM-WMD Counterforce Technologies into Project RG-Counter WMD Technologies and Capabilities Development as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles. There was also decreased investment in Counter-small Unmanned Aerial Systems (C-sUAS). Real growth in this project is 0.4%.			
Accomplishments/Planned Programs Subtotals	8.483	8.959	22.253

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RG: *Counter Weapons of Mass Destruction Advanced Technology Development*	40.688	20.277	235.087	-	235.087	238.668	242.425	246.630	250.582	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RI / *Nuclear Survivability*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	159.267	25.545	32.732	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	217.544

Note

Beginning in FY 2020, efforts in this project are captured under project RD-Nuclear Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Nuclear Survivability project develops 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 Department of Defense Instruction 3150.09, Chemical, Biological, Radiological, and Nuclear Survivability Policy. The Defense Threat Reduction Agency is designated by the Department of Defense (DoD) as the center of excellence for electromagnetic pulse (EMP) survivability assessments. The System Vulnerability and Assessment effort 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 activities provide the warfighter with unique x-ray, gamma ray, and EMP test capabilities in support of system survivability development, certification, and sustainment. This effort leverages research from and coordinates with the National Nuclear Security Administration (United States) and the Atomic Weapons Establishment (United Kingdom) to develop enabling technologies for improved nuclear weapon effects experimentation capabilities. Nuclear technology analysis efforts support detailed planning related to policy, strategy, objectives, and programmatic integration. 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RI: Nuclear Survivability	25.545	32.732	-
Description: Project RI provides the capability for DoD nuclear forces and their associated control and support systems and facilities to avoid, repel, endure, or withstand attack or other hostile action, to the extent that essential functions can continue or be resumed after the onset of hostile action.			
FY 2019 Plans: - Align nuclear detonation personnel casualty output from Defense Threat Reduction Agency's (DTRA's) Health Effects from Radiological & Nuclear Environments (HENRE) for Hazard Prediction and Assessment Capability (HPAC) to the Defense Health Agency's Joint Medical Planning Tool. - Advance cold/warm x-ray and laser experimentation in order to improve nuclear survivability. For cold x-ray impulse, initiate ion beam and diagnostics development on PITHON, leading to high fluence x-rays for materials and full system impulse capability for Re-entry Vehicles/Re-entry Bodies to improve radiation survivability. Complete debris mitigation system for Double-EAGLE in			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RI / *Nuclear Survivability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
support of cold x-rays for optics and thermostructural response efforts that support Missile Defense Agency (MDA) and satellite systems requirements - Translate radiation hardening basic mechanisms and physics of failure into engineering solutions to improve device and component hardening and survivability. - Update environment and protection standards on periodic five year intervals and respond to Service and Combatant Command requests for verification assessments, to include conduct of U.S. European Command/ U.S. Pacific Command Operational Plan and mission critical systems analytical assessments. - Continue development of Radiation Hardened by Design (RHBD) neutron Single Event Effects mitigation techniques for strategic radiation hardened digital complementary metal-oxide-semiconductor and Analog Mixed Signal Devices. - Develop High Altitude Electro Magnetic Pulse (HEMP), atmospheric, and disturbed environment standards; conduct verification assessments for the Services and MDA; develop technology insertions; and provide subject-matter expert support to provide combat readiness and survivability status to leadership and feedback for Military Standards validity. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the realignment of Project RI-Nuclear Survivability into Project RD-Nuclear Technologies and Capabilities Development as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles.			
Accomplishments/Planned Programs Subtotals	25.545	32.732	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RI: *Counter Weapons of Mass Destruction Advanced Technology Development*	7.289	5.783	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across the DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of CWMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	185.241	30.320	29.388	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	244.949

Note

Beginning in FY 2020, efforts in this project are captured under project RD-Nuclear Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Nuclear and Radiological Effects project develops modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions; consolidate validated modeling tools into the Joint Information Environment 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 2018	FY 2019	FY 2020
Title: RL: Nuclear & Radiological Effects	30.320	29.388	-
Description: Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions. ***FY 2019 Plans:*** - Develop system-generated electromagnetic pulse follow-on efforts and electromagnetic pulse coupling and response efforts to deliver high-fidelity early-time electromagnetic analysis and operational tools for US and Allied nuclear weapon effects stakeholders. - Publish updates to Weapons Output eBooks, delivering high-fidelity nuclear source terms and historical test data for use in, and validation of, modern weapon effects codes. - Develop petroleum effects models for Consequences of Execution, linking higher order impacts to Political Military Economic Social Infrastructure Information (PMESII) analyses. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The decrease from FY 2019 to FY 2020 is due to the realignment of Project RL-Nuclear Survivability into Project RD-Nuclear Technologies and Capabilities Development as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles.			
Accomplishments/Planned Programs Subtotals	30.320	29.388	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RL: *Counter Weapons of Mass Destruction Advanced Technology Development*	8.505	3.427	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RM / *WMD Counterforce Technologies*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RM: *WMD Counterforce Technologies*	104.355	13.956	12.780	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	131.091

