Department of Defense
Fiscal Year (FY) 2021 Budget Estimates

February 2020

Defense Threat Reduction Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Appropriation: RDT&E, Defense-Wide **Date: February 2020**

OVERVIEW

The Defense Threat Reduction Agency (DTRA) is the Department of Defense's (DoD) principle Research, Development, Test & Evaluation (RDT&E) program for combating and countering the danger posed by the networks and capabilities of foreign weapons of mass destruction (WMD) and improvised threats. These threats present an immediate, persistent, and evolving risk to our nation's security.
Detecting, deterring and defeating these threats is a DoD priority, and DTRA's mission. DTRA's RDT&E portfolio addresses these threats, and is driven by overarching National, Department and Agency level strategic policy. This RDT&E portfolio is structured to align with the strategic objectives of the 2018 National Defense Strategy (NDS) and Nuclear Posture Review (NPR).

DTRA's RDT&E portfolio spans the technology spectrum from basic through applied research and, where applicable, includes the capability to test new advanced technology capabilities or, to validate with experimental data, computer simulations, or models. The portfolio balances scientific exploration and discovery with near- and mid-term priorities and facilitates innovative solutions and technologies that transition to cost-effective capabilities. The portfolio not only focuses on sensor development, other advanced components, prototype development, and capability transition, but also on leveraging the application of leading information science and the development of advanced analytic capabilities that provide the warfighters with operational and near real-time decision support and capabilities.

This portfolio is a risk balanced effort to address complex problems in DTRA's mission space, including understanding the environment, threats, and vulnerabilities; controlling, defeating, disabling, and disposing of threats; and enhancing DoD's ability to safeguard the force and manage consequences and outcomes.

- Understand the Environment, Threats, and Vulnerabilities: Provides the technical underpinnings to anticipate, detect, identify, locate, characterize, and assess WMD and improvised threat networks. DTRA's portfolio will prioritize capabilities that enable U.S. forces to more effectively operate in environments where their traditional strengths in battlespace awareness are being actively countered.

- Control, Defeat, Disable, and Dispose of Threats: Provides the technical underpinnings to counter threat networks, WMD threats/proliferation, counter improvised threats, and combat threats posed by Unmanned Aerial Systems (UASs). DTRA's portfolio will prioritize capabilities that permit warfighters to defeat, interrupt, or otherwise render useless threat networks well ahead of actual threat employment.

- Safeguard the Force and Manage Consequences and Outcomes: Support operating forces capability to monitor and respond to chemical, biological, radiological, or nuclear incidents; mitigate hazards and their effects; and allow military personnel and other mission-critical personnel to continue operating effectively. Operating forces must be prepared to recover casualties, decontaminate personnel and equipment, and establish a protective posture. In response to these emerging and other enduring challenges, the portfolio supports developing and transitioning innovative technologies to protect mission-essential personnel, capabilities, and associated control and support systems.

DTRA's enduring mission is to enable DoD, the U.S. Government, and international partners to counter and deter WMD and improvised- threat networks including those that pose risk to a credible and effective U.S. nuclear deterrent. The FY 2021 request reflects a reduction of -$74.830 million resulting from the Defense-Wide Review (DWR) in which the SECDEF conducted program reviews across the Department's portfolio and made strategic decisions to transfer functions to the Military Services and reduce resources associated with lower priority efforts in order to resource higher priorities. DWR decisions included a reduction of -$31.850 million to DTRA's lowest priority RDT&E programs and a reduction of -$42.980 million in DTRA's C-IED programs to align RDT&E efforts with the Army as the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020. DTRA's budget continues to reflect Services Requirements Review Board (SRRB) reductions previously implemented across the Future Years Defense Program.

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

14 Feb 2020

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Research, Development, Test & Eval, DW	663,254	543,261		164,795	708,056
Total Research, Development, Test & Evaluation	663,254	543,261		164,795	708,056

Department of Defense
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Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Research, Development, Test & Eval, DW	576,997		27,491	27,491	604,488
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Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Basic Research	36,148	26,000			26,000
Applied Research	150,040	174,096		1,677	175,773
Advanced Technology Development	288,894	330,065		49,528	379,593
Advanced Component Development & Prototypes	169,638			113,590	113,590
System Development & Demonstration	7,219	13,100			13,100
Management Support	11,315				
Total Research, Development, Test & Evaluation	663,254	543,261		164,795	708,056
Summary Recap of FYDP Programs					
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Basic Research	14,617				14,617
Applied Research	174,571		3,699	3,699	178,270
Advanced Technology Development	366,659		3,861	3,861	370,520
Advanced Component Development & Prototypes			19,931	19,931	19,931
System Development & Demonstration	21,150				21,150
Management Support					
Total Research, Development, Test & Evaluation	576,997		27,491	27,491	604,488
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R-121PB: FY 2021 President's Budget (Published Version), as of February 14, 2020 at 09:16:50

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
1	0601000BR	DTRA Basic Research	01	36,148	26,000			26,000	U
		Basic Research		36,148	26,000			26,000	
10	0602134BR	Counter Improvised-Threat Advanced Studies	02				1,677	1,677	U
21	0602718BR	Counter Weapons of Mass Destruction Applied Research	02	150,040	174,096			174,096	U
		Applied Research		150,040	174,096		1,677	175,773	
28	0603134BR	Counter Improvised-Threat Simulation	03	13,648			49,528	49,528	U
29	0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	03	275,246	330,065			330,065	U
		Advanced Technology Development		288,894	330,065		49,528	379,593	
97	0604134BR	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04	169,638			113,590	113,590	U
		Advanced Component Development & Prototypes		169,638			113,590	113,590	
128	0605000BR	Counter Weapons of Mass Destruction Systems Development	05	7,219	13,100			13,100	U
137	0605141BR	Mission Assurance Risk Management System (MARMS)	05						U
		System Development & Demonstration		7,219	13,100			13,100	
162	0605502BR	Small Business Innovation Research	06	11,315					U
		Management Support		11,315					

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		Applied Research		174,571		3,699	3,699	178,270	
28	0603134BR	Counter Improvised-Threat Simulation	03			3,861	3,861	3,861	U
29	0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	03	366,659				366,659	U
		Advanced Technology Development		366,659		3,861	3,861	370,520	
97	0604134BR	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04			19,931	19,931	19,931	U
		Advanced Component Development & Prototypes				19,931	19,931	19,931	
128	0605000BR	Counter Weapons of Mass Destruction Systems Development	05	15,650				15,650	U
137	0605141BR	Mission Assurance Risk Management System (MARMS)	05	5,500				5,500	U
		System Development & Demonstration		21,150				21,150	
162	0605502BR	Small Business Innovation Research	06						U
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R-121PB: FY 2021 President's Budget (Published Version), as of February 14, 2020 at 09:16:50

Program Element Table of Contents (by Budget Activity then Line Item Number)

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
1	01	0601000BR	DTRA Basic Research	Volume 5 - 1

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
10	02	0602134BR	Counter Improvised-Threat Advanced Studies	Volume 5 - 5
21	02	0602718BR	Counter Weapons of Mass Destruction Applied Research	Volume 5 - 11

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
28	03	0603134BR	Counter Improvised-Threat Simulation	Volume 5 - 35
29	03	0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	Volume 5 - 39

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Line #	Budget Activity	Program Element Number	Program Element Title	Page
97	04	0604134BR	Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing	Volume 5 - 67

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128	05	0605000BR	Counter Weapons of Mass Destruction Systems Development	Volume 5 - 95
137	05	0605141BR	Mission Assurance Risk Management System (MARMS)	Volume 5 - 127

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
162	06	0605502BR	Small Business Innovation Research	Volume 5 - 133

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Program Element Title	Program Element Number	Line #	BA	Page
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Counter Improvised-Threat Simulation	0603134BR	28	03	Volume 5 - 35
Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing	0604134BR	97	04	Volume 5 - 67
Counter Weapons of Mass Destruction Advanced Technology Development	0603160BR	29	03	Volume 5 - 39
Counter Weapons of Mass Destruction Applied Research	0602718BR	21	02	Volume 5 - 11
Counter Weapons of Mass Destruction Systems Development	0605000BR	128	05	Volume 5 - 95
DTRA Basic Research	0601000BR	1	01	Volume 5 - 1
Mission Assurance Risk Management System (MARMS)	0605141BR	137	05	Volume 5 - 127
Small Business Innovation Research	0605502BR	162	06	Volume 5 - 133

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ACRONYMS

AD	Agent Defeat
ANTS	Attack the Network Tool Suite
ATAC	Advanced Targeting Assessment Capability
ATAK	Android Tactical Assault Kit
ATD	Advanced Technology Development
BAA	Broad Agency Announcement
CBRNE	Chemical, Biological, Radiological, Nuclear, and High-yield Explosives
CCDR	Combatant Commander
CCMD	Combatant Command
C-IED	Counter-Improvised Explosive Device
COE	Consequence of Execution
CoE-NI	Consequence of Execution – Nuclear Integration
CONOPS	Concept of Operations
CONUS	Continental United States
C-sUAS	Counter-Small Unmanned Aerial Systems
CTBT	Comprehensive Nuclear Test Ban Treaty
CT/CP	Counterterrorism / Counterproliferation
CTS	Component Test Structure
C-UAS	Counter-Unmanned Aerial System

CWMD	Countering Weapons of Mass Destruction
CWMD-T	Combating Weapons of Mass Destruction –Terrorism
DAPSS	Denied Area Persistent Sensor System
DEL	DTRA Experimentation Lab
DIAMONDS	Defense Integration and Management of Nuclear Data Services
DIOCC/DIA	Defense Intelligence Operations Coordination Center/Defense Intelligence Agency
DITEC	DTRA Integration Technical Experimentation Center
DoD	Department of Defense
DO	DISCREET OCULUS
DPPG	Defense Policy and Planning Guidance
DRDC	Defense Research and Development Canada
DSCS	Defense Satellite Communications System
DTRA	Defense Threat Reduction Agency
DTRIAC	Defense Threat Reduction Information Analysis Center
DT&E	Development, Test, and Evaluation
ECA	Enhanced Consequence Analysis
ECBC	Edgewood Chemical Biological Center
EM-1	Capabilities of Nuclear Weapons: Effects Manual Number 1
EMP	Electromagnetic Pulse
EMREP	Electromagnetic Reliability and Effects Predictions
EOD	Explosive Ordnance Disposal

EPA	Environmental Protection Agency
FEFLO	Finite Element Flow Solver
FFRDC	Federally Funded Research and Development Center
FOC	Full Operational Capability
FREAK	Force-on-Force Evaluation and Analysis of Key Performance Parameters
FYDP	Future Years Defense Program
HDBT	Hard and Deeply Buried Target
HPC	High Performance Computing
IED	Improvised Explosive Device
IIRM	Interaction of Ionizing Radiation with Matter
IMAAC	Interagency Modeling and Atmospheric Assessment Center
IMEA	Integrated Munitions Effects Assessment
IMS	International Monitoring System
IoT	Internet of Things
IR	Infrared
ISS	Integrated Sensor System
IT	Information Technology
JWICS	Joint Worldwide Intelligence Communications System
LAMP	Loop-mediated Isothermal Amplification
LLE	Laboratory for Laser Energetics
LLNL	Lawrence Livermore National Laboratory
MACS	Modular Autonomous Countering WMD System

MAGICS	Modular Airborne Gaseous Isotope Collection System
MDA	Missile Defense Agency
M&S	Modeling and Simulation
MSEE	Materials Science in Extreme Environments
NACT	Nuclear Arms Control Technology
NLAN	Non-Classified Local Area Network
NuCS	Nuclear Capabilities Services
NWE	Nuclear Weapons Effects
sUAS	Small Unmanned Aerial Systems
TXL	Transportable Xenon Laboratory
UAS	Unmanned Aerial Systems
UCP	Unified Command Plan
UGF	Underground Facility
UGT	Underground Test
UK	United Kingdom
USANCA	U.S. Army Nuclear and Combating WMD Agency
USEUCOM	U.S. European Command
USFK	U.S. Forces Korea
USG	United States Government
USNORTHCOM	U.S. Northern Command
USPACOM	U.S. Pacific Command
USSOCOM	U.S. Special Operations Command

USSTRATCOM	U.S. Strategic Command
UTAS	Underground Targeting and Analysis System
VAPO	Vulnerability Assessment Protection Option
VEO	Violent Extremist Organization
VIRTUS	Virtual Radiation Training through Ubiety System
VMS	Virtual Management System
V&V	Verification and Validation
WEP	Weapon Effects Phenomenology
WMD	Weapons of Mass Destruction
WSMR	White Sands Missile Range

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	325.307	36.148	26.000	14.617	0.000	14.617	11.488	11.237	11.361	11.584	Continuing	Continuing
RU: *Basic Research for Countering WMD*	325.307	36.148	26.000	14.617	0.000	14.617	11.488	11.237	11.361	11.584	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Basic Research for Countering WMD project, as the nation's primary basic research portfolio dedicated to countering weapons of mass destruction (CWMD), is a core strategic investor in future scientific and technological progress across the full spectrum of the Defense Threat Reduction Agency's (DTRA) mission areas. This project concentrates on high risk, high-payoff basic research, leveraging world-class expertise in academia, government, and industry, to increase the foundational body of scientific knowledge supporting DTRA's Applied Research and Advanced Technology Development projects.

This project aligns with DTRA's strategic objectives that support policy and planning guidance from the Executive Office of the President, the Department of Defense (DoD), and the broader WMD threat reduction and consequence management communities. The portfolio addresses this through fundamental research focused on making revolutionary scientific discoveries relevant to emerging and future Counter Weapons of Mass Destruction and Improvised Threat Network (CWMDITN) challenges. Program managers drive interdisciplinary portfolios primarily drawing from physics, chemistry, biology, mathematics, and information and network sciences to: train the next-generation workforce; advance the fundamental knowledge and understanding in the sciences; promote university research to support the CWMDITN mission; and facilitate transition of research to support our warfighters.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	37.023	26.000	25.500	0.000	25.500
Current President's Budget	36.148	26.000	14.617	0.000	14.617
Total Adjustments	-0.875	0.000	-10.883	0.000	-10.883
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.875	-			
• Realignments	-	-	-0.333	-	-0.333
• Defense Wide Review (DWR) Adjustments	-	-	-10.550	-	-10.550

Change Summary Explanation

The decrease in FY 2021 from the President's Budget submission is the result of:

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research*

(1) a realignment of funds to program element 0603160BR for investment in the Automated Solicitation Proposal Management System (ASPMS), a contract and grant management system, and

(2) Defense-Wide Review (DWR) adjustment of -$10.550 million resulting from reductions to DTRA's lowest priority RDT&E programs.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 1					**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research*				**Project (Number/Name)** RU / *Basic Research for Countering WMD*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
RU: *Basic Research for Countering WMD*	325.307	36.148	26.000	14.617	0.000	14.617	11.488	11.237	11.361	11.584	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Basic Research for Countering WMD project, as the nation's primary basic research portfolio dedicated to countering weapons of mass destruction (CWMD), is a core strategic investor in future scientific and technological progress across the full spectrum of the Defense Threat Reduction Agency's (DTRA) mission areas. This project concentrates on high risk, high-payoff basic research, leveraging world-class expertise in academia, government, and industry, to increase the foundational body of scientific knowledge supporting DTRA's Applied Research and Advanced Technology Development projects.

This project aligns with DTRA's strategic objectives that support policy and planning guidance from the Executive Office of the President, the DoD, and the broader WMD threat reduction community. The portfolio addresses this guidance through capability enhancements, projects, and Science and Technology (S&T) investments that support CWMD and reduce global nuclear dangers. Specifically, they include: accelerating the development of standoff radiological/nuclear detection capabilities; researching countermeasures and defenses to non-traditional agents; securing vulnerable materials; developing an in-depth understanding of the capabilities, values, intent, and decision making of potential adversaries, whether they are states, networks, or individuals; defeating WMD agents; researching biologically-based and inspired materials for DoD applications; and leveraging science, technology, and innovation through domestic and international partnerships and agreements.

This project solicits, coordinates, and conducts research to build a robust, forward-looking fundamental research portfolio targeting strategic, mission-focused, basic research with high potential impact for CWMD. The research projects are selected for scientific merit, technical quality, and the potential for innovation. Each research project offers opportunities to expand the knowledge base to help the warfighter, to bring to bear new science solutions with a fresh approach, or to leverage revolutionary approaches to technical surprise, building a foundation for future CWMD solutions. This research will enable new capabilities to: better understand the environment, threats and vulnerabilities; control, defeat, disable, and/or dispose of WMD threats; and safeguard the force by managing consequences.

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Title: Project RU: Basic Research for Countering WMD	36.148	26.000	14.617	0.000	14.617
Description: Project RU funds the exploration and discovery of fundamental scientific knowledge related to DTRA's CWMD mission by research performers from academia, government, and industry. ***FY 2020 Plans:*** - Down-select and award two cooperative agreements to initiate the first DTRA basic research university partnerships: Material Science in Extreme Environments; and Interaction of Ionizing Radiation with Matter - Establish partnership with two teams of universities and laboratories to improve multidisciplinary collaborations, increase engagement with the academic community, and develop the CWMD Science, Technology, Engineering, and Mathematics (STEM) workforce.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research*	**Project (Number/Name)** RU / *Basic Research for Countering WMD*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Support the long-term development of a world-class STEM workforce focused on CWMD research. - Conduct an Internal Portfolio Review to assess the focus and scope of basic research related to CWMD challenges. Assess DTRA's coordination of CWMD basic research across DoD and the broader basic research community. ***FY 2021 Base Plans:*** - Establish Initial Program Plans with the two university partnerships to map the first 12 months of research in the areas of: Material Science in Extreme Environments; and Interaction of Ionizing Radiation with Matter - Address basic research gaps and warfighters' emerging technical needs. - Support the long-term development of a world-class STEM workforce focused on CWMD research. - Promote university research to support Counter Weapons of Mass Destruction and Improvised Threat Network (CWMDITN) challenges. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 is the result of: (1) a realignment of funds to program element 0603160BR for the Automated Solicitation Proposal Management System (ASPMS), a contract and grant management system, for Agency cost sharing with CBDP, and (2) Defense-Wide Review (DWR) adjustment of -$10.550 million resulting from reductions to DTRA's lowest priority RDT&E programs.					
Accomplishments/Planned Programs Subtotals	36.148	26.000	14.617	0.000	14.617

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Procurement methods include competitive selection awards through university partnerships, DTRA's Broad Agency Announcement, and collaborative funding through other organizations.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	1.677	0.000	3.699	3.699	7.340	7.811	7.929	8.127	Continuing	Continuing
JC: *Enable Rapid Capability Delivery*	0.000	0.000	0.502	0.000	2.500	2.500	6.117	6.564	6.657	6.830	Continuing	Continuing
JS: *Assist Situational Understanding*	0.000	0.000	1.175	0.000	1.199	1.199	1.223	1.247	1.272	1.297	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) Counter Improvised - Threat Advanced Studies program element (PE) funds technology outreach to produce studies that will drive earlier understanding of technologies and scientific theories for future programs to enhance the Department of Defense's ability to effectively counter asymmetric threats. Asymmetric threats are characterized by an environment in which an adversary employs a combination of conventional weapons, irregular tactics, and/or terrorism to obtain their objectives. The end-state of the PE is to evaluate the feasibility and practicality of research projects, taking the most promising proposals and translating them into practical prototypes for use against asymmetric threats.

