Department of Defense
Fiscal Year (FY) 2017 President's Budget Submission

February 2016

Defense Threat Reduction Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Table of Volumes

Volume 5 Table of Contents

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Exhibit R-1, RDT&E Programs

Defense Threat Reduction Agency

Fiscal Year 2017-2021 Budget Estimates

Appropriation: RDT&E, Defense-Wide **Date: February 2016**

OVERVIEW

The Defense Threat Reduction Agency (DTRA) safeguards the United States and its allies from global Weapons of Mass Destruction (WMD) by integrating, synchronizing, and providing responsive expertise, technologies, and capabilities. This mission is directly aligned to strategic and operational planning guidance in the 2015 National Security Strategy, 2015 National Military Strategy, FY 2017-2021 Defense Planning Guidance, 2015-2018 Department of Defense (DoD) Agency Strategic Plan, 2014 Quadrennial Defense Review, 2014 DoD Strategy for Countering Weapons of Mass Destruction, 2014 Independent Review of the Department of Defense Nuclear Enterprise, DTRA/SCC-WMD 2015-2020 Strategic Plan, FY 2017 Budget Guidance for Countering Biological Threats Resource Priorities, 2010 Nuclear Posture Review, and the 2015 Implementation Directive for Better Buying Power 3.0.

The Research, Development, Test & Evaluation (RDT&E) budget funds research supporting DTRA's chartered responsibilities and national commitments across the chemical, biological, radiological, nuclear and high-yield explosives mission space. This research provides critical, cost-effective solutions to strategic, operational and technical challenges associated with WMD surveillance, detection, defeat, prevention, nonproliferation, counterproliferation, consequence management, and monitoring and verification.

As a strategic component of the DTRA mission to safeguard the United States and its allies from global WMD, the Basic Research Initiative balances the imperatives of unconstrained exploration, discovery and experimentation with near- and mid-term priorities arising as a result of continuously evolving threat environments. In support of this mission, the portfolio has two principle goals: (1) to facilitate innovative solutions and revolutionary technologies that transition to cost effective threat reduction capabilities; and, (2) to actively promote the development of the next generation of scientists and researchers committed to maintaining US technological superiority in achieving the Countering WMD (CWMD) mission.

The WMD Defeat Technologies applied research portfolio advances DTRA's CWMD mission by balancing the following imperatives: (1) invest in DTRA's applied research capabilities and increase the CWMD technology base to maximize future pay-off; (2) 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, (3) ensure applied research efforts are directly aligned to the mission-specific capability requirements of the Military Departments, Combatant Commanders, other DoD and federal agencies, and international partners.

The Counterproliferation Initiatives advanced technology development portfolio advances the CWMD mission by selecting initiatives that meet the following criteria: (1) transitioning technologies meet mission-specific capability requirements of the Military Departments, Combatant Commanders, other DoD and federal agencies, and international partners; (2) preliminary assessments of components and subsystems confirm the highest potential for technological feasibility, operability, and producibility upon transition out of science and technology (S&T) research; and, (3) programs demonstrate cost effectiveness or cost reduction potential during field testing or simulation at scale. Additional investment in the WMD Defeat Capabilities system development and demonstration portfolio supports International Monitoring System technology requirements under the Nuclear Arms Control Technology program. This portfolio directly supports U.S. and allied warfighter and national technical monitoring requirements and provides vital data used by the treaty monitoring community.

DTRA is committed to supporting Small Business Innovation Research and Small Business Technology Transfer programs. These programs stimulate technological innovation in the private sector, strengthen the role of small business in meeting DoD research and development needs, foster participation of minority and disadvantaged businesses in technological innovation, and increase the commercial application of DoD-supported research and development results.

DTRA rebalanced the overall Agency portfolio to align with strategic direction and minimize risk. The FY 2017 budget submission balances near term operational needs with future technical developments and capabilities. Reductions to the RDT&E portfolio impacted investment in efforts with lower return on investment, lower customer demand, or that were early in the development cycle.