Note

Beginning in FY 2020, efforts in this project are captured under project RG-Counter Weapons of Mass Destruction (WMD) Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The WMD Counterforce Technologies Project develops Countering Weapons of Mass Destruction (CWMD) weapon 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 Defense Threat Reduction Agency (DTRA) technical reachback cell. These activities are critical enablers for the development of advanced CWMD planning tools and include Advanced Energetics and Advanced Life Sciences. Advanced Energetics develops energetic materials and weapon design technology providing advanced defeat capabilities for engaging hard and deeply buried targets that are well beyond current high explosive blast/fragmentation warhead technology. Advanced Life Sciences research develops technologies to find, locate, mitigate, and defeat WMD using bio-organisms or components.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RM: WMD Counterforce Technologies	13.956	12.780	-
Description: Project RM provides novel and enhanced weapons energetic materials and structures, full-scale testing of counter WMD weapon effects, weapon effects modeling, weapon delivery optimization, and technical reachback services.			
FY 2019 Plans: - Transition Hellfire-sized structural reactive material warhead technology and design to the Military services to improve capabilities to hold targets at risk. - Advance technical capabilities or methods to detect, locate/track, identify, characterize, monitor, assess, plan and protect against, deter, delay, disrupt, neutralize, or destroy WMD through special innovative research targeted at meeting capability gaps in CWMD. - Test biocide at larger scale to analyze prompt and persistent effects, improving capability to neutralize or destroy biological weapons or agents. - Develop CWMD weapon effects modeling algorithms and scaled test series leveraging machine learning and optimization for attack planning to investigate CWMD weapon effects, and enhance WMD defeat Modeling and Simulation planning tools.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / **Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
The decrease from FY 2019 to FY 2020 is due to the realignment of Project RM-WMD Counterforce Technologies into Project RG-Counter WMD Technologies and Capabilities as part of the Agency's RDT&E portfolio restructuring to bring greater agility and efficiency to programmatic and financial operations and better integrate refreshed organizational roles.			
Accomplishments/Planned Programs Subtotals	13.956	12.780	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RM: *Counter Weapons of Mass Destruction Advanced Technology Development*	23.667	25.243	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of CWMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RR: ****CWMD Test and Evaluation	86.614	12.810	14.345	17.816	-	17.816	18.156	18.451	17.775	18.131	Continuing	Continuing

Note

****Project RR title changes from Countering WMD Test and Evaluation to CWMD Test and Evaluation in FY 2020.

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 counterproliferation pillar of the National Strategy to Counter WMD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: RR: Countering WMD Test and Evaluation	12.810	14.345	17.816
Description: Project RR provides a unique national test bed capability for the study of weapon-target interaction, simulated WMD facility characterization, and WMD facility defeat testing to evaluate the implications of WMD and other special weapon use against U.S. military and civilian assets.			
FY 2019 Plans: - Develop the use of seismo-acoustic arrays as test diagnostics (both hardware and algorithms) and tools for assessing decoupling/coupling. - Continue reconstitution of instrumentation and diagnostics sensors infrastructure capabilities in support of Counter-WMD technology development projects. - Continue additional diagnostics, instrumentation, and explosives handling research in support of other testing and compliance initiatives. - Support Combatant Commands with development and testing of Chemical , Biological, Radiological, Nuclear, and High-Explosive (CBRNE) sensors and WMD countermeasures being developed to support Combatant Command requirements.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
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 2018	FY 2019	FY 2020
- Support exercises and planning events at the Nevada Test Bed in order to develop existing defeat technologies, tools, and capabilities. Further extend testing at the Nevada National Security Site in support of the National Center for Nuclear Security portfolio's nonproliferation efforts. - Continue to 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 weapons effects on WMD storage facilities. - Provide development, maintenance, upgrades, and testing for Autonomous Systems Test Development to support an adaptable test bed for standardized evaluation of autonomous systems in development for CWMD missions. ***FY 2020 Plans:*** - Continue to develop seismo-acoustic arrays as test diagnostics (both hardware and algorithms) and tools for assessing decoupling/coupling. - Continue reconstitution of instrumentation and diagnostics sensors infrastructure capabilities in support of CWMD technology development projects. - Continue additional diagnostics, instrumentation, and explosives handling research in support of other testing and compliance initiatives. - Continue to develop and test WMD and explosives sensors and WMD countermeasures to support Combatant Command requirements. - Continue to develop existing defeat technologies, tools, and capabilities for signature characterization in support of exercises and planning events at the Nevada Test Bed. - Continue to 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 weapons effects on WMD storage facilities. - Continue to provide development, maintenance, upgrades, and testing for Autonomous Systems Test Development to support an adaptable test bed for standardized evaluation of autonomous systems in development for CWMD missions. - Develop the test infrastructure to test transportable system to identify signature characterization that supports existing defeat technologies, tools, and capabilities. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The increase from FY 2019 to FY 2020 is due to increased investment for test instrumentation and data acquisition systems to remain "cutting edge" in gathering test data for customers based on customer demand signals and to develop the test infrastructure to test transportable systems to identify signature characterization that supports existing defeat technologies, tools, and capabilities.			
Accomplishments/Planned Programs Subtotals	12.810	14.345	17.816

Exhibit R-2A, RDT&E Project Justification: PB 2020 Defense Threat Reduction Agency		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 28/0603160BR/RR: *Counter Weapons of Mass Destruction Advanced Technology Development*	0.000	12.394	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill science and technology development needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

E. Performance Metrics

Percentage of CWMD technologies selected for transition to Budget Activity (BA) 3, Advanced Technology Development (ATD) and BA 4, Advanced Component Development and Prototypes (ACD&P).