Activities within this PE are driven by efforts to understand, anticipate, illuminate, isolate, and mitigate asymmetric threat networks and enable timely research that hastens the development of new capabilities for countering global asymmetric threats, their associated networks, and emerging technologies.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	1.677	0.000	1.711	1.711
Current President's Budget	0.000	1.677	0.000	3.699	3.699
Total Adjustments	0.000	0.000	0.000	1.988	1.988
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignments	-	-	0.000	3.988	3.988
• Defense Wide Review (DWR) adjustments	-	-	0.000	-2.000	-2.000

Change Summary Explanation

The increase from FY 2020 to FY 2021 reflects the net impact of:

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*

(1) a realignment of funds from PE 0604134BR (Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing) to increase investment in developing materials, devices, and methods for eventual transition to Advanced Technology Development, and
(2) Defense-Wide Review (DWR) reduction of -$2.000 million resulting from the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED R&D programs effective 1 October 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
JC: *Enable Rapid Capability Delivery*	0.000	0.000	0.502	0.000	2.500	2.500	6.117	6.564	6.657	6.830	Continuing	Continuing

A. Mission Description and Budget Item Justification

Defense Threat Reduction Agency (DTRA) takes a deliberate, structured, and proactive approach to meet future capability gaps and requirements through continuous study. DTRA enables DoD, the U.S. Government, and International Partners to counter and deter Weapons of Mass Destruction and Improvised Threat networks. The mission is embodied in three capability areas: understand the environment, threats, and vulnerabilities; control, defeat, disable, and dispose of WMD and asymmetric threats; and safeguard the force and manage consequences.

Activities within this project are driven by current and anticipated asymmetric threats. The applied research enables the understanding and shaping of new theories and development of new technologies in support of Combatant Commands and the DoD. The applied research will drive programmatic action to anticipate, illuminate, isolate, and mitigate asymmetric threats.

This project will investigate emerging threat technologies as well as developing analysis support tools that identify emergent capability requirements and associated gaps. It provides timely acquisition and delivery of solutions to address evolving threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JC: Enable Rapid Capability Delivery	0.000	0.502	0.000	2.500	2.500
Description: This project will assess and understand current and emerging technologies that address the evolving asymmetric threat environment.					
FY 2020 Plans: - Identify and develop technologies to neutralize power sources (batteries) within improvised explosive devices or improvised threats through the Working Against Bomb Initiation Techniques project. - Disable power sources (batteries) through physical and chemical mechanisms in a standoff, non-contact manner via the Working Against Bomb Initiation Techniques project.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Support the three U.S. Military Service Academies' CAPSTONE, research efforts, through guidance, mentoring, and funding projects associated with evolving asymmetric threats to foster next-generation research against these threats. - Support and facilitate exploration of progressive technology innovations in three to five white papers that address key asymmetric threats that directly support Combatant Commanders' requirements and grow the pipeline of potential capabilities to counter asymmetric threat networks. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 reflects the net impact of: (1) a realignment of funds from PE 0604134BR (Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing) to increase investment in developing materials, devices, and methods for eventual transition to Advanced Technology Development, and (2) Defense-Wide Review (DWR) reduction of -$2.000 million resulting from the transfer of C-IED programs to the Army to better align RDTE efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED R&D programs effective 1 October 2020.					
Accomplishments/Planned Programs Subtotals	0.000	0.502	0.000	2.500	2.500

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 28/0603134BR/JC: *Counter Improvised-Threat Simulation*	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing
• 97/0604134BR/JC: *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*	**Project (Number/Name)** JS / *Assist Situational Understanding*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
JS: *Assist Situational Understanding*	0.000	0.000	1.175	0.000	1.199	1.199	1.223	1.247	1.272	1.297	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project sponsors innovative studies that leverage expertise from academia and world-class research institutions in government and industry. It cultivates research community partnerships and is forward-looking to: help understand the environment, threats and vulnerabilities; anticipate and plan for emerging improvised threats; and leverage innovative approaches for future Counter Improvised Threat (C-IT) solutions to prevent or mitigate battlefield operational surprise in support of Combatant Commands (CCMDs) and deployed Warfighters.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JS: Assist Situational Understanding	0.000	1.175	0.000	1.199	1.199
Description: This project conducts analytical research studies to counter emerging improvised threats.					
FY 2020 Plans: - Conduct up to five research studies to support counter threat networks and emerging improvised threat efforts. - Support collaborative relationships with the analytical community. - Conduct annual project reviews to ensure progress toward study objectives. - Assess the focus and scope of C-IT challenges within our internal portfolio and across the broader analytic community to synchronize efforts and ensure successful partnerships.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: - Conduct up to five research studies to support countering WMD and improvised threat networks. - Support collaborative relationships with the analytical community. - Conduct annual project reviews to ensure progress toward study objectives. - Assess the focus and scope of C-IT challenges within our internal portfolio and across the broader analytic community to synchronize efforts and ensure successful partnerships. - Focus on identifying and closing gaps in U.S. and Allies' technology vulnerabilities, developing methodologies to counter emerging threat networks, and in forming material solution investments.					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602134BR / *Counter Improvised-Threat Advanced Studies*	**Project (Number/Name)** JS / *Assist Situational Understanding*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
No significant change.					
Accomplishments/Planned Programs Subtotals	0.000	1.175	0.000	1.199	1.199

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 97/0604134BR/JS: *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	10.978	9.797	0.000	10.090	10.090	10.286	10.585	10.887	11.105	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive selection of most appropriate performers to fulfill analytical 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-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,255.600	150.040	174.096	174.571	0.000	174.571	174.915	177.995	185.192	188.975	Continuing	Continuing
RA: *CWMD Cross-Cutting Technical and Information Sciences*	264.657	36.665	44.167	40.965	0.000	40.965	42.194	42.773	47.564	48.593	Continuing	Continuing
RD: *Nuclear Technologies and Capabilities Development*	43.398	21.050	89.860	92.492	0.000	92.492	91.351	93.732	95.307	97.214	Continuing	Continuing
RE: *Counter Terrorism Technologies*	0.693	0.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.543
RF: *Forensics Technologies*	223.112	7.716	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	230.828
RG: *Counter WMD Technologies and Capabilities Development*	105.632	7.938	22.253	22.958	0.000	22.958	22.919	23.715	24.190	24.675	Continuing	Continuing
RI: *Nuclear Survivability*	184.812	22.632	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	207.444
RL: *Nuclear & Radiological Effects*	215.561	27.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	243.204
RM: *WMD Counterforce Technologies*	118.311	11.342	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	129.653
RR: *CWMD Test and Evaluation*	99.424	14.204	17.816	18.156	0.000	18.156	18.451	17.775	18.131	18.493	Continuing	Continuing

Note

In FY 2020, the Defense Threat Reduction Agency (DTRA) consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects into the renamed project RD-Nuclear Technologies and Capabilities Development. Additionally, DTRA consolidated RM-Weapons of Mass Destruction (WMD) Counterforce Technologies into the renamed project RG-Counter WMD Technologies and Capabilities Development. There is no change to the program element or project structure in the FY 2021 request.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
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*

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

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

B. Program Change Summary ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Previous President's Budget	155.924	179.096	182.758	-	182.758
Current President's Budget	150.040	174.096	174.571	-	174.571
Total Adjustments	-5.884	-5.000	-8.187	-	-8.187
• Congressional General Reductions	-	-5.000			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.244	-			
• SBIR/STTR Transfer	-3.640	-			
• Realignments	-	-	-8.187	-	-8.187

Change Summary Explanation

The Congressional reduction in FY 2020 is for unjustified growth. The decrease in FY 2021 from the previous President's Budget submission is due to the net impact of:
(1) the realignment of funds to PE 0603160BR for the CWMD Information Integration Cell (CIIC) to better reflect the nature of this activity,
(2) increased investment in nuclear weapons effects targeting, battlefield nuclear warfare, certification without underground testing,
(3) realignment of funds from PE 0602718BR to 0603160BR for full effects modeling and WMD survivability and consequence management, and
(4) increased investment in WMD counterforce activities to conduct testing of advanced diagnostics with Defence Research and Development Canada as part of a Coalition Warfare Program to advance CWMD planning tools.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RA: *CWMD Cross-Cutting Technical and Information Sciences*	264.657	36.665	44.167	40.965	0.000	40.965	42.194	42.773	47.564	48.593	Continuing	Continuing

A. Mission Description and Budget Item Justification

The CWMD Cross-Cutting Technical and Information Sciences project develops concepts and technologies in the areas of high-speed information processing, modeling and simulation, signal detection, and data-driven decision analysis in support of the Defense Threat Reduction Agency's (DTRA's) technical reach-back teams. This project develops and maintains continuously improving collaborative architectures and Weapons of Mass Destruction (WMD) modeling and simulation codes that drive an integrated suite of decision support tools serving the Combatant Commands, other Department of Defense (DoD) agencies, and national and international Countering WMD (CWMD) partners. This effort also funds research activities that benefit the public through analysis and engagement to reduce and counter threats posed by WMD via the 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	36.665	44.167	40.965	0.000	40.965
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 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 Force-on-Force Evaluation and Analysis of Key Performance Parameters (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 Virtual Radiation Training through Ubiety System (VIRTUS), which provides a mobile phone-based radiation sensor emulator for search training. - Provide increased stand-alone modeling capability for Android Tactical Assault Kit (ATAK), which incorporates CWMD capabilities into a mobile phone-based tactical common operating picture, to support new, emerging and updated modeling and simulation requirements.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Transition the Enhanced Mapping and Positioning System (EMAPS) to the Joint Program Executive Office, Chemical and Biological Defense. This system uses Light, Detection and Ranging (LIDAR) to automatically create real-time 2D/3D annotated physical maps of areas denied to the Global Positioning System. ***FY 2021 Base 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 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. - Provide quarterly updates to forecasted changes/developments in geopolitical landscapes and the intersection of Chemical, Biological, Radiological, and Nuclear (CBRN) and WMD employment systems. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects the net effect of the realignment of funds from this program element to program element 0603160BR for the CWMD Information Integration Cell (CIIC) to better reflect the nature of this activity.					
Accomplishments/Planned Programs Subtotals	36.665	44.167	40.965	0.000	40.965

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RA: *Counter Weapons of Mass Destruction Advanced Technology Development*	18.080	34.825	50.019	-	50.019	46.279	49.207	50.708	51.721	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research*	**Project (Number/Name)** RA / *CWMD Cross-Cutting Technical and Information Sciences*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 162/0605502BR/RA: *Small Business Innovation Research*	11.315	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.315

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency											Date: February 2020	
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RD: *Nuclear Technologies and Capabilities Development*	43.398	21.050	89.860	92.492	0.000	92.492	91.351	93.732	95.307	97.214	Continuing	Continuing

Note

In FY 2020, DTRA consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects in program element 0602718BR, into the renamed project RD-Nuclear Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

Nuclear Technologies and Capabilities Development encompasses the following related areas:

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

2. 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.

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 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.

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RD: Nuclear Technologies and Capabilities Development	21.050	89.860	92.492	0.000	92.492

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 2020 Plans:
- Enhance contamination avoidance capabilities.
- Contribute to the development of an American National Standards Institute (ANSI) standard to assess DoD radiation imager's performance and evaluation.
- Develop and test new application-specific integrated circuits (ASIC) to improve radiation detector performance while also reducing power requirements.
- Test and evaluate a proof of principle Virtual Reality/Augmented Reality (VR/AR) testbed for use in evaluating radiation detection equipment.
- Actualize 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.
- 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.
- Integrate sensor platforms and layering of additional data sets to enhance detection of nuclear targets of interest.

Enhance and expand capabilities to identify nuclear targets of interest in overhead imagery using next-generation computer-vision techniques, in order to enable follow-on actions
- 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.
- 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.
- Conduct research on improved nuclear battlefield casualty assessment and medical planning for nuclear/ radiological events.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- 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 nuclear targeting capabilities linking higher order impacts to Political Military Economic Social Infrastructure Information (PMESII) analyses. By 4th QTR FY21, develop software prototype capable of injecting nuclear effects, and integrate into select models supporting CCMD and Service wargames. - Develop low-cost, mobile and autonomous wide area and point search detectors to enable the warfighter to characterize, map, and avoid radiation hazards on the nuclear battlefield. - Improve support to a robust nuclear deterrent without resumption of underground nuclear testing by providing modernized survivability standards, toolkits and test and evaluation (T&E) data for legacy and new mission critical nuclear, conventional, satellite and missile defense systems. - Deliver integrated, cloud-ready, cross-cutting platform, applications, and data analysis AI-enhanced capabilities to support the full spectrum of nuclear operations, war gaming, and assessments. - Develop wearable neutron detectors made of Boron-Coated Straw in support of the development of modern, novel detector solutions to revolutionize concept of operations (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. - Develop petroleum effects models for nuclear targeting capabilities linking higher order impacts to Political Military Economic Social Infrastructure Information (PMESII) analyses. - Conduct research on improved nuclear battlefield casualty assessment and medical planning for nuclear/ radiological events. - 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.					
FY 2021 Base Plans: - Enhance existing contamination avoidance capabilities. - Develop an additional new radiation signature test device (RSTD) to expand test capabilities and detector evaluation. - Evaluate the performance of novel materials (e.g. CLLBC (Cs2LiLa(Br,Cl)6:Ce, Dual-sided micro-structured semiconductor neutron detectors (DSMSNDs)) as a replacement for both high energy resolution gamma-ray detectors and high pressure Helium- neutron detectors.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Further 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. - Generate additional 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. - Support transitioning those technologies that demonstrate exceptional capabilities in radiation and nuclear threat detection to advanced technology development. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to the net impact of: (1) increased investment in nuclear weapons effects targeting, battlefield nuclear warfare, certification without underground testing, and (2) realignment of funds from PE 0602718BR to 0603160BR for full effects modeling and WMD survivability and consequence management.					
Accomplishments/Planned Programs Subtotals	21.050	89.860	92.492	0.000	92.492

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RD: *Counter Weapons of Mass Destruction Advanced Technology Development*	21.193	70.153	51.416	-	51.416	51.480	53.081	55.547	56.659	Continuing	Continuing
• 128/0605000BR/RD: *Counter Weapons of Mass Destruction Systems Development*	-	7.500	15.650	-	15.650	14.803	13.959	13.118	13.381	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RE: *Counter Terrorism Technologies*	0.693	0.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.543

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RE: Counter-Terrorism Technologies ***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.	0.850	-	-	-	-
Accomplishments/Planned Programs Subtotals	0.850	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RE: *Counter-Terrorism Technologies*	108.964	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	108.964

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RF: *Forensics Technologies*	223.112	7.716	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	230.828

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RF: Forensics Technologies	7.716	0.000	0.000	0.000	0.000
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 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	7.716	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RF: *Counter Weapons of Mass Destruction Advanced Technology Development*	30.947	-	-	-	-	-	-	-	-	0.000	30.947
• 128/0605000BR/RF: *Counter Weapons of Mass Destruction Systems Development*	6.016	-	-	-	-	-	-	-	-	0.000	6.016

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency											Date: February 2020	
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RG: *Counter WMD Technologies and Capabilities Development*	105.632	7.938	22.253	22.958	0.000	22.958	22.919	23.715	24.190	24.675	Continuing	Continuing

Note

In FY 2020, DTRA consolidated RM-Weapons of Mass Destruction (WMD) Counterforce Technologies into RG-Counter WMD Technologies and Capabilities Development.

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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RG: Counter WMD Technologies and Capabilities Development	7.938	22.253	22.958	0.000	22.958
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 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Conduct incremental capability demonstrations for advanced technology systems. - Initiate development of novel, air delivered, incendiary weapon fills for agent defeat. - Develop future advanced holistic payloads, specifically for hard and deeply buried targets. - Provide infrastructure to collect signatures including sensors, lab and field equipment, collection software, and collection tools. - Develop 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. - Develop and test structural reactive materials and advanced thermal agent defeat devices to improve the capability to defeat and/or neutralize CWMD-related targets. - Test biocide at a 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 2021 Base Plans: - Develop offensive counter-proliferation, counter-WMD technologies in support of Combatant Command requirements. - Develop WMD pathway defeat technologies, as well as threat-specific test articles and analyses. - Develop lighter, smaller, more effective breaching capabilities. - Develop next generation WMD detection technology applications. - Develop advanced data analytics and technical capabilities to rapidly capture, catalogue and illuminate nefarious activities to counter improvised threat networks and provide WMD situational awareness. - Build analytic capabilities that enhance the Fusion Analysis Development Effort (FADE)/Multi- Intelligence Spatial Temporal (MIST) tool suite for geospatial predictive analytics, and pattern of life and anomaly detection. This fusion of sources provides a central, tailorable asset for CWMD mission planning, mission execution, and supports CONPLAN 7599 for identifying and assessing threats. - Deliver mobile phone-based tactical common operating picture to U.S. Forces, to support new, emerging and updated modeling and simulation requirements. - Conduct biocide testing at larger scale to analyze prompt and persistent effects, improving capability to neutralize or destroy biological weapons or agents. - Develop environmental monitors for identification and characterization of CBRN production.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop CWMD weapon effects modeling algorithms and scaled test series for attack planning to investigate CWMD weapon effects enhance WMD defeat modeling and simulation planning tools and assess new WMD defeat mechanisms. - Conduct small scale testing of structural reactive materials and advanced thermal agent defeat devices to improve the capability to defeat and/or neutralize CWMD-related targets. - Conduct biocide testing at larger scales to analyze prompt and persistent effects, improving capability to neutralize or destroy biological weapons or agents. - Research and investment in application of basic and applied research initiatives and support test and evaluation of emerging autonomous technologies to support future and emerging threat requirements. - Develop offensive counter-proliferation, counter-WMD technologies in support of combatant command requirements. - Develop WMD pathway defeat technologies, as well as threat-specific test articles and analyses. - Initiate studies on novel next generation agent defeat warhead fills and design. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to increased investment in WMD counterforce activities to conduct testing of advanced diagnostics with Defence Research and Development Canada as part of a Coalition Warfare Program to advance CWMD planning tools.					
Accomplishments/Planned Programs Subtotals	7.938	22.253	22.958	0.000	22.958

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RG: *Counter Weapons of Mass Destruction Advanced Technology Development*	22.354	225.087	265.224	0.000	265.224	242.425	246.630	250.582	255.592	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	184.812	22.632	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	207.444

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

Efforts in this project include system vulnerability assessment, experimental capabilities, nuclear technology analysis, and human survivability.

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RI: Nuclear Survivability	22.632	0.000	0.000	0.000	0.000
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 2020 Plans: N/A					
FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	22.632	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RI: *Counter Weapons of Mass Destruction Advanced Technology Development*	8.583	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.583

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	215.561	27.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	243.204

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RL: Nuclear & Radiological Effects	27.643	0.000	0.000	0.000	0.000
Description: Project RL delivers nuclear weapons effects applications that enable effective targeting of U.S. nuclear weapons, and inform protection and response against adversary nuclear attacks.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	27.643	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RL: *Counter Weapons of Mass Destruction Advanced Technology Development*	2.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.947
• 128/0605000BR/RL: *Counter Weapons of Mass Destruction Systems Development*	1.203	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.203

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RM: *WMD Counterforce Technologies*	118.311	11.342	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	129.653

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RM: WMD Counterforce Technologies ***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 2020 Plans:*** N/A ***FY 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A	11.342	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	11.342	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 29/0603160BR/RM: *Counter Weapons of Mass Destruction Advanced Technology Development*	40.365	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.365

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RR: *CWMD Test and Evaluation*	99.424	14.204	17.816	18.156	0.000	18.156	18.451	17.775	18.131	18.493	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Countering WMD Test and Evaluation project provides a unique national test capability for simulated WMD facilities and processes. This capability provides structured and systematic end-to-end test event planning, preparation, management, execution, and data analysis. It also offers test instrumentation (data acquisition systems and optics), scientific analysis and predictions, test article construction, test article/test bed remediation, tunnel mining, architectural and engineering design, systems engineering and integration, and test data management. The project leverages 50 years of expertise in investigating weapons effects and target response across the spectrum of hostile environments that could be created by 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RR: Countering WMD Test and Evaluation	14.204	17.816	18.156	0.000	18.156
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 2020 Plans:*** - Develop seismo-acoustic arrays as test diagnostics (both hardware and algorithms) and tools for assessing decoupling/coupling. - Continue reconstitution of instrumentation and diagnostics of sensor infrastructure capabilities in support of CWMD technology development projects. - Conduct diagnostics, instrumentation, and explosives handling research in support of other testing and compliance initiatives. - Develop and test WMD and explosives sensors and WMD countermeasures to support Combatant Command (CCMD) requirements. - Expand existing defeat technologies, tools, and capabilities for signature characterization in support of exercises and planning events at the Nevada Test Bed. - 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- 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. - Design and develop a data architecture that provides for the integration of RD department data from multiple RDT&E programs into an enterprise storage solution, curate compiled data from T&E events and move to an existing data center, develop portals for interagency access to data, and execute three initial data analytics demonstrations.					
FY 2021 Base Plans: - Develop seismo-acoustic arrays as test diagnostics (both hardware and algorithms) and tools for assessing decoupling/coupling. - Continue reconstitution of instrumentation and diagnostics of sensor infrastructure capabilities in support of CWMD technology development projects. - Develop additional diagnostics, instrumentation, and explosives handling research in support of other testing and compliance initiatives. - Develop and test WMD and explosives sensors and WMD countermeasures to support CCMD requirements. - Develop existing defeat technologies, tools, and capabilities for signature characterization in support of exercises and planning events at the Nevada Test Bed. - 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. - Develop the test infrastructure to test transportable system to identify signature characterization that supports existing defeat technologies, tools, and capabilities. - Develop tools and data analytics for delivery to CCMDs in direct response to existing capability gaps. - Complete data architecture implementation to enable interagency partnerships at an unclassified level. - Complete development of portals for all identified external collaborations. - Perform two data analytics demonstrations and deliver two additional tools to the CCMDs.					
FY 2021 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: The increase from FY 2020 to FY 2021 is due to inflation.					
Accomplishments/Planned Programs Subtotals	14.204	17.816	18.156	0.000	18.156

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603134BR / *Counter Improvised-Threat Simulation*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	23.366	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing
JC: *Enable Rapid Capability Delivery*	23.366	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) advanced technology development program element funds the assessment, analysis, experimentation, evaluation, and testing of systems to counter asymmetric threats to determine feasibility for prototyping, spiral development, Program of Record investment and potential for immediate fielding.