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Department of Defense
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

29 Jan 2016

Appropriation	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Research, Development, Test & Eval, DW	487,802	488,817		488,817	461,305		461,305
Total Research, Development, Test & Evaluation	487,802	488,817		488,817	461,305		461,305

R-1C1: FY 2017 President's Budget (Published Version of PB Position), as of January 29, 2016 at 16:25:17

Department of Defense
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
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(Dollars in Thousands)

29 Jan 2016

Summary Recap of Budget Activities	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Basic Research	36,607	38,436		38,436	35,436		35,436
Applied Research	147,019	152,915		152,915	154,857		154,857
Advanced Technology Development	287,903	290,310		290,310	266,444		266,444
System Development And Demonstration	6,667	7,156		7,156	4,568		4,568
Management Support	9,606						
Total Research, Development, Test & Evaluation	487,802	488,817		488,817	461,305		461,305
Summary Recap of FYDP Programs							
Research and Development	487,802	488,817		488,817	461,305		461,305
Total Research, Development, Test & Evaluation	487,802	488,817		488,817	461,305		461,305

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Total Research, Development, Test & Evaluation	487,802	488,817		488,817	461,305		461,305

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Defense-Wide
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Exhibit R-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

29 Jan 2016

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

Line No	Program Element Number	Item	Act	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Sec
1	0601000BR	DTRA Basic Research Initiative	01	36,607	38,436		38,436	35,436		35,436	U
	Basic Research			36,607	38,436		38,436	35,436		35,436	
20	0602718BR	Weapons of Mass Destruction Defeat Technologies	02	147,019	152,915		152,915	154,857		154,857	U
	Applied Research			147,019	152,915		152,915	154,857		154,857	
27	0603160BR	Counterproliferation Initiatives - Proliferation Prevention and Defeat	03	287,903	290,310		290,310	266,444		266,444	U
	Advanced Technology Development			287,903	290,310		290,310	266,444		266,444	
121	0605000BR	Weapons of Mass Destruction Defeat Capabilities	05	6,667	7,156		7,156	4,568		4,568	U
	System Development And Demonstration			6,667	7,156		7,156	4,568		4,568	
151	0605502BR	Small Business Innovation Research	06	9,606							U
	Management Support			9,606							
Total Research, Development, Test & Eval, DW				487,802	488,817		488,817	461,305		461,305	

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Defense Threat Reduction Agency
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Sec
1	0601000BR	DTRA Basic Research Initiative	01	36,607	38,436		38,436	35,436		35,436	U
Basic Research				36,607	38,436		38,436	35,436		35,436	
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Program Element Table of Contents (by Budget Activity then Line Item Number)

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

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

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

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

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

Program Element Table of Contents (Alphabetically by Program Element Title)

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ACRONYMS

AA-HPRT	Analytics Hard Problem Research Team
ACES	Arms Control Enterprise System
AD	Agent Defeat
AEHF	Advanced Extremely High Frequency
AFX	Air Force Explosive
AI	Active Interrogation
AOR	Area of Responsibility
ARAT	Adversarial Route Analysis Tool
ARIEL	Autonomous Reconnaissance Infrared Electro-optical Loitering
ASIC	Application Specific Integrated Circuit
ATAC	Advanced Targeting Assessment Capability
ATD	Advanced Technology Development
AUV	Autonomous Underwater Vehicle
AWE	Atomic Weapons Establishment
BAA	Broad Agency Announcement
BDA	Battle Damage Assessment
BDI	Battle Damage Information
BLADE	BDI Link Advanced Demonstrator
BLU	Bomb, Live Unit
C4I	Command, Control, Communications, Computers, and Intelligence
CANES	Consolidated Afloat Network and Enterprise Services
CAPE	Cost Assessment and Program Evaluation
CARDS	CBRN Air-droppable Remotely Deployed Sensor System
CATTS	Cost Analysis Tool for Test Sites
C-B	Chemical-Biological
CBP	Customs and Border Protection
CBRNE	Chemical, Biological, Radiological, Nuclear, and High-yield Explosives
CCDR	Combatant Commander
CFD	Computational Fluid Dynamics
CHAMP	Counter Electronics High Power Microwave Advanced Missile Project
CJCS	Chairman, Joint Chiefs of Staff
CNDSP	Computer Network Defense Service Provider
CCMD	Combatant Command
COE	Consequence of Execution
CoE-NI	Consequence of Execution – Nuclear Integration
COI	Community of Interest
CONOPS	Concept of Operations
CONUS	Continental United States
COOP	Continuity of Operations
COP	Common Operating Picture
CP	Counter-proliferation

CPGS	Conventional Prompt Global Strike
CSM	Computational Structure Mechanics
CTBT	Comprehensive Nuclear Test Ban Treaty
CT/CP	Counterterrorism / Counterproliferation
CTS	Component Test Structure
CTTS	CBRNE Tactical Training System
C-WAC	Counter-WMD Analysis Center
CWMD	Countering Weapons of Mass Destruction
CWMD-T	Combating Weapons of Mass Destruction –Terrorism
DAPSS	Denied Area Persistent Sensor System
DEL	DTRA Experimentation Lab
DHS	Department of Homeland Security
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
DOE	Department of Energy
DOJ	Department of Justice
DPG	Dugway Proving Ground
DPPG	Defense Policy and Planning Guidance
DRDC	Defence Research and Development Canada
DSCS	Defense Satellite Communications System
DTRA	Defense Threat Reduction Agency
DT&E	Development, Test and Evaluation
ECBC	Edgewood Chemical Biological Center
EDTC	Engineering and Development Test 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
FinFets	Fin-Shaped Field Effect Transistors
FOC	Full Operational Capability
FYDP	Future Years Defense Program
GCC	Global Command and Control
GEF	Guidance for Employment of the Force
GKMC	Global Knowledge Management System
GSA	Global Situational Awareness
GSM	Global System for Mobile Communications
GUI	Graphical User Interface

HAMMER	Heated and Mobile Munitions Employing Rockets
HANE	High Altitude Nuclear Environments
HARP	High Altitude Radiological Phenomenology
HEBX	Hybridized Enhanced Blast Explosive
HEMP	High Altitude Electro Magnetic Pulse
HDBT	Hard and Deeply Buried Target
HPAC	Hazard Prediction and Assessment Capability
HPC	High Performance Computing
HPCMP	High Performance Computing Modernization Program
HTD	Hard Target Defeat
IBRD	Interagency Biological Restoration Demonstration
ICEPIC	Improved Concurrent Electromagnetic Particle-in-Cell
IED	Improvised Explosive Device
IMEA	Integrated Munitions Effects Assessment
IMS	International Monitoring System
IOC	Initial Operational Capability
IPODS	Integrated Precision Ordnance Delivery System
ISIS	Integrated Stand-off Inspection System
ISR	Intelligence, Surveillance, Reconnaissance
ISS	Integrated Sensor System
IR	Infrared
IT	Information Technology
ITD	Integrated Technology Demonstration
IWMDT	Integrated Weapons of Mass Destruction Toolset
JAIEG	Joint Atomic Information Exchange Group
JCAM	Joint Collaborative Analysis Model
JCDE	Joint Concept Development & Experimentation
JCIDS	Joint Capabilities Integration and Development System
JCTD	Joint Concept Technology Demonstration
JDAM	Joint Direct Attack Munition
JEM	Joint Effects Model
JMEWS	Joint Multi-Effects Warhead System
JSAF	Joint Semi-Automated Forces
KAFB	Kirtland Air Force Base
keV	kilo-electronvolt
LCP	Large Caliber Penetrator
LLE	Laboratory for Laser Energetics
LLNL	Lawrence Livermore National Laboratory
LTS	Large Test Structure
MACS	Modular Autonomous Countering WMD System
MASS	MILSATCOM Atmospheric Scintillation Simulator
MCNP	Monte Carlo N-Particle
MDA	Missile Defense Agency

M&S	Modeling and Simulation
MEEC	Maxwell's Equivalent Equations Circuit
MET	Modernization of Enterprise Terminals
MILSATCOM	Military Satellite Communications
MFK-R	Mobile Field Kit – Radiological
MIL STD	Military Standard
MPAS	Mission Planning and Assessment System
NACT	Nuclear Arms Control Technology
NATO	North Atlantic Treaty Organization
NAVSATCOMMFAC	Naval Satellite Communications Facility
NCNS	National Center for Nuclear Security
NCPC	National Counterproliferation Center
NIF	National Ignition Facility
NLP	Natural Language Processing
nm	nanometer
NM	Nuclear Matters
NMCC	National Military Command Center
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPS	Naval Postgraduate School
NSB	Navy Standardization Board
NSPD	National Security Presidential Directive
NST	New START Treaty
NTNF	National Technical Nuclear Forensics
NTPR	Nuclear Test Personnel Review
NuCS	Nuclear Capability Services
NWE	Nuclear Weapon Effects
NWEN	Nuclear Weapon Effects Network
NWEDS	Nuclear Weapons Effects Database System
NWRM	Nuclear Weapons Related Materiel
OCO	Overseas Contingency Operations
OCONUS	Outside the Continental United States
ODX	Operationally demonstrated/exercised
O&M	Operation and Maintenance
ORNL	Oak Ridge National Laboratory
OSD CAPE	Office of the Secretary of Defense Capability Assessment and Program Evaluation
OSD-NM	Office of the Secretary of Defense, Nuclear Matters Office (in the Office of the Assistant Secret Programs)
OSTP	Office of Science and Technology Policy
PASCC	Project on Advanced Systems and Concepts for Countering WMD
PDCALC	Probability of Damage Calculator
PDV	Product Demonstration Vehicle
PITAS	Photonuclear Inspection and Threat Analysis System