Understanding asymmetric threats is the driving force behind DTRA's deliberate, structured, and proactive approach to understanding, anticipating, illuminating, isolating, and/or mitigating threats through identified needs. DTRA is working to bring concepts and theories forward to assist and hasten the development of subsystems and components along with integration into prototypes for field experiments and/or laboratory tests.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.648	49.528	0.000	50.110	50.110
Current President's Budget	13.648	49.528	0.000	3.861	3.861
Total Adjustments	0.000	0.000	0.000	-46.249	-46.249
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignments	-	-	0.000	-14.279	-14.279
• Defense Wide Review (DWR) Adjustments	-	-	0.000	-31.970	-31.970

Change Summary Explanation

The decrease in FY 2021 from the previous President's Budget submission is due to:
(1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to increase investment in WMD counterterrorism activities, and

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603134BR / *Counter Improvised-Threat Simulation*

(2) Defense-Wide Review (DWR) adjustment of -$31.970 million resulting from reductions to DTRA's lowest priority RDT&E programs and the the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603134BR / *Counter Improvised-Threat Simulation*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
JC: *Enable Rapid Capability Delivery*	23.366	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project is driven by current and projected threat activities. It enables the timely validation, resourcing, applied research and prototype development and delivery to counter threats that continue to impact US forces. The project supports the evaluation of integrated technologies or prototype systems in a realistic environment to counter asymmetric threats.

DTRA performs experiments and modeling and simulations in the pursuit of advanced technology development. The outcomes of these experiments are incorporated into new or existing prototypes to enhance system performance while reducing cost.
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JC: Enable Rapid Capability Delivery	13.648	49.528	0.000	3.861	3.861

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 2020 Plans:
- Improve detection capabilities through baseline threat signatures for vehicles, explosives, and other threats in support of sensor capability development.
- Develop common database for signatures for DoD and other government agencies to use for sensor development and tactics, techniques, and procedures (TTPs).
- Conduct testing and evaluation of future technology development in support of countering – asymmetric threats.
- Increase the processing, exploitation, and dissemination of data for integrated sensors identifying improvised threat facilitation networks.
- Enhance integration of sensors identifying improvised threat facilitation networks.

FY 2021 Base Plans:
N/A

FY 2021 OCO Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603134BR / *Counter Improvised-Threat Simulation*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop 12 acquisition threat signal packages for databases with hardware and software implementation plans to update current capabilities across the Combatant Commands, ensuring a more robust capability response to asymmetric threats. - Conduct two evaluation events to verify and analyze threat signal inputs to improve ability of capabilities to counter asymmetric threat networks. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects a decrease due to: (1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to increase investments in WMD counterterrorism activities and, (2) Defense-Wide Review (DWR) adjustments of -$31.970 million resulting from reductions to DTRA's lowest priority RDT&E programs and the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.					
Accomplishments/Planned Programs Subtotals	13.648	49.528	0.000	3.861	3.861

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 10/0602134BR/JC: *Counter Improvised-Threat Advanced Studies*	0.000	0.502	0.000	2.500	2.500	6.117	6.564	6.657	6.830	Continuing	Continuing
• 97/0604134BR/JC: *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing

Remarks

D. Acquisition Strategy

Competitive Selection to determine the optimal performer who can produce a viable deliverable within schedule and budget.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	2,234.299	275.246	330.065	366.659	0.000	366.659	340.184	348.918	356.837	363.972	Continuing	Continuing
RA: *CWMD Cross-Cutting Technical and Information Sciences*	68.860	18.080	34.825	50.019	0.000	50.019	46.279	49.207	50.708	51.721	Continuing	Continuing
RD: *Nuclear Technologies and Capabilities Development*	64.946	21.193	70.153	51.416	0.000	51.416	51.480	53.081	55.547	56.659	Continuing	Continuing
RE: *Counter-Terrorism Technologies*	858.849	108.964	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	967.813
RF: *Forensics Technologies*	459.463	30.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	490.410
RG: *Counter WMD Technologies and Capabilities Development*	175.576	22.354	225.087	265.224	0.000	265.224	242.425	246.630	250.582	255.592	Continuing	Continuing
RI: *Nuclear Survivability*	57.782	8.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.365
RL: *Nuclear & Radiological Effects*	11.895	2.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.842
RM: *WMD Counterforce Technologies*	197.217	40.365	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	237.582
RT: *Target Assessment Technologies*	339.711	21.813	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	361.524

Note

In FY 2020, Defense Threat Reduction Agency (DTRA) consolidated program element 0603160BR projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL- Nuclear and Radiological Effects into the renamed project RD-Nuclear Technologies and Capabilities Development. Additionally, DTRA consolidated projects RE-Counter-Terrorism Technologies, RM-WMD Counterforce Technologies, RR-CWMD Test and Evaluation, and RT-Target Assessment Technologies, into the renamed project RG-Counter WMD Technologies and Capabilities Development. There is no change to the program element or project structure in the FY 2021 request.

A. Mission Description and Budget Item Justification

The Advanced Technology Development portfolio is aligned with strategic planning 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*

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.

B. Program Change Summary ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Previous President's Budget	280.858	340.065	333.624	-	333.624
Current President's Budget	275.246	330.065	366.659	-	366.659
Total Adjustments	-5.612	-10.000	33.035	-	33.035
• Congressional General Reductions	-	-10.000			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.041	-			
• SBIR/STTR Transfer	-6.653	-			
• Realignments	-	-	33.035	-	33.035

Congressional Add Details ($ in Millions, and Includes General Reductions)	**FY 2019**	**FY 2020**
Project: RM: *WMD Counterforce Technologies*		
Congressional Add: *Target Sensing Technologies*	10.000	0.000
Congressional Add Subtotals for Project: RM	10.000	0.000
Congressional Add Totals for all Projects	10.000	0.000

Change Summary Explanation

The Congressional reduction in FY 2020 is for excess and unjustified growth. The increase in FY 2021 from the previous President's Budget submission is due to increased investment in WMD counterterrorism activities including the improvement of Combatant Commanders' offensive capabilities for render safe, pathway defeat, critical infrastructure defeat, and improved CWMD Joint Intelligence Preparation of the Operational Environment (JIPOE) and Preparation of the Environment (PE) capabilities. This increase also supports efforts to develop, integrate, demonstrate, and transition CWMD advanced sensors, surveillance, and defeat planning technologies in support of the warfighter. DTRA intends to increase research and development in CWMD target assessment technologies including tools for the characterization of CWMD targets across all Combatant Commands. Additionally, DTRA realigned of the CWMD situational awareness for the CWMD Information Integration Cell (CIIC) from program element 0602718BR to better reflect the nature of this activity.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RA: *CWMD Cross-Cutting Technical and Information Sciences*	68.860	18.080	34.825	50.019	0.000	50.019	46.279	49.207	50.708	51.721	Continuing	Continuing

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RA: CWMD Cross-Cutting Technical and Information Sciences	18.080	34.825	50.019	0.000	50.019
Description: Project RA develops modeling and simulation capabilities and provides technical reachback support to maintain and increase decision advantage for the United States and its allies through improved situational understanding across the complete CWMD mission space. ***FY 2020 Plans:*** - Develop a robust quick reaction capability to rapidly transition both material and non-material developmental technologies to fielded solutions. Develop acquisition expertise, innovation tools, and agile contract solutions to more effectively deliver capabilities to the warfighter as urgent operational requirements emerge. - Continue to provide tailored support to DoD with Technical Reachback via processes, capabilities, and expertise in WMD and explosives modeling and simulation. Leverage this support for partner stakeholders, providing scientific modeling support to Department of Health and Human Services and serving as the Federal Emergency Management Agency's Interagency Modeling and Atmospheric Assessment Center (IMAAC) Technical Operations Hub. - Continue to develop capabilities in support of United States Strategic Command (USSTRATCOM) and United					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
States Northern Command (USNORTHCOM) that predict and simulate Higher Order Effects, including the spread of infectious diseases, WMD protection measures, DoD response efforts, and force health protection measures. ***FY 2021 Base Plans:*** - Develop processes, capabilities and expertise in order to deliver rapid responses to Requests for Information as DOD's only resource providing 24/7/365 WMD subject matter expertise and analyses to customers across the full spectrum of Chemical, Biological, Radiological, Nuclear, and high yield Explosives (CBRNE) in support of Combatant Command (CCMD) plans and operations. - Develop the global synthetic population and activity database for modeling infectious disease propagation and impacts of population behaviors and movement after a WMD event in support of CCMD force health protection and consequence management planning. - Utilize acquisition expertise, innovation tools, and agile contract solutions to deliver capabilities to the warfighter as urgent operational requirements emerge; transition material and non-material developmental technologies to fielded solutions as rapidly as possible. - Provide expanded/enhanced CWMD information sharing and data analysis to meet increasing CCMD and interagency demand for support. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to the realignment of CWMD situational awareness for the CWMD Information Integration Cell (CIIC) from program element 0602718BR to better reflect the nature of this activity and increased investment in cross-cutting research and develpment. Additionally, DTRA realigned funds from program element 0602718BR for the improvement of the Automated Solicitation Proposal Management System (ASPMS), a contract and grant management system. This supports the cost sharing agreement between DTRA and the Chemical Biological Defense Program (CBDP).					
Accomplishments/Planned Programs Subtotals	18.080	34.825	50.019	0.000	50.019

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RA: *Counter Weapons of Mass Destruction Applied Research*	36.665	44.167	40.965	0.000	40.965	42.194	42.773	47.564	48.593	Continuing	Continuing
• 162/0605502BR/RA: *Small Business Innovation Research*	11.315	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.315

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency												Date: February 2020
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
RD: *Nuclear Technologies and Capabilities Development*	64.946	21.193	70.153	51.416	0.000	51.416	51.480	53.081	55.547	56.659	Continuing	Continuing

Note

In FY 2020, DTRA consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL- Nuclear and Radiological Effects in program element 0603160BR, into the renamed project RD-Nuclear Technologies and Capabilities Development. There are no changes to the program element or project structure in the FY 2021 request.

A. Mission Description and Budget Item Justification

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

2. 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.

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 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.

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.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RD: Nuclear Technologies and Capabilities Development	21.193	70.153	51.416	0.000	51.416
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. ***FY 2020 Plans:*** - Conduct utility assessment and transition prototype sensors with improved capabilities for wide area search mission - Develop an additional new radiation signature test device (RSTD) to expand test capabilities and detector evaluation - Conduct test and evaluation and utility assessments of Medium Resolution Radioisotope Identification Devices (RIIDs to inform acquisition decisions by JPEO-CBRND. - Develop prototype wearable detectors to enhance user agility during search operations. - Provide novel isotope identification algorithm to support DOD's unique search needs - Integrate radionuclide sensors into the Integrated Early Warning Technology Demonstration (IEW) - Transition those technologies that demonstrate exceptional capabilities in radiation and nuclear threat detection to advanced technology development - Develop and test techniques to improve the ability of nuclear modeling codes to support tactical DoD operations. - Develop, integrate, and field test technologies and techniques for field analysis of nuclear events to provide (1) rapid answers in support of nuclear threats, attribution processes, and counterproliferation activities, and 2) improved situational awareness on the nuclear battlefield in order to inform tactical and strategic military action. - Develop and test Modular Airborne Gaseous Isotope Collection System (MAGICS) in the field in support of closer, sooner, site-specific monitoring. Novel technologies are necessary to conduct gas monitoring in support of nuclear detection missions, as timing, signature strength and complex analysis present challenges. - Develop unattended sensor networks for autonomous detection and analysis. - Continue to conduct targeted research on component-level technologies, such as low-power electronics, solid-state photodetectors, search and ID algorithms, and helium-3 replacement technologies, which will improve existing detection technology subsystem components.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop, demonstrate, test, and transition systems that remotely monitor nuclear and radiological threat signatures in small and wide areas. - Develop new or update existing standards and handbooks to capture critical information for DoD to verify and validate mission critical systems. - Develop and collaborate on Satellite System Natural and Nuclear Environment Protection Standard with DoD Stakeholders and the DoD Standardization Program Office. - Produce technical reports addressing DoD radiogenic disease concerns; which address Congressional interest in historical veteran radiation exposure and present day radiological exposures of the DoD-affiliated population. - Maintain Defense Integration and Management of Nuclear Data Services (DIAMONDS) while developing DIAMONDS Next Generation testing for functional and data validation. Maintain current reporting on both systems to allow for data verification and validation in preparation for initial operating capability release. - Develop natural gas and water/seawater effects models in support of USSTRATCOM Consequences of Execution efforts, linking higher order effects to Political Military Economic Social Infrastructure Information (PMESII) analyses - Integrate, demonstrate, and deliver a suite of consistent and enhanced models, tools, references, and data to US and Allied nuclear weapon effects stakeholders.					
FY 2021 Base Plans: - Develop software capability by Q4 FY 2021 to inject nuclear effects with appropriate fidelity into 3-4 studies/ analyses/wargames. - Integrate improved contamination identification and avoidance capabilities into Service sensor networks and command and control systems - Provide Long Dwell Spectrometer (LDS) with utility assessment for transition to Technical Support Group - Develop and evaluate a modern replacement for the Alpha Beta detector more suited to support DoD's mission - Evaluate the performance of prototype for use as a replacement for high-pressure Helium-3 tubes for neutron detection in support of the development of modern, novel detector solutions - Provide prototype next generation cadmium zinc telluride (CZT) high-resolution (0.5%) detectors with 200% increase in size - Provide prototype, novel neutron multiplicity detectors that are not Helium-3 based but meet or exceed the performance of Helium-3 based neutron detectors - Provide automated/autonomous system that combines 3D Light Detection and Ranging (LIDAR) mapping with radiation hazard detection and identification of point and wide area hazards for operational utility assessment					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Provide improved aerial search/long dwell capabilities integrated into Mission Design Tool. - Provide novel, low profile, low power photomultiplier that can offer a significant reduction in size, weight and power requirements for radiation detectors - Provide prototype electromagnetic pulse (EMP) sensor(s) for use on the battlefield enabling warfighter situational awareness of EMP effects - Conduct Technology Demonstrations of an integrated sensor network able to rapidly identify and map a radiological contaminated area using mobile, unmanned, manned and unattended sensors - Conduct test and evaluation and utility assessments to inform acquisition decisions for selection of radiation imagers to support DoD missions. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 is a result of the net impact of decreased investment in nuclear warfighting dominance to fund increased investment in nuclear weapons effects targeting, battlefield nuclear warfare, certification without underground testing, and enhanced consequence analysis in program element 0602718BR.					
Accomplishments/Planned Programs Subtotals	21.193	70.153	51.416	0.000	51.416

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RD: *Counter Weapons of Mass Destruction Applied Research*	21.050	89.860	92.492	0.000	92.492	91.351	93.732	95.307	97.214	Continuing	Continuing
• 128/0605000BR/RD: *Counter Weapons of Mass Destruction Systems Development*	-	7.500	15.650	0.000	15.650	14.803	13.959	13.118	13.381	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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*

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RE: *Counter-Terrorism Technologies*	858.849	108.964	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	967.813

Note

Beginning in FY 2020, efforts in this project are captured under project RG-Counter WMD Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Counter-Terrorism Technologies project develops and transitions a full spectrum of new technologies to counter emergent weapons of mass destruction (WMD) threats. This project supports the U.S. Special Operations Command (USSOCOM) in two research areas: (1) Countering WMD-Terrorism (CWMD-T) Counterproliferation Research and Development, which is a collaborative effort to develop advanced, warfighter-unique technologies to defeat terrorist WMD development/ acquisition pathways, to include defeat of the devices themselves, while minimizing risks to U.S. forces; and (2) USSOCOM CWMD-T Support, which develops concepts and technologies to integrate and synchronize operations and activities that prevent terrorists 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RE: Counter-Terrorism Technologies	108.964	0.000	0.000	0.000	0.000
Description: Project RE supports Joint U.S. Military Forces, specifically USSOCOM, in the research areas of warfighter-unique, mission-specific WMD defeat, denial, counterproliferation, and interdiction technologies.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	108.964	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RE: *Counter Weapons of Mass Destruction Applied Research*	0.850	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.850

Remarks

D. Acquisition Strategy

Assessment and selection of best performer for developmental requirements to meet specific military capability needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RF / *Forensics Technologies*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RF: *Forensics Technologies*	459.463	30.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	490.410

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, integrates, tests, and demonstrates post-detonation nuclear forensics systems 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 forensic capabilities enable the Defense Threat Reduction Agency (DTRA) and its trusted 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 DoD Directive S-2060.04, DTRA serves as the U.S.

Government lead for post-detonation National Technical Nuclear Forensics (NTNF) research and development (R&D). As the central NTNF R&D coordinator, DTRA works in consultation with interagency partners to develop and improve ground-based capabilities supporting exploitation and attribution missions. NTNF R&D supports advanced research in the following areas: (1) Prompt nuclear effects exploitation for attribution; (2) nuclear device characterization for forensics; and (3) nuclear forensic materials exploitation for attribution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RF: Forensics Technologies	30.947	0.000	0.000	0.000	0.000
Description: Project RF supports nuclear forensics by developing: (1) technologies, systems and procedures for post detonation nuclear forensics; (2) on/off-site analysis to meet forensic, verification, monitoring and confidence-building requirements; and (3) technologies to detect, locate, identify, track, and interdict nuclear and radiological threats, including enablers to their acquisition and development.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
Accomplishments/Planned Programs Subtotals	30.947	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RF: *Counter Weapons of Mass Destruction Applied Research*	7.716	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.716
• 128/0605000BR/RF: *Counter Weapons of Mass Destruction Systems Development*	6.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.016

Remarks

D. Acquisition Strategy

Assessment and selection of best performer for developmental requirements to meet specific military capability needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 3					**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*				**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
RG: *Counter WMD Technologies and Capabilities Development*	175.576	22.354	225.087	265.224	0.000	265.224	242.425	246.630	250.582	255.592	Continuing	Continuing

Note

Defense Threat Reduction Agency's (DTRA) consolidated projects RE-Counter-Terrorism Technologies, RM-WMD Counterforce Technologies, RR-CWMD Test and Evaluation, and RT-Target Assessment Technologies, into the renamed project RG-Counter WMD Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

Counter WMD Technologies and Capabilities Development encompasses the following areas.

1. Defeat Technologies 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.

2. 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.

3. Counter-terrorism 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 terrorist WMD development and acquisition pathways, to include defeat of the devices themselves, while minimizing risks to U.S. forces; and (2) counterterrorism concepts and technologies to integrate and synchronize activities that prevent terrorists 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.

4. 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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*

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.

5. 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.

6. 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 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 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RG: Counter WMD Technologies and Capabilities Development	22.354	225.087	265.224	0.000	265.224
Description: Project RG develops advanced technologies and weapon concepts and validates their applicability to CWMD. ***FY 2020 Plans:*** - Finalize full scale testing of the Agent Defeat Penetrator fill. - Conduct full-scale prototype demonstration of novel access denial technology in an operational environment. - Develop offensive counterproliferation, counter-WMD technologies in support of Combatant Command requirements. - Develop WMD pathway defeat technologies, as well as threat-specific test articles and analyses. - Develop lighter, smaller, more effective breaching capabilities. - Develop next generation WMD detection technology applications. - Integrate High Performance Computing (HPC) software tools into Dynamic Picture of the Operating					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Environment (DPOE), leveraging capabilities of high performance computing to improve automated analytics to more accurately and quickly identify events, actors, and threats. - Develop and integrate advanced algorithms and refine an operational framework for a mission planning tool to enhance warfighter capabilities to search for, detect, and identify chemical threats prior to release. - Demonstrate a miniaturized chemical warfare agent collection and detection capability for trace-level and remote CWMD search missions. - Initiate development of remote sensing and characterization capabilities to aid in the detection and identification of biological weapons production facilities. - Develop, integrate and demonstrate advanced CWMD sensing payloads for both unmanned and remote sensing missions. - Initiate development of a Chemical Intelligence, Surveillance, and Reconnaissance area search mission planning tool to enhance capabilities to search for, detect, and identify chemical threats prior to release. - Conduct mission-oriented experiments to model, simulate, analyze, or exploit technical capabilities intended to counter WMD or mitigate risks and impacts to critical assets in operationally relevant conditions. - Develop enhancements to the Integrated Munitions Effects Assessment modeling and simulation planning tool. - Support for Combatant Command exercises and planning events at the Nevada Test Bed to develop target defeat technologies, tools, and capabilities. - Develop and maintain interagency capabilities and special tests in support of national priority programs and mission requirements. - Integrate engineering rule-based development for automated advanced targeting characterization efforts to meet Combatant Command and IC WMD and HDBT characterization and defeat requirements. - Develop the Functional Full Dimensional Defeat Enterprise process including developing new means for identifying facility functions, determining defeat vulnerabilities in support of attack planning and execution, and determining new battle damage information methods. - Maintain cooperative CWMD project technical exchanges with the United Kingdom (UK) in support of US/UK Project Agreement. - Maintain Coalition Warfare Program Agreement with Republic of Korea for advancement of autonomous tunnel exploitation technologies. - Develop complex geotechnical models for support of geotechnical site characterization of WMD hard target sites. - Develop enhancements and integrate warfighter requirements into client version and the mobile version for Sensitive Site Exploitation.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop and assess new analytic capabilities to enhance the warfighter's ability to conduct predictive analysis and forecast potential WMD threats informing future CWMD requirements.					
FY 2021 Base Plans: - Deliver a streamlined Underground Facility (UGF) characterization tool incorporating Automated Advanced Targeting Development (A2TD) automation. - Deliver Full Dimensional Defeat Enterprise (FDDE) planning visualization tool for mobile deployment - Achieve Initial Operational Capability of System of Systems Facility Defeat Methods for Combatant Command Course of Action development. - Deliver Advanced Solid Mechanics computational tools in support of Combatant Command requirements. - Begin development of second generation HPC software tools for DPOE, leveraging capabilities of high performance computing to improve automated analytics to more accurately and quickly identify events, actors and threats . - Integrate new models into DPOE to assess adversarial groups' intent to conduct chemical or biological weapon attacks. - Develop and integrate advanced capabilities and refine an operational framework to enhance warfighter capabilities to search for, detect, and identify WMD threats prior to release. - Extend WMDpedia capabilities to support CWMD Mission Planning incorporating semi-supervised and active machine learning. - Maintain cooperative CWMD project technical exchange with the United Kingdom (UK) in support of US/UK Project Agreement - Conduct material science development and applications development to provide advanced materials for use in chemical and biological agent defeat. - Develop, demonstrate, and transition a ground sensor with multiple modalities for signature detection, classification, and localization for strategic systems defeat.. - Develop and transition four high explosive prototype fills to the Army. - Develop, integrate and demonstrate advanced CWMD sensing payloads for both unmanned and remote sensing missions. - Develop machine learning neural networks trained to optimize conventional weapon strikes against hardened and WMD facilities. - Develop new and enhanced capabilities for defensive vulnerability assessment and offensive WMD defeat modeling and simulation planning tools.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Investigate, develop, and integrate new technologies for enhancement and protection of autonomous capabilities to provide joint solutions in a multi-domain environment. - Develop CWMD weapon effects modeling algorithms and conduct scaled test series leveraging machine learning and optimization to investigate CWMD weapon effects for enhancing WMD defeat modeling and simulation planning tools and assessing new WMD defeat mechanisms . - Conduct full-scale prototype demonstration of novel access denial technology in an operational environment. - Complete Coalition Warfare Program Agreement with Republic of Korea for advancement of autonomous tunnel exploitation technologies. - Develop offensive counter-proliferation, counter-WMD technologies in support of Combatant Command requirements. - 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. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to increased investment in WMD counterterrorism activities including the improvement of Combatant Commanders' offensive capabilities for render safe, pathway defeat, critical infrastructure defeat, and improved CWMD Joint Intelligence Preparation of the Operational Environment (JIPOE) and Preparation of the Environment (PE) capabilities. This increase also supports efforts to develop, integrate, demonstrate, and transition CWMD advanced sensors, surveillance, and defeat planning technologies in support of the warfighter. Finally, DTRA intends to increase research and development in CWMD target assessment technologies including tools for the characterization of CWMD targets across all Combatant Commands.					
Accomplishments/Planned Programs Subtotals	22.354	225.087	265.224	0.000	265.224

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RG / *Counter WMD Technologies and Capabilities Development*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RG: *Counter Weapons of Mass Destruction Applied Research*	7.938	22.253	22.958	-	22.958	22.919	23.715	24.190	24.675	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RI / *Nuclear Survivability*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	57.782	8.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.365

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

Efforts in this project include human survivability, radiation Hardened nano-electronics, stockpile logistics, and the nuclear Surety Program

The Nuclear Survivability project develops, integrates, demonstrates, and transitions 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 (DoD) Instruction 3150.09, Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy. The Defense Threat Reduction Agency (DTRA) is the DoD-designated center of excellence for electromagnetic pulse survivability assessments. The System Vulnerability and Assessment effort develops nuclear assessment capabilities to support operational planning, weapon 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. The radiation-hardened nano-electronics effort develops and integrates radiation-hardened, high-performance prototype nano-electronics to meet DoD space and strategic deterrence system requirements. The Human Survivability effort supports the Nuclear Test Personnel Review Program (NTPR), confirming the participation of Atomic Veterans in nuclear testing and radiological events and providing radiation dose assessments. The NTPR is administered by the Department of Veterans Affairs and the Department of Justice for radiogenic disease compensation programs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RI: Nuclear Survivability ***Description:*** Project RI develops, integrates, and transitions novel technologies that radically enhance the survivability and resilience of DoD nuclear forces and their associated control and support systems in the event of an attack or other hostile action.	8.583	-	-	-	-
Accomplishments/Planned Programs Subtotals	8.583	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RI / *Nuclear Survivability*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RI: *Counter Weapons of Mass Destruction Applied Research*	22.632	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	22.632

Remarks

D. Acquisition Strategy

Assessment and selection of best performer for developmental requirements to meet specific military capability needs. Performer base includes best-of-breed researchers across DoD and other government agency laboratories, academia, industry, and international partner organizations.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	11.895	2.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.842

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, integrates, and transitions nuclear and radiological assessment modeling tools for use in military planning processes. The assessment modeling tools provide critical analytics for Consequence of Execution (COE) considerations during nuclear targeting and post-detonation nuclear response, supporting interagency strategic and tactical decision making. These COE considerations can include the full range of political, military, economic, social, infrastructure, and information (PMESII) factors and their interaction, extending analytical capabilities beyond common damage assessment practices and into second and third order effects. These activities/efforts support Combatant Commands and other Department of Defense (DoD) organizations by providing accurate and reliable consequence assessment and response information.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RL: Nuclear and Radiological Effects ***Description:*** Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions.	2.947	-	-	-	-
Accomplishments/Planned Programs Subtotals	2.947	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RL: *Counter Weapons of Mass Destruction Applied Research*	27.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.643
• 128/0605000BR/RL: *Counter Weapons of Mass Destruction Systems Development*	1.203	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.203

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RM: *WMD Counterforce Technologies*	197.217	40.365	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	237.582

Note

Beginning in FY 2020, efforts in this project are captured under project RG-Counter WMD Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Weapons of Mass Destruction (WMD) Counterforce Technologies project develops, integrates, demonstrates, and transitions emerging technologies enabling efforts to find, characterize, assess, and plan for the defeat of WMD threats. There are three core research efforts in this project: (1) The WMD battlespace awareness effort provides warfighters with capabilities to find, characterize, and assess WMD threats. This effort develops and integrates sensing technologies with multi-mission Unmanned Aerial System payloads; (2) The Countering WMD (CWMD) weapons effects effort develops 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) The Innovative Technologies and Engineering effort takes promising technologies discovered under fundamental and basic research and further develops them 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RM: WMD Counterforce Technologies ***Description:*** Project RM provides: (1) full-scale testing of CWMD weapons effects, weapon effects modeling, and weapon delivery system optimization; and (2) WMD sensor, surveillance, and data processing technologies.	30.365	-	-	-	-
Accomplishments/Planned Programs Subtotals	30.365	-	-	-	-

	FY 2019	FY 2020
Congressional Add: Target Sensing Technologies	10.000	0.000

FY 2019 Accomplishments: - Procured four (4) flight test prototypes systems and eight (8) prototype sensor systems for target sensing technologies program. Details classified.
- Funded two (2) flight test execution activities using procured flight test prototypes. Details classified.
- Funded further development of additional algorithm development and integration with mission performance capabilities, resulting in software configuration control board system recommendations and analysis. Details classified.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

	FY 2019	FY 2020
- Funded transition planning of program and systems development to Service/Warfighter. ***FY 2020 Plans:*** N/A		
Congressional Adds Subtotals	10.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RM: *Counter Weapons of Mass Destruction Applied Research*	11.342	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.342

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development*	**Project (Number/Name)** RT / *Target Assessment Technologies*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RT: *Target Assessment Technologies*	339.711	21.813	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	361.524

Note

Beginning in FY 2020, efforts in this project are captured under project RG-Counter WMD Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

The Target Assessment Technologies project develops, integrates, tests, demonstrates, and transitions processes and technologies providing advanced capabilities in the areas of Weapons of Mass Destruction (WMD) target assessment and functional defeat. The functional defeat process includes 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. Applying these processes to time-dependent constraints related to WMD target characterization and threat analysis presents a further technical challenge. This project develops analytical tools and processes required to (1) find and characterize WMD targets and associated hard and deeply buried targets (HDBTs) and (2) to assess in real time the results of physical and functional defeat operations (such as a direct attack). These novel, dynamic capabilities enable Combatant Commands (CCMDs) and the intelligence community (IC) to hold at risk high value targets possessed by adversaries.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RT: Target Assessment Technologies ***Description:*** Project RT provides CCMDs and the IC with technologies and processes to find and characterize WMD targets and hard and deeply buried targets and then assess the results of attacks against those targets.	21.813	-	-	-	-
Accomplishments/Planned Programs Subtotals	21.813	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	135.144	169.638	113.590	0.000	19.931	19.931	39.432	30.015	29.690	29.746	Continuing	Continuing
JC: *Enable Rapid Capability Delivery*	117.640	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing
JS: *Assist Situational Understanding*	17.504	10.978	9.797	0.000	10.090	10.090	10.286	10.585	10.887	11.105	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element supports the development, demonstration, and testing of technologies to advance the analytical infrastructure, methods, and tools to enhance asymmetric countermeasure solutions. Advancements in analytics include the production of tools that leverage machine learning and artificial intelligence, increasing our ability to expedite the understanding of threat facilitation network connections and activities. This investment also enables development and delivery of capabilities to understand, anticipate, illuminate, isolate, and/or mitigate asymmetric threats and their effects.

DTRA expedites technology transition from the laboratory to operational use to reduce risk within the acquisition process. This is done by evaluating integrated technologies or prototype systems in a high quality and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	148.772	113.590	0.000	69.950	69.950
Current President's Budget	169.638	113.590	0.000	19.931	19.931
Total Adjustments	20.866	0.000	0.000	-50.019	-50.019
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignments	20.866	-	0.000	-19.709	-19.709
• Defense Wide Review Adjustments	-	-	0.000	-30.310	-30.310

Change Summary Explanation

The decrease from FY 2020 to FY 2021 reflects:
(1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to fund higher priority investments including WMD counterterrorism technologies, and

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*

(2) Defense-Wide Review (DWR) adjustment of -$30.310 million resulting from reductions to DTRA's lowest priority RDT&E programs and the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
JC: *Enable Rapid Capability Delivery*	117.640	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

DTRA delivers counter asymmetric threats materiel solutions in support of joint and combined forces, effectively addressing changes to threat tactics, techniques, and procedures (TTPs). DTRA responds to asymmetric threats identified by the forward deployed warfighter as well as academia and industry.

This project builds prototypes and tests and evaluates existing industry systems to meet Combatant Command capability gaps and emerging asymmetric threats. DTRA also provides solutions to prevent or mitigate battlefield operational surprise.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JC: Enable Rapid Capability Delivery	158.660	103.793	0.000	9.841	9.841

Description: This project delivers materiel solutions to counter asymmetric threats in support of joint and combined forces supporting contingency operations, effectively addressing changes to threat tactics, techniques, and procedures (TTPs).

FY 2020 Plans:
- Improve size, weight, power and integration of sensors to small unmanned systems.
- Improve on-board vs. off-board data processing to provide real time data in unmanned systems to support real time improvised threat detection.
- Improve/develop detection and defeat of Unmanned Systems capabilities using future technology, including acoustic detection at range, machine learning of constantly changing threat signatures (acoustic, RF signal, radar cross-section, optics, Unattended Radiated Emissions (URE), etc.).

FY 2021 Base Plans:
N/A

FY 2021 OCO Plans:
- Develop two user-friendly technologies to inform and evaluate the autonomous systems and energetics focus areas.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop an aviation sensor fabrication prototype to address detection and identification capability gaps (Split Aces and Hyper Spectral Imaging). - Provide two to three models and simulations in support of Counter Asymmetric Systems activities. - Conduct one theater support/ capabilities test in support of asymmetric threats. - Conduct one vendor demonstration and validate system performance capabilities for asymmetric threats. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects: (1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to fund higher priority investments including WMD counterterrorism technologies, and (2) Defense-Wide Review (DWR) adjustment of -$30.310 million resulting from reductions to DTRA's lowest priority RDT&E programs and the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.					
Accomplishments/Planned Programs Subtotals	158.660	103.793	0.000	9.841	9.841

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 10/0602134BR/JC: *Counter Improvised-Threat Advanced Studies*	0.000	0.502	0.000	2.500	2.500	6.117	6.564	6.657	6.830	Continuing	Continuing
• 28/0603134BR/JC: *Counter Improvised-Threat Simulation*	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing

Remarks

D. Acquisition Strategy

Assess and select best performer for developmental requirements to meet specific military capability needs. Performer base includes research developers across DoD and other Government agency laboratories, academia, and industry.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Armor IED (AAIED)	C/FFP	Battelle : Idaho Falls, ID	-	9.556	Apr 2019	7.052	Nov 2019	-		-		-	0.000	16.608	16.608
Booby Trapped Structures (BTS)	C/FFP	Shield AI : San Diego, CA	3.420	7.066	May 2019	4.251	May 2020	-		-		-	0.000	14.737	14.737
Buried IED	C/CPFF	Naval Research Lab : Washington, DC	-	7.553	Feb 2019	2.299	Nov 2019	-		-		-	0.000	9.852	9.852
Home-Made Explosives (HME)	C/CPFF	Manufacturing Techniques, Inc. (MTEQ) HQ : Lorton, VA	17.956	8.825	Mar 2019	5.002	Mar 2020	-		-		-	0.000	31.783	31.783
Network	C/FFP	John Hopkins : Baltimore, MD	16.121	15.963	Apr 2019	12.875	Apr 2020	-		-		-	0.000	44.959	44.959
Person-Born IED (PBIED)	C/FFP	MIT Lincoln Laboratory (MIT-LL) : Lexington, MA	4.000	9.704	May 2019	5.752	May 2020	-		-		-	0.000	19.456	19.456
Radio Controlled IED (RCIED)	C/CPFF	Rampart Technologies, Colorado Springs, CO : Sericore, Hanover, MD	-	3.015	May 2019	0.500	Nov 2019	-		-		-	0.000	3.515	3.515
RDT&E Technology Enablers	C/CPFF	Various : Various	18.663	23.451	Jan 2019	12.662	Jan 2020	-		-		-	0.000	54.776	54.776
Sensitive Integration Office (SIO) Programs	C/CPFF	Various : Various	15.551	18.220	May 2019	10.000	Nov 2019	-		-		-	0.000	43.771	43.771
Tunnel	C/FFP	ERDC: Vicksburg, MS : MIT Lincoln Labs: Boston, MA	5.250	4.958	Mar 2019	0.000		-		-		-	0.000	10.208	10.208
Unmanned Aerial Systems (UAS)	C/FFP	Technology Service Corporation (TSC) Fairfax, VA : BAE Systems, Fridley, MN	10.223	6.419	May 2019	17.005	May 2020	-		-		-	0.000	33.647	33.647

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vehicle-Attached IED (VAIED)	C/CPFF	Various : TBD	-	2.770	Apr 2019	0.000		-		-		-	0.000	2.770	2.770
Vehicle-Borne IED (VBIED)	C/CPFF	Naval Surface Warfare Center (NSWC) Dahlgren : King George County, VA	7.500	11.815	May 2019	5.249	May 2020	-		-		-	0.000	24.564	24.564
Water-Borne IED (WBIED)	C/FFP	Various : Various	0.954	4.073	Aug 2019	0.000		-		-		-	0.000	5.027	5.027
Integrated Signatures Program (ISP)	MIPR	Indian Head Explosive Ordnance Technology Division : Indian Head, MD	-	-		-		0.000		4.000	Jan 2021	4.000	Continuing	Continuing	-
Split Aces 4.0	MIPR	Naval Air Systems Command PM263 : Patuxent River, MD	-	-		-		0.000		2.841	Feb 2021	2.841	Continuing	Continuing	-
		Subtotal	99.638	133.388		82.647		0.000		6.841		6.841	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation (T&E) 6.4	MIPR	Naval Air Weapons Station : China Lake, CA	11.485	11.397	Dec 2018	13.637	Jan 2019	-		-		-	0.000	36.519	36.519
T&E Threat Support 6.4	MIPR	Intelligence and Information Warfare Directorate (I2WD), Communications-Electronics Research, Development and Engineering Center (CERDEC) :	5.275	9.155	Dec 2018	7.509	Jan 2019	-		-		-	0.000	21.939	21.939

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Aberdeen Proving Ground, MD													
C-sUAS Test & Evaluation	MIPR	Naval Air Warfare Center Weapons Division : China Lake, CA	-	4.720	Dec 2018	-		0.000		3.000	Mar 2021	3.000	Continuing	Continuing	-
SETA Capability Research Architecture Cell (CRAC)	C/CPAF	Zel Technologies : Reston, VA	1.242	-		-		-		-		-	0.000	1.242	1.242
		Subtotal	18.002	25.272		21.146		0.000		3.000		3.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	117.640	158.660		103.793		0.000		9.841		9.841	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Anti-Armor IED (AAIED)																												
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)																												
Explosive Form Projectile (EFP) Detect - Stalker																												
Explosive Form Projectile (EFP) Detect Spiral																												
Non-Linear Junction Tech																												
EFP Detection & Defeat																												
Booby Trapped Structures (BTS)																												
Iron Horse																												
Buried IED																												
Microwave Frequency Oscillator (MFO) - Mineroller																												
Spectral Polarmetric Instrument Data Analysis (SPIDA)																												
SPIDA Spiral (Automated Change Detection)																												
Home-Made Explosives (HME)																												
Mini Hyper Spectral Imaging Group 3																												
Standoff Portable Isotopic Neutron Spectroscopy (SPINS)																												
Improvised Threat Device Replication																												
T&E Threat Support																												
Network																												
Cobalt Doom																												

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

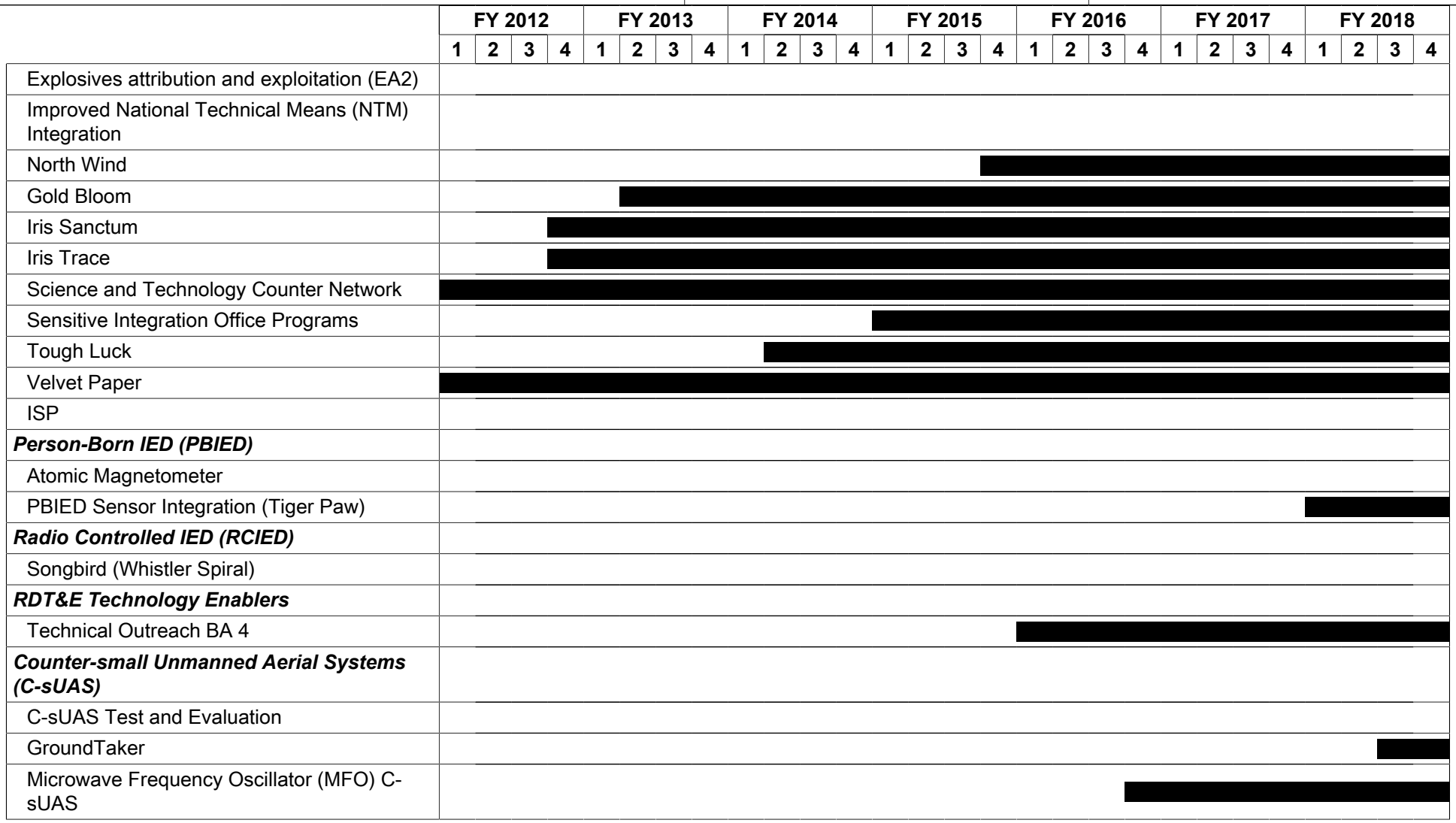

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
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	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mobile C-sUAS Airborne Platform Suite (MCAPS) Spiral																												
Multi vs. Multi Airborne Dispersed																												
Multi vs. Multi Dismounted Deployed																												
Pike on Reaper																												
Tech Exploitation Tech Red Device Coordination																												
Split Aces 4.0																												
Test & Eval																												
Test & Evaluation Support																												
Vehicle-Borne IED (VBIED)																												
Supernova Spiral																												
C-IED																												
Travel																												
Rapid Experimentation and Analysis for Development Support (READS)																												
UK Joint Tech Development																												
VBIED Detection Sensor Integration																												

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Anti-Armor IED (AAIED)																												
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)																												

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
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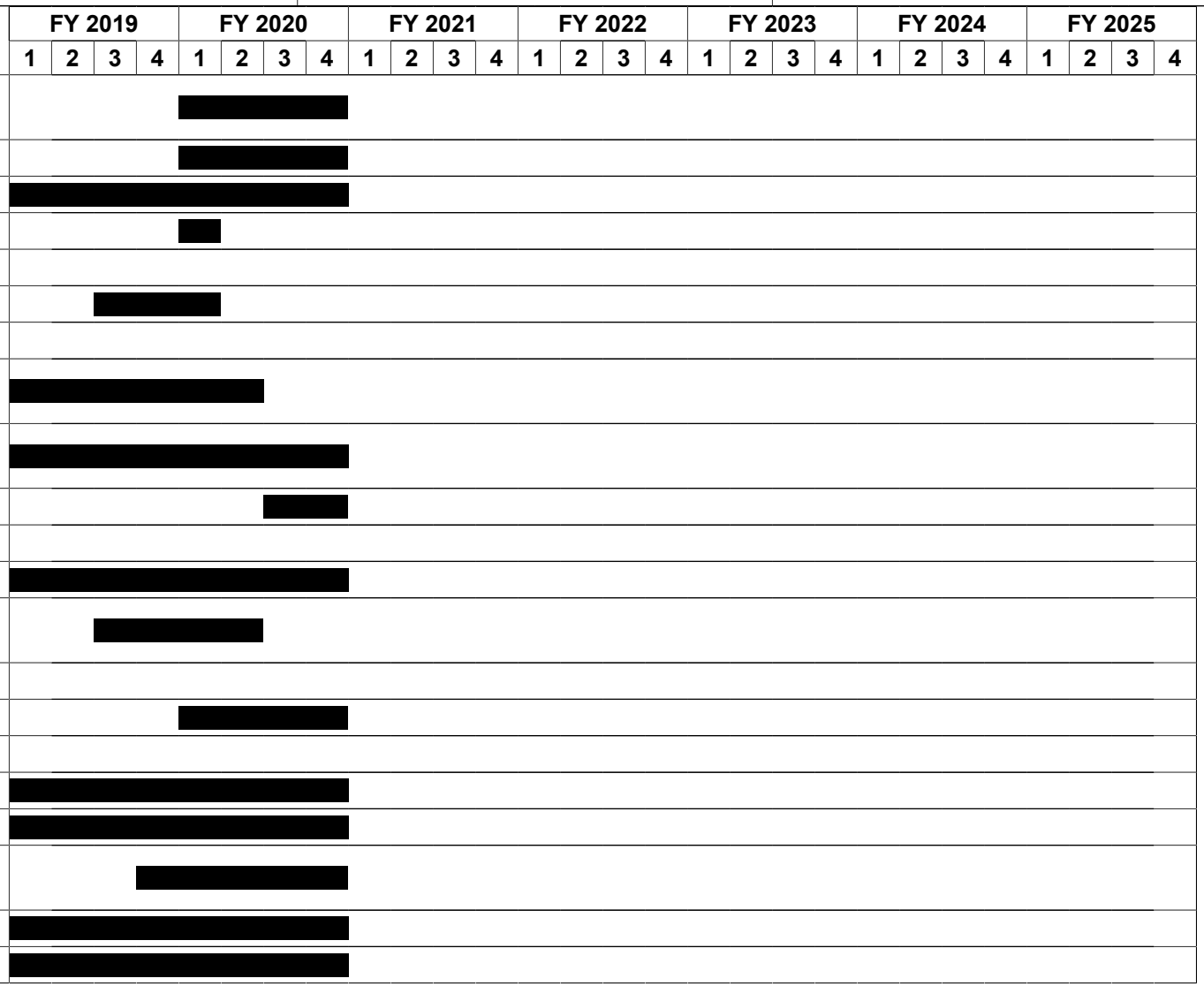

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

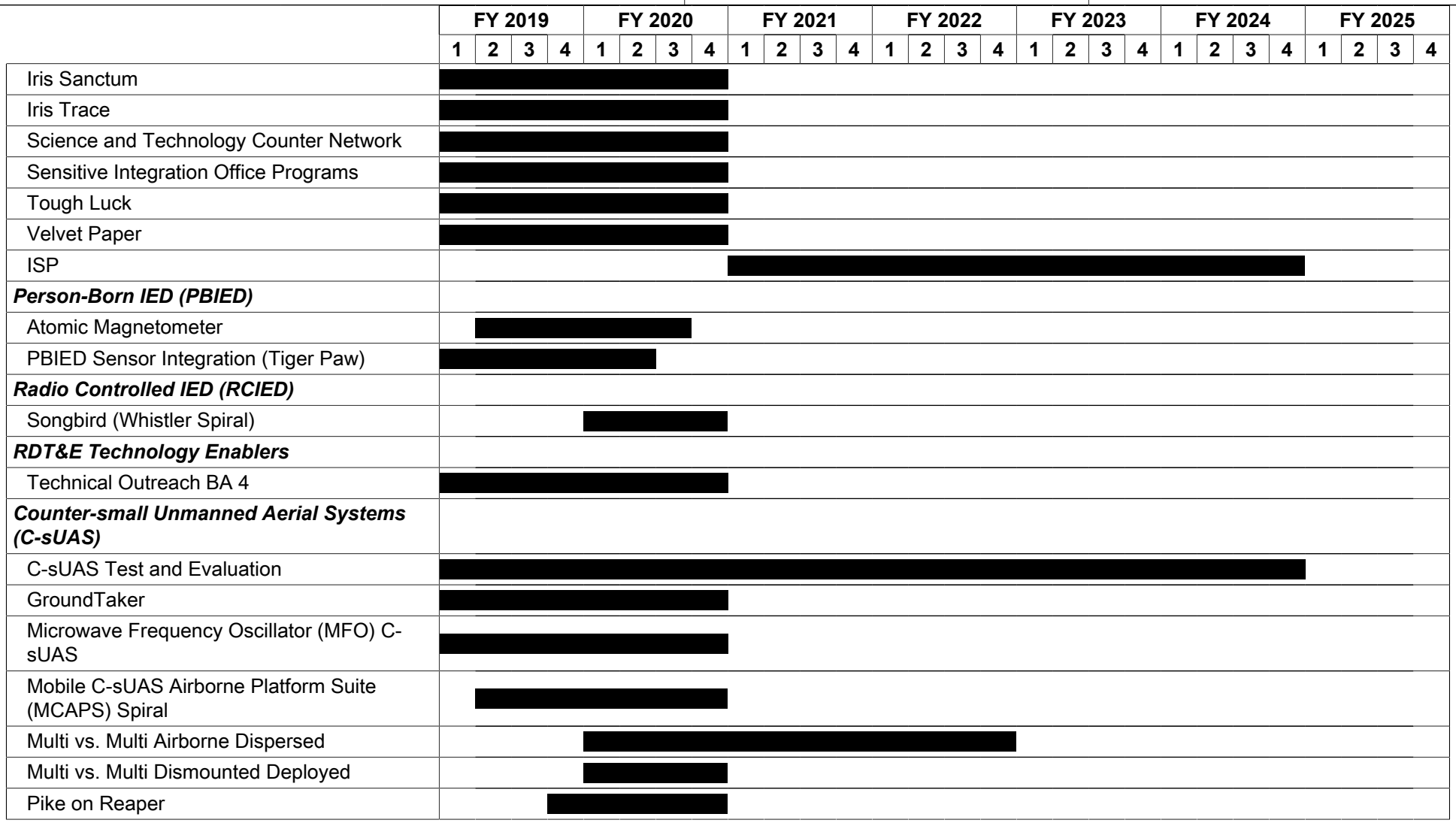

Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

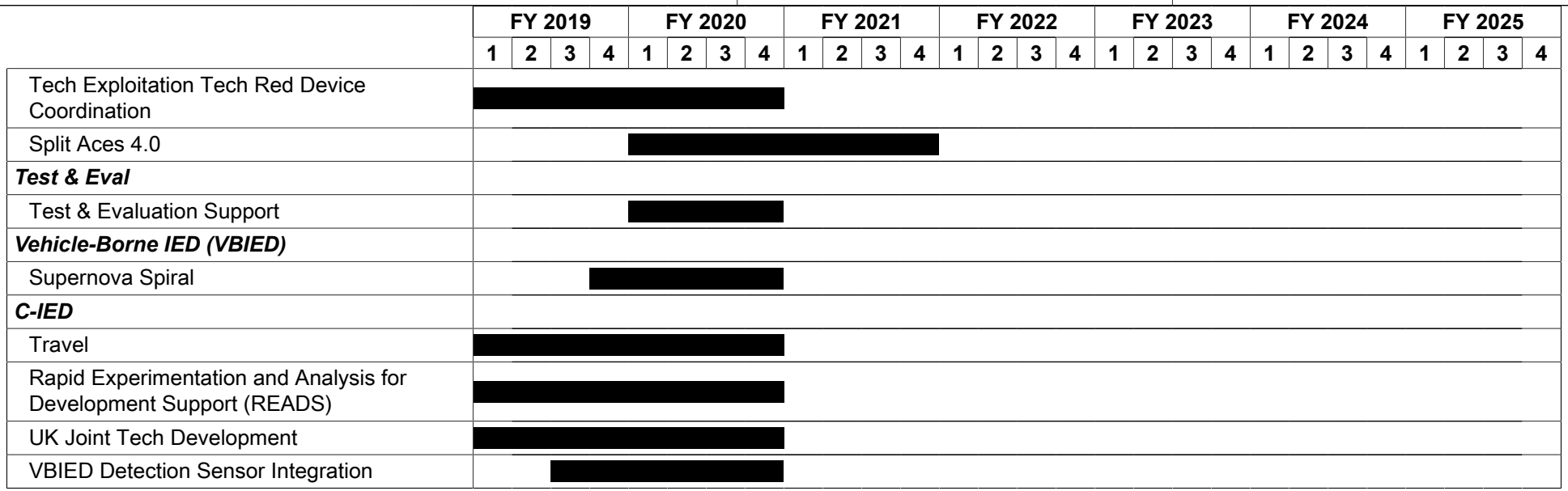

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Anti-Armor IED (AAIED)				
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)	1	2020	4	2020
Explosive Form Projectile (EFP) Detect - Stalker	1	2020	4	2020
Explosive Form Projectile (EFP) Detect Spiral	1	2020	4	2020
Non-Linear Junction Tech	1	2019	4	2020
EFP Detection & Defeat	1	2020	1	2020
Booby Trapped Structures (BTS)				
Iron Horse	3	2019	1	2020
Buried IED				
Microwave Frequency Oscillator (MFO) - Mineroller	1	2019	2	2020
Spectral Polarmetric Instrument Data Analysis (SPIDA)	1	2019	4	2020
SPIDA Spiral (Automated Change Detection)	3	2020	4	2020
Home-Made Explosives (HME)				
Mini Hyper Spectral Imaging Group 3	4	2018	4	2020
Standoff Portable Isotopic Neutron Spectroscopy (SPINS)	3	2019	2	2020
Improvised Threat Device Replication				
T&E Threat Support	1	2020	4	2020
Network				
Cobalt Doom	1	2018	4	2020
Explosives attribution and exploitation (EA2)	1	2019	4	2020
Improved National Technical Means (NTM) Integration	4	2019	4	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
North Wind	4	2015	4	2020
Gold Bloom	2	2013	4	2020
Iris Sanctum	4	2012	4	2020
Iris Trace	4	2012	4	2020
Science and Technology Counter Network	1	2012	4	2020
Sensitive Integration Office Programs	1	2015	4	2020
Tough Luck	2	2014	4	2020
Velvet Paper	1	2012	4	2020
ISP	1	2021	4	2024
Person-Born IED (PBIED)				
Atomic Magnetometer	2	2019	3	2020
PBIED Sensor Integration (Tiger Paw)	1	2018	2	2020
Radio Controlled IED (RCIED)				
Songbird (Whistler Spiral)	1	2020	4	2020
RDT&E Technology Enablers				
Technical Outreach BA 4	1	2016	4	2020
Counter-small Unmanned Aerial Systems (C-sUAS)				
C-sUAS Test and Evaluation	1	2019	4	2024
GroundTaker	3	2018	4	2020
Microwave Frequency Oscillator (MFO) C-sUAS	4	2016	4	2020
Mobile C-sUAS Airborne Platform Suite (MCAPS) Spiral	2	2019	4	2020
Multi vs. Multi Airborne Dispersed	1	2020	4	2022
Multi vs. Multi Dismounted Deployed	1	2020	4	2020
Pike on Reaper	4	2019	4	2020
Tech Exploitation Tech Red Device Coordination	1	2019	4	2020

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JC / *Enable Rapid Capability Delivery*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Split Aces 4.0	1	2020	4	2021
Test & Eval				
Test & Evaluation Support	1	2020	4	2020
Vehicle-Borne IED (VBIED)				
Supernova Spiral	4	2019	4	2020
C-IED				
Travel	1	2018	4	2020
Rapid Experimentation and Analysis for Development Support (READS)	3	2012	4	2020
UK Joint Tech Development	1	2019	4	2020
VBIED Detection Sensor Integration	3	2019	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
JS: *Assist Situational Understanding*	17.504	10.978	9.797	0.000	10.090	10.090	10.286	10.585	10.887	11.105	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A. Mission Description and Budget Item Justification

This project enables DTRA's Catapult Information System Program to design, develop, test, and deliver mission capabilities that support the ability to collect, aggregate, and analyze intelligence data on global improvised threats and threat networks. Catapult and DTRA's Mission Information Technology (MIT) capability allows DTRA to rapidly develop, engineer, test and deploy analytical tools, threat models and simulations, data science methodologies, and software applications in support of the Warfighter. Catapult and its associated Attack the Network Tool Suite (ANTS) integrates intelligence data sources that support the detection and identification of improvised threats, threat networks and actors, command and control, operations, intelligence, and engagement for neutralizing, attacking, and defeating both current and emerging improvised threats and threat networks.

DTRA's MIT capability, with its embedded Combatant Command (CCMD) capability, data integrators, and reachback staff work continuously to create capabilities requested by users from the DoD, the Intelligence Community (IC), interagency partners, and the Whole of Government to ingest, fuse, analyze, and present mission relevant data and information. These capabilities reside in Catapult, a cloud technology-based data analytics platform developed and being delivered by DTRA that provides an extensible, continuously augmented, real-time repository of intelligence on improvised threats, including IEDs, and worldwide threat actors and networks. Catapult is fully operational and accredited on the Secret Internet Protocol Router Network (SIPRNet) and Joint Worldwide Intelligence Communications System (JWICS). The Catapult architecture pulls from more than 850 data sources on SIPRNet and more than 170 data sources on JWICS. Catapult uses a set of more than 100 tools (ANTS) and services to provide national-level capabilities for data and information capture, discovery, access, aggregation, correlation, visualization, analysis, sharing, and distribution for users from the strategic level to the tactical edge.

In addition to Catapult, the DTRA MIT created and deployed a significant capability called Voltron. Voltron provides analysts access to signals intelligence (SIGINT) data within a secure and IC-accredited software developer environment. Voltron provides users a single interface to query more than 25 data sources and combines results into dynamic visualizations and exports. Voltron captures analytics techniques and provides a constantly growing toolbox providing analysts with continuously new models in support of analysis and operations. Voltron provides analysts access to methodologies involving multi-INT fusion in an easy to use interface. These methods are based on years of experience supporting the tactical targeting environment and built in collaboration with other teams across the IC. There are currently more than 75 models in Voltron available to the user community.

DTRA's authorities and mission have enabled a unique, Secure Development Operations (DevSecOps) "Path-to-Production" to rapidly develop and deploy mission-driven IT solutions. This unique development environment includes an integrated Cyber Security Assessment and Authorization process, an in-house collateral

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

Authorizing Official for SIPRNet and DIA-approved Authorization to Operate on JWICS, creating a strong partnership between technologists and intelligence analysts working real-world problems, and a collaborative and innovative culture that launches practical software solutions rapidly.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JS: Assist Situational Understanding	10.978	9.797	0.000	10.090	10.090
Description: This project enables DTRA to design, develop, test, and deliver mission capabilities that support the ability to collect, aggregate, and analyze intelligence data on global improvised threats and threat networks. The project allows DTRA to rapidly develop, engineer, test, and deploy analytical tools, threat models and simulations, data science methodologies, and software applications in support of the Warfighter. Catapult and its associated Attack the Network Tool Suite (ANTS) integrates intelligence data sources that support the detection and identification of improvised threats, threat networks and actors, command and control, operations, intelligence, and engagement for neutralizing, attacking, and defeating both current and emerging improvised threats and threat networks. Provides testing and engineering support for COTS and GOTS intelligence analysis application and software and systems that operate on the mission enclave. Supports cybersecurity testing and security engineering of new or upgraded software and systems prior to authorization to operate on production enclaves. Sandia / SETA Capability Research Architecture Cell (CRAC) identifies, investigates, explores, evaluates, and tests prototypes of emerging and cutting edge information technology that provides superior advantage to analysts and warfighters. Sandia / CRAC builds partnerships with mission partners in DoD, IC, IA, Academia, National Labs and Industry to support, develop and integrate plans, programs, requirements, resources, technology and innovations across the mission spectrum for DTRA. Facilitates innovation, acceleration of programs, rapid response to emerging events, and rapid development and operationalization of new technologies. ***FY 2020 Plans:*** - Extend current DTRA Mission IT capability (Vantage), which supports Force Protection and Mission Planning, with augmented reality and virtual reality technologies (Examples include: HoloLens and Oculus Rift). - Create new 3D visualizations for underwater/Bathymetric datasets to support maritime operations and mitigate new improvised threats. - Integrate C-sUAS geo-spatial enabled data from the cloud architecture (Catapult) with VMS developed applications such as Foxhole to better visualize the effectiveness of proposed C-sUAS systems and optimize					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
C-sUAS system placement in tactical/operational environments. - Integrate machine learning for automated geo-spatial feature extraction creating time efficiencies in support of Request for Support (RFS) product delivery to include line of sight analysis, threat vulnerability assessments, and blast modeling. - Develop inter-operability with geo-spatial applications/models across the 70+ production facing developed tool suite. Examples include integrating advanced geo-spatial models with multi-INT data through Team Phoenix developed capabilities to include Voltron Horizon tool. - Integrate new Data Science environment, which will spawn graph analytics, machine learning, and neural networks against the 126M unique documents resident within Catapult. - Cross corpus entity resolution and correlation to identify similar entities across multiple reports and reporting types resident within the Catapult architecture/data lake. This will include techniques to track specific Catapult entities across time and their locations mentioned in relevant reporting. These new techniques will expand DTRA's ability to identify and track improvised threat networks through automation. - Create a set of data preparation micro-services to build an efficient pipeline for incorporation of Catapult data into future Data Science algorithms and experiments. - Enhance location precision and categorization of Catapult-extracted locations to provide more accurate geospatial plotting of relevant locations. Improvements to Natural Language Processing extraction of location information through supplementing extracted locations with relevant attributes derived from the context of the report.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: - Develop predictive Data Science models through supervised and unsupervised Machine Learning against current and emerging threats; including fusion of multi-INT data across unclassified and classified data sets to identify networks and locations of interest to DTRA and its mission partners. - Create a new development environment to enable “technology at the edge” to support real-time development of new Data Science models/algorithms at mission partner sites to enhance existing or future Catapult Machine Learning models. - Implement role-based access control and dynamic query analytics across Catapult data through Elastic Search to enable users to quickly retrieve known affiliates, family members, contacts, aliases, email addresses and other information about entities and enemy threat networks without running additional queries.					

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Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Create "Functions as a Service" by commoditizing common used functions and analytics across the ANTS to enable scalability and elasticity across the tool suite allowing ANTS capabilities to execute analytics against larger and more diverse data sets. - Extend Catapult architecture to allow for shared services across Whole of Government to enable MIT developed analytics to be re-used in other platforms and tools across various IC and DoD organizations. - Develop Active Learning interface and pipeline to enable crowdsourced input for training and tagging data to feed new Data Science machine learning models. - Modularize Catapult's Data Processing Framework to enable targeted data transformation based on data source, artifact mime type, artifact size, or any number of other source specific properties; Add better processing support for structured data, imagery, financial, SIGINT, Measurement and Signature Intelligence (MASINT), Internet of Things (IoT), and cyber data to broaden the scope of the Catapult Analytics stack. - Enable collaborative VR capabilities to assist mission planning and force protection by extending existing VR capabilities to enable multi-user support and shared walkthroughs of 3D models. - Determine the best techniques to shrink neural network algorithms to work on low power and small computer platforms such as cameras or SUASs (Real-time Processing at the Edge wrapping up in early FY 2021). - Determine the capabilities that go beyond simple content identification and labeling, and move toward understanding the story and context of the video or image (Computer Vision for Improvised Threats). - Determine unsupervised and supervised techniques to cluster relevant information and enable accurate insight for analysts to improve the understanding of (1) themes, (2) intent of extracted text, (3) topics, (4) authenticity, etc. within the given data set(s) (Natural Language Processing – Understanding and Context). - Improve processing with alternative hardware (neuromorphic processors, Field Programmable Gate Arrays, etc.) by determining the best next generation hardware designed to maximize the runtime efficiency, accuracy, and limited space/power consumption of select AI/ML solutions. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The slight increase from FY 2020 to FY 2021 is due to the growing number of requests for services, emerging threats, and technologies, user-base supported, and advancements in technology.					
Accomplishments/Planned Programs Subtotals	10.978	9.797	0.000	10.090	10.090

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 10/0602134BR/JS: *Counter Improvised-Threat Advanced Studies*	0.000	1.175	0.000	1.199	1.199	1.223	1.247	1.272	1.297	Continuing	Continuing

Remarks

D. Acquisition Strategy

Assessment and selection of best performer to provide contractual services to develop and operationalize requirements through the new Enterprise Acquisition Strategy Initiative (EASI) at the least risk, optimal cost and proven technically. Performer base selection includes research developers across DoD and other Government agency laboratories, academia, and industry.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	1.199	1.236	Aug 2019	0.000		-		-		-	0.000	2.435	2.435
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	1.799	1.854	Aug 2019	0.000		-		-		-	0.000	3.653	3.653
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.032	0.031	Oct 2018	0.040	Oct 2019	0.000		0.041	Oct 2020	0.041	Continuing	Continuing	-
IRTM	MIPR	Office of Naval Research : Arlington, VA	0.257	0.000		-		-		-		-	0.000	0.257	0.257
Network	C/FFP	John Hopkins : Baltimore, MD	1.815	0.000		-		-		-		-	0.000	1.815	1.815
Vehicle-Borne IED (VBIED)	C/CPFF	Naval Surface Warfare Command : Dahlgren, VA	8.500	0.000		-		-		-		-	0.000	8.500	8.500
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	-	-		5.218	Aug 2020	0.000		5.374	Aug 2021	5.374	Continuing	Continuing	-
		Subtotal	13.602	3.121		5.258		0.000		5.415		5.415	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	0.400	0.412	Aug 2019	-		-		-		-	0.000	0.812	0.812
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	0.599	0.618	Aug 2019	0.000		-		-		-	0.000	1.217	1.217
QRC IT Network (OIR)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.366	Mar 2019	0.090	Mar 2020	0.000		0.093	Mar 2021	0.093	Continuing	Continuing	-
QRC IT Network (RS)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	0.258	Mar 2019	0.090	Mar 2020	0.000		0.093	Mar 2021	0.093	Continuing	Continuing	-
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.097	0.129	Oct 2018	0.120	Oct 2019	0.000		0.122	Oct 2020	0.122	Continuing	Continuing	-
Catapult Information System Support	C/CPAF	Zel Technologies : Reston, VA	0.319	0.550	Sep 2019	0.500	Mar 2020	0.000		0.515	Mar 2021	0.515	Continuing	Continuing	-
Carnegie Mellon University-Software Engineering Institute (CMU-SEI)	MIPR	Carnegie Mellon University/SEI : Hanscomb AFB, MA	0.215	0.000	Mar 2019	0.000		-		-		-	0.000	0.215	0.215
		Subtotal	1.630	3.333		0.800		0.000		0.823		0.823	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	0.400	0.412	Aug 2019	0.000		-		-		-	0.000	0.812	0.812
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	0.599	0.618	Aug 2019	0.750		0.000		0.774	Aug 2020	0.774	Continuing	Continuing	-
QRC IT Network (OIR)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.078	Mar 2019	0.234	Mar 2020	0.000		0.241	Mar 2021	0.241	Continuing	Continuing	-
QRC IT Network (RS)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.030	Mar 2019	0.234	Mar 2020	0.000		0.241	Mar 2021	0.241	Continuing	Continuing	-
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	-	-		0.917	Aug 2020	0.000		0.944	Aug 2021	0.944	Continuing	Continuing	-
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.194	0.184	Oct 2018	0.240	Oct 2019	0.000		0.247	Oct 2020	0.247	Continuing	Continuing	-
SETA Capability Research Architecture Cell (CRAC)	C/CPAF	Zel Technologies : Reston, VA	1.079	1.202	Sep 2019	1.364	Sep 2020	0.000		1.405	Sep 2021	1.405	Continuing	Continuing	-
		Subtotal	2.272	4.524		3.739		0.000		3.852		3.852	Continuing	Continuing	N/A

Remarks

In this R-3, FY 2020 was updated to reflect increased visibility of Catapult's execution plans as a Program of Record.

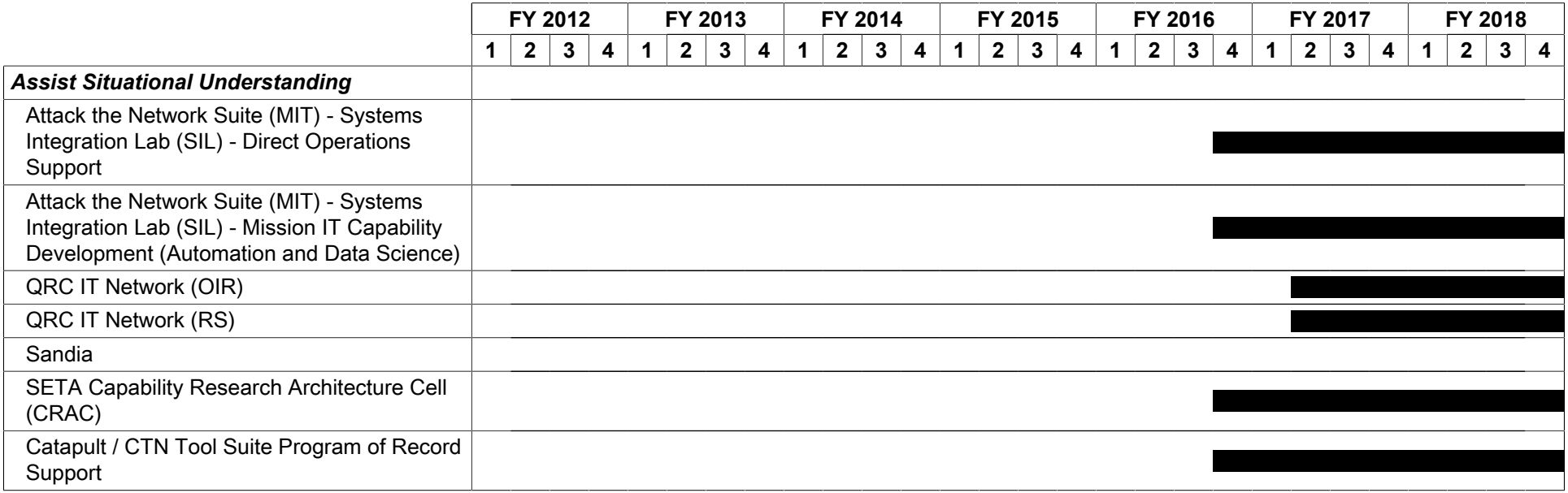
	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.504	10.978		9.797		0.000		10.090		10.090	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency			**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*	

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*



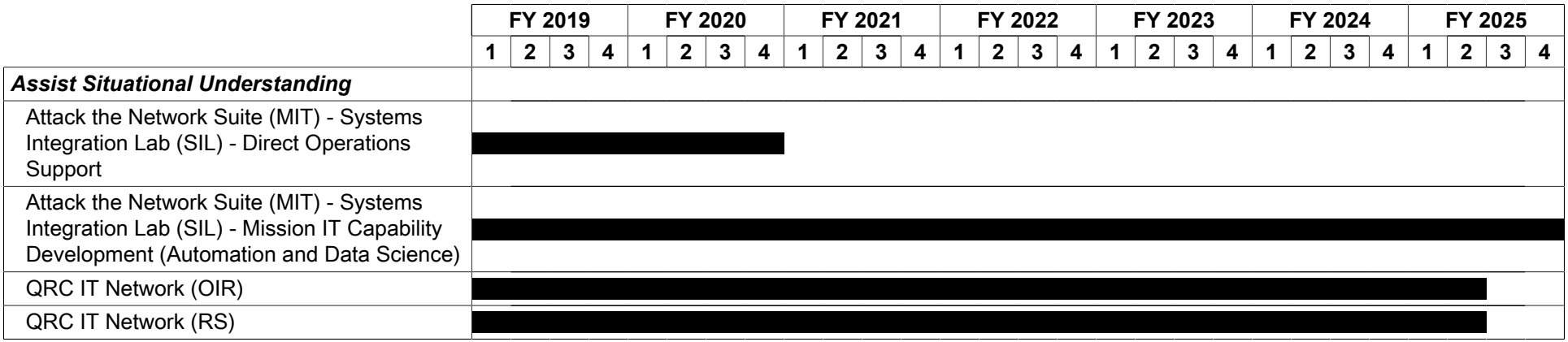


Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

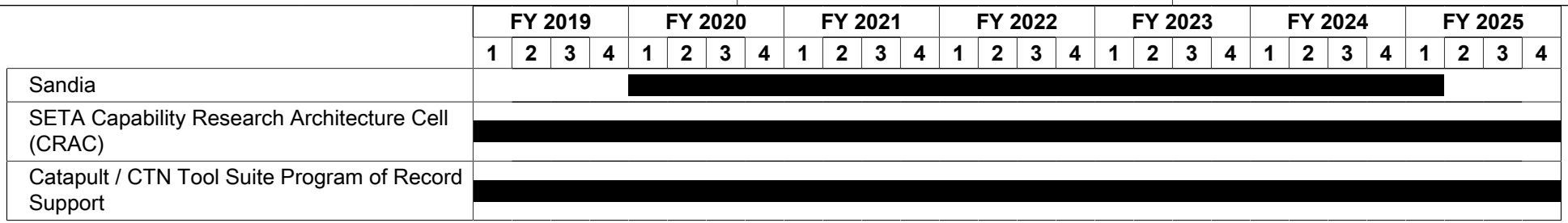


Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604134BR / *Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing*	**Project (Number/Name)** JS / *Assist Situational Understanding*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Assist Situational Understanding				
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	4	2016	4	2020
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	4	2016	4	2025
QRC IT Network (OIR)	2	2017	2	2025
QRC IT Network (RS)	2	2017	2	2025
Sandia	1	2020	1	2025
SETA Capability Research Architecture Cell (CRAC)	4	2016	4	2025
Catapult / CTN Tool Suite Program of Record Support	4	2016	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	31.368	7.219	13.100	15.650	0.000	15.650	14.803	13.959	13.118	13.381	Continuing	Continuing
MA: *Mission Assurance Risk Management System*	0.000	0.000	5.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
RD: *Nuclear Technologies and Capabilities Development*	0.000	0.000	7.500	15.650	0.000	15.650	14.803	13.959	13.118	13.381	Continuing	Continuing
RF: *Forensics Technologies*	31.368	6.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.384
RL: *Nuclear & Radiological Effects*	0.000	1.203	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.203

Note

In program element 0605000BR, DTRA consolidated project RF-Forensics Technologies into the renamed project RD-Nuclear Technologies and Capabilities Development beginning in FY 2020. On July 3, 2019, Office of the Secretary of Defense established program element 0605141BR for project MA-Mission Assurance Risk Management System. Beginning in FY 2021, funding for project MA-Mission Assurance Risk Management System will be requested in this newly established program element.

A. Mission Description and Budget Item Justification

The Counter Weapons of Mass Destruction (CWMD) Systems Development program element supports the development and demonstration of technologies and systems for the CWMD mission, including modeling and simulation (M&S) capabilities, verification and monitoring technologies, and decision support systems. This funding supports International Monitoring System (IMS) technology requirements under the Nuclear Arms Control Technology (NACT) mission and development of nuclear weapon effects (NWE) M&S capabilities for decision support systems, including Enhanced Consequence Analysis (ECA).

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	6.163	13.100	13.150	-	13.150
Current President's Budget	7.219	13.100	15.650	-	15.650
Total Adjustments	1.056	0.000	2.500	-	2.500
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.203	-			
• SBIR/STTR Transfer	-0.147	-			
• Realignment	-	-	2.500	-	2.500

Change Summary Explanation

The increase in FY 2021 from the previous President's Budget is due to the net impact of:
(1) increased investment for verification and validation, testing, documentation, and enhanced support of M&S capabilities to enable integration of these capabilities in U.S. and allied nuclear planning and decision-making, and
(2) realignment of funding to the newly established program element 0605141BR for the Mission Assurance and Risk Management System as a program of record.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MA: *Mission Assurance Risk Management System*	0.000	0.000	5.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In an October 29, 2018 memorandum, the Deputy Secretary of Defense directed the transfer of Mission Assurance Risk Management System (MARMS) program management responsibilities from the Department of Defense Chief Information Officer (DoD CIO) to the Defense Threat Reduction Agency (DTRA), in light of DTRA's role in conducting Joint Mission Assurance Assessments. Prior to FY 2020, funding for MARMS is captured in program element 0605170D8Z; beginning in FY 2021 funding for MARMS is captured in a newly established program element, 0605141BR.

A. Mission Description and Budget Item Justification

The Mission Assurance Risk Management System (MARMS) is a Department of Defense (DoD) risk management system that directly supports the Secretary of Defense's Mission Assurance (MA) responsibilities as defined in the DoD Directive (DoDD) 3020.40, Mission Assurance, with the objectives of creating resilience and supporting critical processes to enable the protection of assets and ensuring defense critical missions. MARMS will function as an integration framework spanning multiple security domains that will support risk-informed decision-making, resource investment, and improved synchronization at different levels within DoD. MARMS supports multiple Joint Capability Areas (JCA): Command and Control, Logistics, and Protection. MARMS is an acquisition category (ACAT) III software program and has a "high" impact value for each of the three security objectives (confidentiality, integrity, and availability) in accordance with DoD Instruction (DoDI) 8510.01 and the Committee on National Security Systems Instruction (CNSSI) 1253.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: MA - Mission Assurance Risk Management System	0.000	5.600	0.000	0.000	0.000
Description: MARMS Requirements Definition Package (RDP)-1 defines multiple spirals of major technological improvements. Each spiral is comprised of multiple Capability Drops (CD) that defined specific capabilities. RDP-1 defines seven (7) capability drops focusing on the collection, analysis, warehousing, sharing, protection, and accessing of Defense Critical Infrastructure (DCI) and AntiTerrorism (AT) data supporting multiple types and levels of trusted users. ***FY 2020 Plans:*** - Continue system engineering and agile development per MARMS RDP-1. - Continue to improve capability of the Information Sharing Data Registry (CD1) and Mission Assurance Assessments (CD2). - Continue development of the Mission Assurance Viewer and Analysis Portal on SIPR (CD6) toward initial					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
capability fielding in 4th Quarter FY 2022. - Continue the development effort of the Mission Assurance Workspace and Viewer on JWICS (CD5) toward initial capability fielding in 4th Quarter FY 2020. - Initiate the development effort of the Cross Domain Solutions (CDS) – Low to High (CD6). - Complete the MA Workspace and Viewer, which will provide the department's leadership with a consolidated MA dashboard and analytical capabilities to perform planning and analysis of MA activities per DODD 3020.40 and DODI 3020.45. ***FY 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 is due to the realignment of existing funding to the newly established program element 0605141BR for the Mission Assurance and Risk Management System as a program of record.					
Accomplishments/Planned Programs Subtotals	0.000	5.600	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 137/0605141BR: *Mission Assurance Risk Management System*	0.000	0.000	5.500	0.000	5.500	5.500	5.500	5.500	5.610	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

Product Development ($ in Millions)

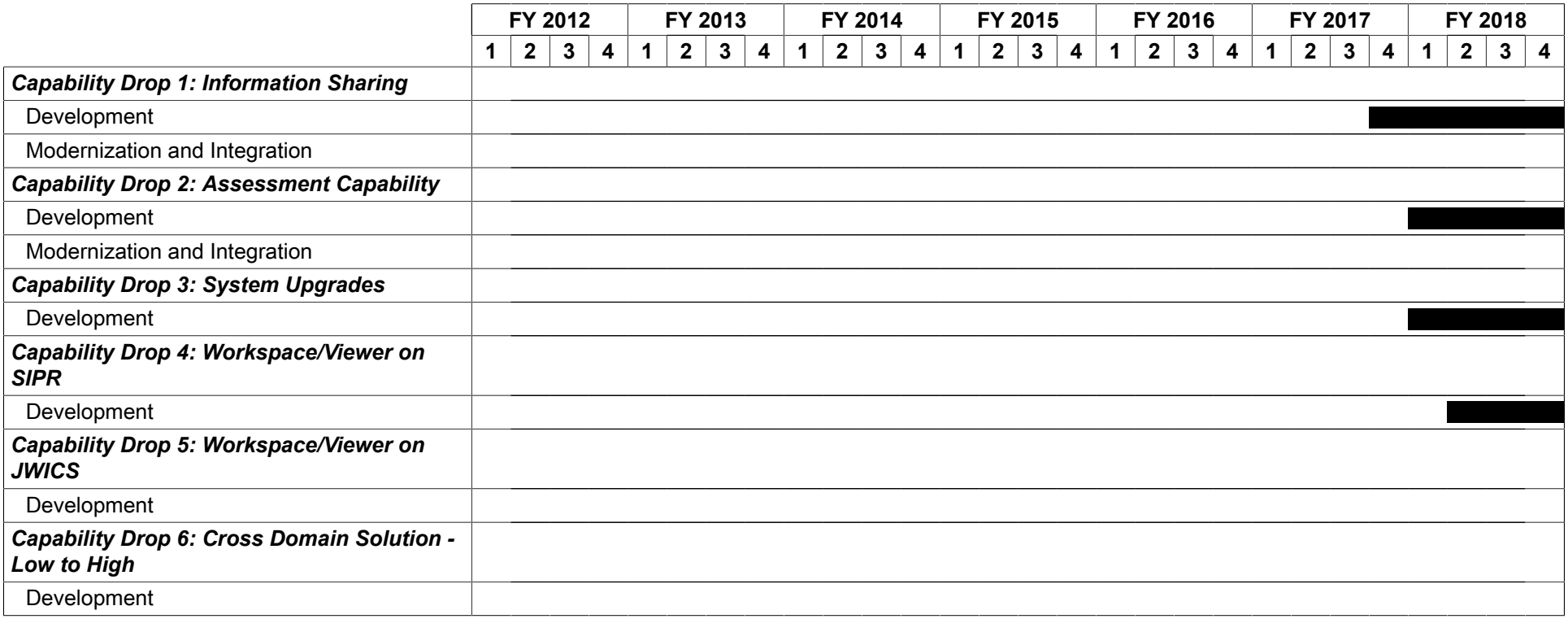
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CD1 - Information Sharing and Lead Integration	MIPR	U.S. Army Futures Command : Picatinny Arsenal, NJ	-	-		2.767	Feb 2020	-		-		-	Continuing	Continuing	-
CD2 - Assessment Capability	C/CPFF	Alion Science & Technology : McLean, VA	-	-		0.690	Feb 2020	-		-		-	Continuing	Continuing	-
CD3 - Existing System Upgrades	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		0.700	Feb 2020	-		-		-	Continuing	Continuing	-
CD3 - Existing System Upgrades	MIPR	U.S Strategic Command (STRATCOM) : Offutt, NE	-	-		0.400	Feb 2020	-		-		-	Continuing	Continuing	-
CD4 - Workspace/Viewer on Secret Internet Protocol Router Network (SIPR) and CD5 - Workspace/ Viewer on Joint Worldwide Intelligence Communications System (JWICS)	C/CPFF	TBD : TBD	-	-		0.560	Feb 2020	-		-		-	Continuing	Continuing	-
CD5 - Workspace/ Viewer on Joint Worldwide Intelligence Communications System (JWICS)	C/CPFF	Institute for Defense Analysis : Washington, DC	-	-		0.390	Feb 2020	-		-		-	Continuing	Continuing	-
MARMS Hosting	MIPR	Acquisition, Logistics, and Technology Enterprise Systems and Services (ALTESS) : Radford, VA	-	-		0.093	Jan 2020	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		5.600		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		5.600		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*



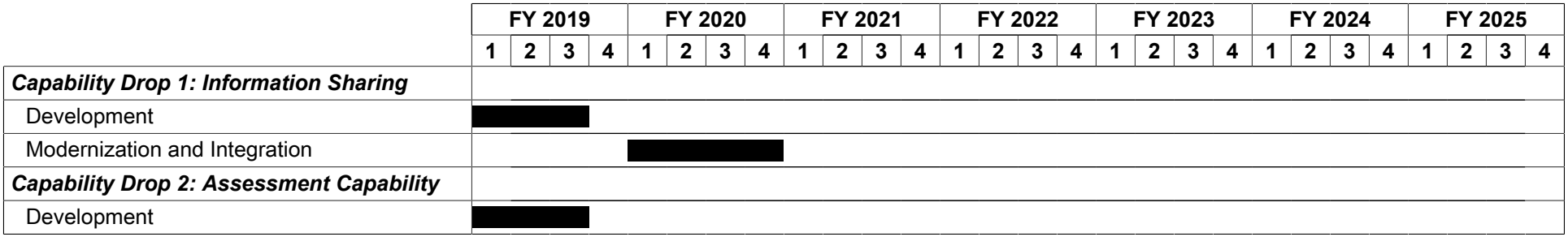


Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Modernization and Integration																												
Capability Drop 3: System Upgrades																												
Development																												
Capability Drop 4: Workspace/Viewer on SIPR																												
Development																												
Capability Drop 5: Workspace/Viewer on JWICS																												
Development																												
Capability Drop 6: Cross Domain Solution - Low to High																												
Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Capability Drop 1: Information Sharing				
Development	4	2017	3	2019
Modernization and Integration	1	2020	4	2020
Capability Drop 2: Assessment Capability				
Development	1	2018	3	2019
Modernization and Integration	1	2020	4	2020
Capability Drop 3: System Upgrades				
Development	1	2018	4	2020
Capability Drop 4: Workspace/Viewer on SIPR				
Development	2	2018	4	2020
Capability Drop 5: Workspace/Viewer on JWICS				
Development	1	2019	4	2020
Capability Drop 6: Cross Domain Solution - Low to High				
Development	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency											Date: February 2020	
Appropriation/Budget Activity 0400 / 5					R-1 Program Element (Number/Name) PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*				Project (Number/Name) RD / *Nuclear Technologies and Capabilities Development*			
COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RD: *Nuclear Technologies and Capabilities Development*	0.000	0.000	7.500	15.650	0.000	15.650	14.803	13.959	13.118	13.381	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2020, DTRA consolidated projects RF-Forensics Technologies, RI-Nuclear Survivability, and RL-Nuclear and Radiological Effects in program element 0602718BR, into the renamed project RD-Nuclear Technologies and Capabilities Development.

A. Mission Description and Budget Item Justification

This project supports the development of capabilities for the Defense Threat Reduction Agency (DTRA) to counter proliferation and weapons of mass destruction (WMD) and to model the consequences of the use of nuclear weapons and integrate these capabilities for Combatant Command use.

DTRA's Nuclear Arms Control Technologies (NACT) program performs Research, Development, Test, and Evaluation (RDT&E) to improve the sustainability, reliability, and effectiveness of capabilities related to its operational mission to install, operate, maintain, and sustain the waveform and radionuclide nuclear detonation detection stations and a radionuclide analysis laboratory comprising the majority of the U.S. portion of the International Monitoring System (IMS). This system delivers data continuously to the U.S. monitoring and verification community supporting warfighter and interagency nuclear-event response. The NACT program directly supports U.S. and allied warfighter and national technical monitoring requirements and provides vital data used by the treaty monitoring community, warfighter planners, DoD, other U.S. Government agencies, and international agencies.

The project addresses WMD monitoring, implementation of, and compliance with arms control agreement requirements validated by the Office of the Under Secretary of Defense, Acquisition and Sustainment. This project conforms to the administration's research and development priorities related to countering WMD. Technical assessments are made against nuclear treaty implementation and nuclear event response requirements to provide the basis for sound project development, evaluate existing programs, provide U.S. IMS data, and to access international IMS data required to support U.S. monitoring policy, decision- makers, and negotiation teams. This project will improve the efficiency, performance, reliability, and sustainability of U.S. IMS stations; optimize IMS capabilities to support both nuclear treaty monitoring and nuclear-event response; and improve capabilities to detect, characterize, and enable discrimination of nuclear events.

The Nuclear Capabilities Services (NuCS) project performs RDT&E to improve capabilities to model nuclear weapon effects (NWE) environments and simulate the response of systems and networks to these effects. The Enhanced Consequence Analysis (ECA) project integrates NuCS capabilities and integrates these modeling and simulation (M&S) capabilities with operational databases and systems. Together, these programs support U.S. and allied planning and decision making in the event of nuclear weapon use.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RD - Nuclear Technologies and Capabilities Development	0.000	7.500	15.650	0.000	15.650

Description: Project RD supports the NACT Program, conducting RDT&E to meet IMS technology requirements in support of treaty verification, monitoring and other emerging nuclear arms control activities, and the NuCS and ECA projects conducting RDT&E to support U.S. and allied nuclear planning and decision making requirements.

FY 2020 Plans:
- Continue to provide data from IMS infrastructure in support of DoD and Interagency nuclear-event response missions to enhance nuclear event response and consequence management mission capabilities.
- Integrate IMS into appropriate DoD and interagency exercises to ensure stakeholder involvement in system optimization and to leverage, to the fullest extent possible, all IMS data streams in informing partner exercise activities.
- Analyze technical requirements for new and upgraded capabilities within the IMS infrastructure that will support nuclear event response.
- Leverage conventional high explosive test events to evaluate U.S. IMS performance.
- Participate in CTBT Organization international- and interagency-sponsored technology development exchanges to ensure IMS research and engineering activities remain current and relevant.

FY 2021 Base Plans:
- Leverage and conduct conventional high explosive test events to evaluate U.S. IMS performance and validate geophysical models.
- Continue to integrate data from IMS infrastructure and upgrade IMS technologies in support of DoD and Interagency nuclear-event response missions and treaty compliance.
- Integrate IMS into appropriate DoD and interagency exercises to ensure stakeholder involvement in system optimization and to leverage, to the fullest extent possible, all IMS data streams in informing partner exercise activities.
- Develop new and upgraded treaty-monitoring capabilities that will support nuclear-event response and strategic DoD missions.
- Participate in international and interagency-sponsored technology development exchanges to ensure IMS research and engineering activities remain current and relevant.
- Establish baseline of integrated nuclear weapon effects modeling and simulation capabilities that have completed V&V (document verification and validation activities and develop training materials for operators and subject-matter experts who develop and use planning and decision-making systems).

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Deliver initial solution for calculating nuclear weapon effects to be integrated into existing planning and decision-support systems at U.S. and allied commands. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to the new requirement for DTRA to provide an Enhanced Consequence Analysis (ECA) capability to improve nuclear effects and response models for the strategic nuclear planning community. Requested by Combatant Commands, specifically U.S. Strategic Command (STRATCOM), this capability will integrate nuclear planning models into conventional Joint Force operational planning models. This new requirement is driven by the 2018 National Defense Strategy and the Nuclear Posture Review (NPR) updates.					
Accomplishments/Planned Programs Subtotals	0.000	7.500	15.650	0.000	15.650

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RD: *Counter Weapons of Mass Destruction Applied Research*	21.050	89.860	92.492	-	92.492	91.351	93.732	95.307	97.214	Continuing	Continuing
• 29/0603160BR/RD: *Counter Weapons of Mass Destruction Advanced Technology Development*	21.193	70.153	51.416	-	51.416	51.480	53.081	55.547	56.659	Continuing	Continuing

Remarks

D. Acquisition Strategy

Assess government, academic, and industrial performers and make selections based upon a "best fit for task" criteria. Common government awardees include DoD Service Laboratories and the Department of Energy National Laboratories.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radionuclide sensor, station, laboratory and network improvements	FFRDC	Pacific Northwest National Laboratory : Richland, WA	-	-		1.550	Jan 2020	1.212	Jan 2021	-		1.212	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements; validation and verification testing	FFRDC	Sandia National Laboratory : Albuquerque, NM	-	-		1.850	Jan 2020	1.350	Jan 2021	-		1.350	Continuing	Continuing	-
Radionuclide sensor, station, and network Improvements	MIPR	Air Force Technical Application Center : Patrick AFB, FL	-	-		0.500	Dec 2019	0.390	Feb 2021	-		0.390	Continuing	Continuing	-
Radionuclide sensor, station, laboratory and network improvements	C/CPFF	General Dynamics Mission Systems, Inc. : Fairfax, VA	-	-		0.435	Nov 2019	0.446	Nov 2020	-		0.446	Continuing	Continuing	-
Station, and network Improvements	C/CPFF	Leidos Innovations Corp : Alexandria, VA	-	-		0.200	Apr 2020	0.240	Nov 2020	-		0.240	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/CPFF	Pennsylvania State University : State College, PA	-	-		0.400	Feb 2020	0.450	Jan 2021	-		0.450	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/CPFF	University of Alaska Fairbanks : Fairbanks, AK	-	-		0.143	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
IMEA Software Development	C/CPFF	Applied Research Associates, Inc : Alexandria, VA	-	-		0.200	Jan 2020	0.200	Feb 2021	-		0.200	Continuing	Continuing	-
IMS Gas Background Analysis	FFRDC	Argonne National Laboratory : Argonne, IL	-	-		0.200	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements; validation and verification testing	C/TBD	TBD : TBD	-	-		0.160	Mar 2020	0.500	Mar 2021	-		0.500	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Seismic and Infrasound sensor, station, and network Improvements	MIPR	US Army Corps of Engineers : Vicksburg, MS	-	-		0.100	Dec 2019	0.300	Jan 2021	-		0.300	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	MIPR	Missile Defense Agency : Fort Belvoir, VA	-	-		0.650	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/TBD	University of Alaska : Fairbanks, AK	-	-		0.500	Feb 2020	0.500	Feb 2021	-		0.500	Continuing	Continuing	-
Radionuclide sensor, station, and network Improvements	FFRDC	Savanah River National Laboratory : Savannah River Site Aiken, SC	-	-		0.500	Apr 2020	0.750	Mar 2021	-		0.750	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	MIPR	DIA/MSIC : TBD	-	-		-		0.250	Mar 2021	-		0.250	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements; validation and verification testing	FFRDC	Lawrence Livermore National Laboratory : Livermore, CA	-	-		-		0.950	Jan 2021	-		0.950	Continuing	Continuing	-
Nuclear weapon effects models and integrated NuCS core architecture development	C/CPFF	Applied Research Associates : Raleigh, NC	-	-		-		3.000	Jul 2021	-		3.000	Continuing	Continuing	-
Enhanced consequence analysis initial capability	C/CPFF	TBD : TBD	-	-		-		5.000	Jul 2021	-		5.000	Continuing	Continuing	-
		Subtotal	-	-		7.388		15.538		-		15.538	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Reqn	Various : Various	-	-		0.112	Nov 2019	0.112	Nov 2020	-		0.112	Continuing	Continuing	-
		Subtotal	-	-		0.112		0.112		-		0.112	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		7.500		15.650		-		15.650	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Nuclear Arms Control Technology (NACT)																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness																												
Optimize and improve IMS station performance: validation and verification testing of RDTE concepts to enable operational implementation																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: testing and evaluation of next generation systems																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: support of DoD and Interagency nuclear-event response missions to enhance nuclear-event response capabilities																												
Nuclear Capabilities Services (NuCS)																												
Integrate, evaluate, and demonstrate initial nuclear weapon effects capabilities integrated in NuCS and provide training sessions for users																												
Enhanced Consequence Analysis (ECA)																												

Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Demonstrate, integrate, and train users on initial ECA nuclear planning and decision support system																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RD / *Nuclear Technologies and Capabilities Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Nuclear Arms Control Technology (NACT)				
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation	1	2020	4	2021
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness	1	2020	4	2021
Optimize and improve IMS station performance: validation and verification testing of RDTE concepts to enable operational implementation	1	2020	4	2025
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: testing and evaluation of next generation systems	1	2020	4	2025
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: support of DoD and Interagency nuclear-event response missions to enhance nuclear-event response capabilities	1	2021	4	2025
Nuclear Capabilities Services (NuCS)				
Integrate, evaluate, and demonstrate initial nuclear weapon effects capabilities integrated in NuCS and provide training sessions for users	1	2021	4	2025
Enhanced Consequence Analysis (ECA)				
Demonstrate, integrate, and train users on initial ECA nuclear planning and decision support system	1	2021	3	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RF: *Forensics Technologies*	31.368	6.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.384
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project supports the development of verification and monitoring capabilities for the Defense Threat Reduction Agency (DTRA) to counter proliferation and weapons of mass destruction (WMD). DTRA's Nuclear Arms Control Technologies (NACT) program performs Research, Development, Test, and Evaluation (RDT&E) to improve the sustainability, reliability, and effectiveness of capabilities related to its operational mission to install, operate, maintain, and sustain the waveform and radionuclide nuclear detonation detection stations comprising the U.S. portion of the International Monitoring System (IMS). This delivers data to the U.S. monitoring and verification community and enables U.S. compliance with the Comprehensive Nuclear Test Ban Treaty (CTBT) in support of U.S. and Department of Defense (DoD) nonproliferation objectives.

The project addresses WMD monitoring, implementation of, and compliance with arms control agreement requirements validated by the Office of the Under Secretary of Defense, Acquisition and Sustainment. This project conforms to the administration's research and development priorities related to WMD arms control and disablement. Technical assessments are made against CTBT implementation requirements and U.S. objectives to provide the basis for sound project development, evaluate existing programs, provide data required to inform compliance assessments, and support U.S. monitoring policy, decision-makers, and negotiation teams.

The primary RDT&E program emphasis is on improvements that enable the installation of treaty-specific stations, which reduce costs and increase the reliability in diverse and often harsh environments; improve efficiency, performance, reliability, and sustainability of existing stations and treaty-specified verification capabilities; and improve capabilities to detect, characterize, and enable discrimination of, nuclear weapons tests. The NACT program directly supports U.S. and allied warfighter and national technical monitoring requirements and provides vital data used by the treaty monitoring community, warfighter planners, DoD, other U.S. Government agencies, and international agencies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RF - Forensics Technologies	6.016	0.000	0.000	0.000	0.000
Description: Project RF supports the NACT Program, conducting RDT&E to meet IMS technology requirements in support of CTBT implementation, compliance, monitoring, inspection, and other emerging nuclear arms control activities.					
FY 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	6.016	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RF: *Counter Weapons of Mass Destruction Applied Research*	7.716	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.716
• 29/0603160BR/RF: *Counter Weapons of Mass Destruction Advanced Technology Development*	30.947	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	30.947

Remarks

D. Acquisition Strategy

Assess government, academic, and industrial performers and make selections based upon a "best fit for task" criteria. Common government awardees include DoD Service Laboratories and the Department of Energy National Laboratories.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radionuclide sensor, station, laboratory and network improvements	FFRDC	Pacific Northwest National Laboratory : Richland, WA	7.533	1.403	Jan 2019	-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements; validation and verification testing	FFRDC	Sandia National Laboratory : Albuquerque, NM	7.421	1.850	Jan 2019	-		-		-		-	Continuing	Continuing	-
Radionuclide sensor, station, and network improvements	MIPR	Air Force Technical Application Center : Patrick AFB, FL	3.354	0.250	Nov 2018	-		-		-		-	Continuing	Continuing	-
Engineering & Technical Services	C/CPFF	Engility Corp : Chantilly, VA	1.986	-		-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/CPFF	Dynetics, Inc : Arlington, VA	1.828	-		-		-		-		-	Continuing	Continuing	-
Radionuclide sensor, station, laboratory and network improvements	C/CPFF	General Dynamics Mission Systems, Inc. : Fairfax, VA	2.489	0.431	Nov 2018	-		-		-		-	Continuing	Continuing	-
Station, and network Improvements	C/CPFF	Leidos Innovations Corp. : Alexandria, VA	0.716	0.200	Apr 2019	-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/CPFF	Pennsylvania State University : State College, PA	0.982	0.200	Jan 2019	-		-		-		-	Continuing	Continuing	-
Station failure and logistics modeling and simulation	C/CPFF	Systems Exchange, Inc. : Carmel, CA	0.313	-		-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	MIPR	Naval Research Laboratory : Washington DC	0.204	0.200	Jan 2019	-		-		-		-	Continuing	Continuing	-
EIF Readiness Planning	C/CPFF	Alion Science and Technology Corp. : McLean, VA	0.300	0.100	Jan 2019	-		-		-		-	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radionuclide sensor, station, laboratory and network improvements	C/CPFF	Raytheon Company : Dulles, VA	0.200	-		-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	C/CPFF	University of Alaska Fairbanks : Fairbanks, AK	0.459	0.129	Mar 2019	-		-		-		-	Continuing	Continuing	-
IMEA Software Development	C/CPFF	Applied Research Associates, Inc. : Alexandria, VA	0.200	0.200	Dec 2018	-		-		-		-	Continuing	Continuing	-
IMS Gas Background Analysis	FFRDC	Argonne National Laboratory : Argonne, IL	0.130	0.100	Apr 2019	-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements; validation and verification testing	C/TBD	TBD : TBD	-	0.295	May 2019	-		-		-		-	Continuing	Continuing	-
Seismic and Infrasound sensor, station, and network Improvements	MIPR	US Army Corps of Engineers : Vicksburg, MS	0.171	0.100	Dec 2018	-		-		-		-	Continuing	Continuing	-
		Subtotal	28.286	5.458		-		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS Support to Program Office	C/CPFF	Engility Corp. : Chantilly, VA	1.472	0.446	Dec 2018	-		-		-		-	Continuing	Continuing	-
A&AS Support to Program Office	MIPR	OUSD A&S : Arlington, VA	0.948	-		-		-		-		-	Continuing	Continuing	-
Travel	TBD	Various : Various	0.662	0.112	Nov 2018	-		-		-		-	Continuing	Continuing	-
		Subtotal	3.082	0.558		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.368	6.016		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NACT																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: automated seismic calibration process																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness																												
Optimize and improve IMS station performance: validation and verification testing of RDTE concepts to enable operational implementation																												
Provide analysis of 800 additional nuclear material samples for treaty verification purposes																												

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NACT																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation																												

Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: automated seismic calibration process																												
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness	■	■	■	■																								
Optimize and improve IMS station performance: validation and verification testing of RDTE concepts to enable operational implementation	■	■	■	■																								
Provide analysis of 800 additional nuclear material samples for treaty verification purposes	■																											

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RF / *Forensics Technologies*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NACT				
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation	2	2017	4	2019
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: automated seismic calibration process	2	2017	4	2018
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness	1	2017	4	2019
Optimize and improve IMS station performance: validation and verification testing of RDTE concepts to enable operational implementation	1	2017	4	2019
Provide analysis of 800 additional nuclear material samples for treaty verification purposes	1	2017	1	2019

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	0.000	1.203	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.203
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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, integrates, and transitions nuclear and radiological assessment modeling tools for use in military planning processes. The assessment modeling tools provide critical analytics for Consequence of Execution (COE) considerations during nuclear targeting and post-detonation nuclear response, supporting interagency strategic and tactical decision making. These COE considerations can include the full range of political, military, economic, social, infrastructure, and information (PMESII) factors and their interaction, extending analytical capabilities beyond common damage assessment practices and into second and third order effects. These activities/efforts support Combatant Commands and other Department of Defense (DoD) organizations by providing accurate and reliable consequence assessment and response information.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: RL: Nuclear and Radiological Effects ***Description:*** Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions.	1.203	-	-	-	-
Accomplishments/Planned Programs Subtotals	1.203	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR: *Nuclear & Radiological Effects*	27.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.643
• 29/0603160BR: *Nuclear & Radiological Effects*	2.947	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.947

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enhanced Consequence Analysis (ECA) Nuclear Planning and Decision Support System	C/CPFF	Booz Allen Hamilton : McLean, VA	-	1.203	Jun 2019	-		-		-		-	0.000	1.203	1.203
		Subtotal	-	1.203		-		-		-		-	0.000	1.203	N/A

Remarks

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

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.203		0.000		-		-		-	0.000	1.203	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Enhanced Consequence Analysis (ECA)																												
Demonstrate, integrate, and train users on initial ECA nuclear planning and decision support system																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Enhanced Consequence Analysis (ECA)				
Demonstrate, integrate, and train users on initial ECA nuclear planning and decision support system	3	2019	4	2019

Note

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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	5.500	-	5.500	5.500	5.500	5.500	5.610	Continuing	Continuing
MA: *Mission Assurance Risk Management System*	0.000	0.000	0.000	5.500	0.000	5.500	5.500	5.500	5.500	5.610	Continuing	Continuing

Note

Program element 0605141BR, Mission Assurance Risk Management System (MARMS) activities were previously justified under program element 0605000BR, Counter Weapons of Mass Destruction Systems Development.

A. Mission Description and Budget Item Justification

MARMS is a Department of Defense (DoD) risk management system that directly supports the Secretary of Defense's Mission Assurance (MA) responsibilities as defined in the DoD Directive (DoDD) 3020.40, Mission Assurance, with the objectives of creating resilience and supporting critical processes to enable the protection of assets and ensuring defense critical missions. MARMS will function as an integration framework spanning multiple security domains that will support risk-informed decision-making, resource investment, and improved synchronization at different levels within DoD. MARMS supports multiple Joint Capability Areas (JCA): Command and Control, Logistics, and Protection. MARMS is an acquisition category (ACAT) III software program and has a "high" impact value for each of the three security objectives (confidentiality, integrity, and availability) in accordance with DoD Instruction (DoDI) 8510.01 and the Committee on National Security Systems Instruction (CNSSI) 1253.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	5.500	0.000	5.500
Total Adjustments	0.000	0.000	5.500	0.000	5.500
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignments	-	-	5.500	-	5.500

Change Summary Explanation

The increase in FY 2021 from the previous President's Budget submission is due to the realignment of funds from program element 0605000BR into this newly established program element 0605141BR for the Mission Assurance and Risk Management System as a program of record.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MA: *Mission Assurance Risk Management System*	0.000	0.000	0.000	5.500	0.000	5.500	5.500	5.500	5.500	5.610	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In an October 29, 2018 memorandum, the Deputy Secretary of Defense directed the transfer of Mission Assurance Risk Management System (MARMS) program management responsibilities from the Department of Defense Chief Information Officer (DoD CIO) to the Defense Threat Reduction Agency (DTRA), in light of DTRA's role in conducting Joint Mission Assurance Assessments. In FY 2020 funding for MARMS is captured in Program Element 0605000BR; prior to FY 2020 funding is captured in Program Element 0605170D8Z.

A. Mission Description and Budget Item Justification

MARMS is a Department of Defense (DoD) risk management system that directly supports the Secretary of Defense's Mission Assurance (MA) responsibilities as defined in the DoD Directive (DoDD) 3020.40, Mission Assurance, with the objectives of creating resilience and supporting critical processes to enable the protection of assets and ensuring defense critical missions. MARMS will function as an integration framework spanning multiple security domains that will support risk-informed decision-making, resource investment, and improved synchronization at different levels within DoD. MARMS supports multiple Joint Capability Areas (JCA): Command and Control, Logistics, and Protection. MARMS is an acquisition category (ACAT) III software program and has a "high" impact value for each of the three security objectives (confidentiality, integrity, and availability) in accordance with DoD Instruction (DoDI) 8510.01 and the Committee on National Security Systems Instruction (CNSSI) 1253.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: MA - Mission Assurance Risk Management System	0.000	0.000	5.500	0.000	5.500
Description: MARMS is a multi-year program that encompasses a family of systems that will be integrated as part of the MARMS Requirements Definition Package (RDP)-1. The RDP-1 defines multiple spirals of major technological improvements. Each spiral is comprised of multiple Capability Drops (CD) that define specific capabilities. RDP-1 defines seven (7) capability drops focusing on the collection, analysis, warehousing, sharing, protection, and accessing of Defense Critical Infrastructure (DCI) and Anti-Terrorism (AT) data to support risk-informed decision making, resource investment and improve synchronization across Mission Assurance-related programs.					
FY 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 Base Plans:*** - Continue to improve capability of the Information Sharing Data Registry (CD1) and Mission Assurance Assessments (CD2) - Modernize and Integrate with additional assessment capabilities (CD2 and CD3) - Continue development of the Mission Assurance Viewer and Analysis Portal on SIPR (CD6) toward initial capability fielding in 4th Quarter FY 2022. - Continue the development effort of the Cross Domain Solutions (CDS) – Low to High (CD6), JWICS to SIPR (CD7) ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 is due to the realignment of funds from program element 0605000BR into the newly established program element 0605141BR for the Mission Assurance and Risk Management System as a program of record.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.500	0.000	5.500

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 128/0605000BR: *Counter Weapons of Mass Destruction Systems Development*	0.000	5.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.600

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CD1 - Information Sharing	MIPR	U.S. Army Future Command (AFC) : Picatinny Arsenal, NJ	-	-		-		1.679	Nov 2020	-		1.679	Continuing	Continuing	-
CD2 - Assessment Capability	C/CPFF	Alion Science & Technology : McLean, VA	-	-		-		0.300	Feb 2021	-		0.300	Continuing	Continuing	-
CD3 - Existing System Upgrades	MIPR	Naval Surface Warfare Center (NSWC) : Dahlgren	-	-		-		0.500	Feb 2021	-		0.500	Continuing	Continuing	-
CD3 - Existing System Upgrades	C/CPFF	Science Applications International Corporation (SAIC) : Omaha, NE	-	-		-		0.350	Nov 2020	-		0.350	Continuing	Continuing	-
CD4 - Workspace/Viewer on Secret Internet Protocol Router Network (SIPR)	C/CPFF	Booz Allen Hamilton (BAH) : McLean, VA	-	-		-		0.603	Feb 2021	-		0.603	Continuing	Continuing	-
CD5 - Workspace/ Viewer on Joint Worldwide Intelligence Communications System (JWICS)	C/CPFF	Booz Allen Hamilton (BAH) : McLean, VA	-	-		-		0.603	Feb 2021	-		0.603	Continuing	Continuing	-
CD6 - Cross Domain Solution SIPR to JWICS	C/CPFF	TBD : TBD	-	-		-		0.700	Feb 2021	-		0.700	Continuing	Continuing	-
CD7 - CD6 - Cross Domain Solution JWICS to SIPR	C/CPFF	TBD : TBD	-	-		-		0.765	Feb 2021	-		0.765	Continuing	Continuing	-
		Subtotal	-	-		-		5.500		-		5.500	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		5.500		-		5.500	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

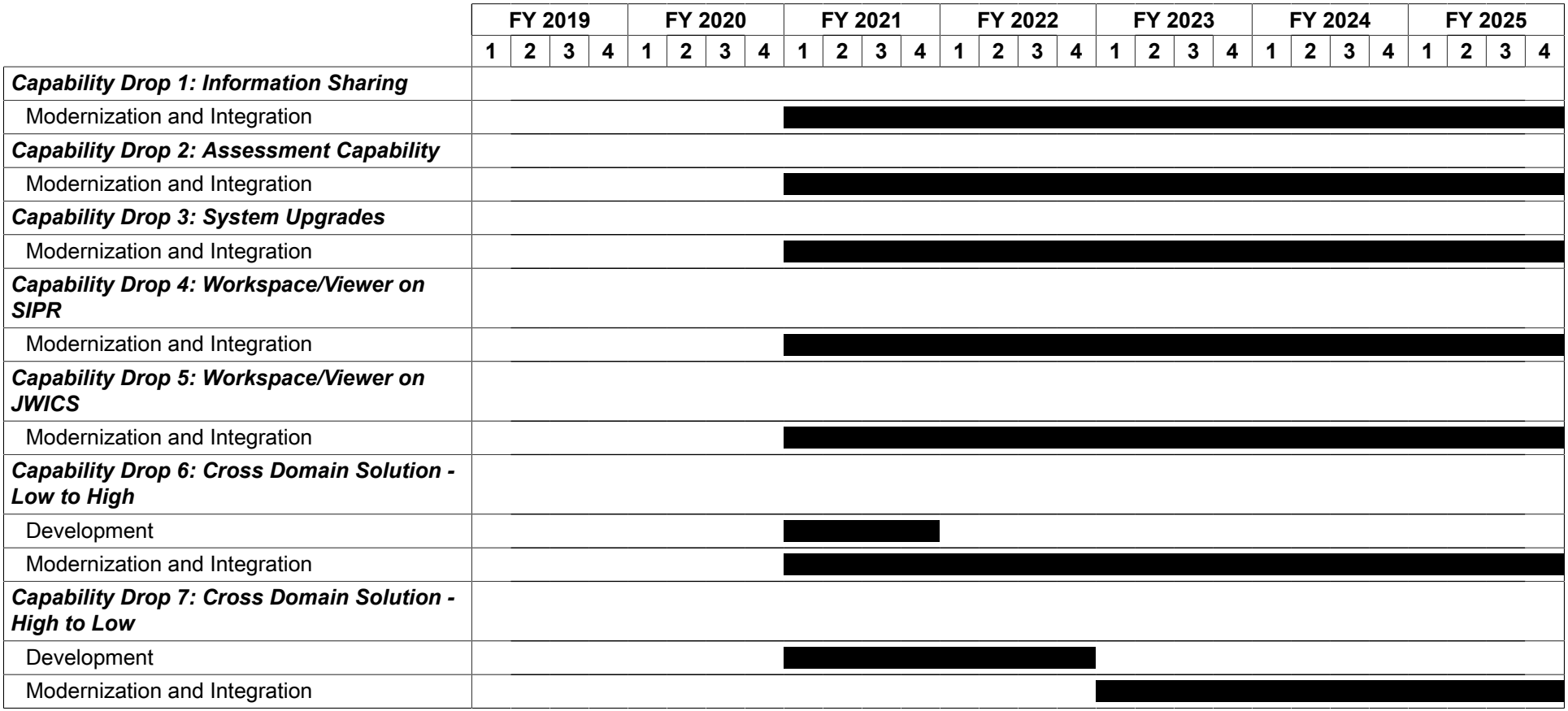

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Defense Threat Reduction Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605141BR / *Mission Assurance Risk Management System (MARMS)*	**Project (Number/Name)** MA / *Mission Assurance Risk Management System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Capability Drop 1: Information Sharing				
Modernization and Integration	1	2021	4	2025
Capability Drop 2: Assessment Capability				
Modernization and Integration	1	2021	4	2025
Capability Drop 3: System Upgrades				
Modernization and Integration	1	2021	4	2025
Capability Drop 4: Workspace/Viewer on SIPR				
Modernization and Integration	1	2021	4	2025
Capability Drop 5: Workspace/Viewer on JWICS				
Modernization and Integration	1	2021	4	2025
Capability Drop 6: Cross Domain Solution - Low to High				
Development	1	2021	4	2021
Modernization and Integration	1	2021	4	2025
Capability Drop 7: Cross Domain Solution - High to Low				
Development	1	2021	4	2022
Modernization and Integration	1	2023	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502BR / *Small Business Innovation Research*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	70.852	11.315	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	82.167
RA: *Information Sciences and Applications*	70.852	11.315	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	82.167

Note

Funding for this program element is not allocated until the year of execution. Program Element 0605502BR “Small Business Innovative Research” is used in reporting year-end actual expenses only.

A. Mission Description and Budget Item Justification

The Small Business Innovative Research (SBIR) and the Small Business Technology Transfer (STTR) programs provide the means for stimulating technological innovation in the private sector, strengthens the role of small business in meeting the Department of Defense (DoD) research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of the DoD supported research and development results. These efforts are responsive to Public Law 106-554.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	11.315	0.000	0.000	-	0.000
Total Adjustments	11.315	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	11.315	-			

Change Summary Explanation

Funding for the SBIR Program is consolidated in this program element during the year of execution.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502BR / *Small Business Innovation Research*	**Project (Number/Name)** RA / *Information Sciences and Applications*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
RA: *Information Sciences and Applications*	70.852	11.315	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	82.167
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

*Funding is not allocated until the year of execution. Program Element 0605502BR “Small Business Innovative Research (SBIR)” is used in reporting year-end actual expenses only.

A. Mission Description and Budget Item Justification

The Small Business Innovative Research (SBIR) and the Small Business Technology Transfer (STTR) programs provide the means for stimulating technological innovation in the private sector and strengthens the role of small business in meeting the Department of Defense (DoD) research and development needs. These programs foster and encourage participation of minority and disadvantaged businesses in technological innovation and increase the commercial application of DoD supported research and development results. These efforts are responsive to Public Law 106-554 Small Business Act (15 U.S.C. 638).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: RA: Information Sciences and Applications ***Description:*** This project provides the means for stimulating technological innovation in the private sector, strengthens the role of small business in meeting the DoD research and development needs; fosters and encourages participation of minority and disadvantaged businesses in technological innovation; and increases the commercial application of the DoD supported research and development results. These efforts are responsive to Public Law 106-554.	11.315	-	-
Accomplishments/Planned Programs Subtotals	11.315	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 21/0602718BR/RA: *Counter Weapons of Mass Destruction Applied Research*	36.665	44.167	40.965	-	40.965	42.194	42.773	47.564	48.593	Continuing	Continuing
• 29/0603160BR/RA: *Counter Weapons of Mass Destruction Advanced Technology Development*	18.080	34.825	50.019	-	50.019	46.279	49.207	50.708	51.721	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502BR / *Small Business Innovation Research*	**Project (Number/Name)** RA / *Information Sciences and Applications*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

N/A

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