PMESII	Political, Military, Economic, Social, Infrastructure, and Information
PNAF	Prime Nuclear Airlift Forces
PPD	Presidential Policy Directive
PTS	Provisional Technical Secretariat
QDR	Quadrennial Defense Review
R2TD	Rapid Reaction Tunnel Detection
R&D	Research and Development
RadHard	Radiation Hardened
RFIS	Robust Fuzewell Instrumentation System
RHBD	Radiation Hardened by Design
RHM	Radiation Hardened Microelectronics
RL-16	US radionuclide laboratory
R/N	Radiological/Nuclear
ROM	Rough Order of Magnitude
S&T	Science & Technology
SBIR	Small Business Innovative Research
SCSP	Special Operations Command Combating Weapons of Mass Destruction-Terrorism Support Pro
SGEMP	System-Generated Electromagnetic Pulse
SHAMRC	Second-order Hydrodynamic Automatic Mesh Refinement Code
SHAPE	Supreme Headquarters Allied Powers, Europe
SHIST	Seismic Hardrock in Situ Test
SMDC	US Army Space and Missile Development Command
SNL	Sandia National Laboratory
SNM	Special Nuclear Material
SOF	Special Operations Forces
SOX	Standoff Operational Exercise
SPE	Source Physics Experiment
SPG	Short Pulse Gamma
SREMP	Source Region Electromagnetic Pulse
START	Strategic Arms Reduction Treaty
STTR	Small Business Technology Transfer
TACBRD	TransAtlantic Collaboration Biological Resiliency Demo
TB	Test Bed
TEAMS	Technical Evaluation Assessment and Monitor Site
TNF	Technical Nuclear Forensics
TOA	Total Obligation Authority
TOW	Tube-launched, Optically-tracked, Wireless-guided
TPMM	Technology Program Management Model
TRAC	Threat Reduction Advisory Committee
TRL	Technology Readiness Level
TSG	Technical Support Group
TTL	Tag, Track, Locate
TVT	Treaty Verification Technology

TWAC	Targeting and Weaponeering Analysis Cell
TXL	Transportable Xenon Laboratory
UAS	Unmanned Aerial Systems
UCP	Unified Command Plan
UGF	Underground Facility
UGT	Underground Test
UHPC	Ultra-High Performance Concrete
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
VOIP	Voice Over Internet Protocol
WACS	WMD Aerial Collection System
WCF	West Coast Facility
WEP	Weapon Effects Phenomenology
WESC	Weapon Effects Steering Committee
WMD	Weapons of Mass Destruction
WSMR	White Sands Missile Range

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency											Date: February 2016	
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 Initiative*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	179.420	36.607	38.436	35.436	-	35.436	38.408	38.918	39.419	40.185	Continuing	Continuing
RU: **Basic Research for Countering WMD*	179.420	36.607	38.436	35.436	-	35.436	38.408	38.918	39.419	40.185	Continuing	Continuing

Note

*Project RU title changes from Fundamental Research for Combating WMD to Basic Research for Countering WMD beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) Basic Research Initiative funds research across physical, material, engineering, computational, and life sciences directed toward greater knowledge and understanding of the fundamental aspects of observable phenomena associated with weapons of mass destruction (WMD).

The Basic Research Initiative is the Nation's only basic research program solely dedicated to countering weapons of mass destruction (CWMD). It provides for the discovery and development of basic knowledge by research performers comprised from academia and world-class research institutions in government and industry. This investment helps motivate the scientific community to conduct research benefiting WMD-related defense missions, advancing the body of CWMD knowledge, and improving knowledge of research efforts that benefit nonproliferation, counter proliferation, and consequence management efforts. These efforts are closely coordinated with DTRA's Chemical and Biological Technologies Department, which executes a basic research program under DoD's Chemical and Biological Defense Program.

Each year, program and technical managers conduct formal assessments of the portfolio, leveraging deep S&T expertise within DTRA, as well as from the Defense Basic Research Advisory Group, independent external panel reviews, and other CWMD-focused stakeholders. This coordination facilitates unique, CWMD-relevant basic research while eliminating unintended duplication of effort in the broader defense S&T community.

Descriptions of the technical areas covered in DTRA's Basic Research Initiative portfolio are provided in the R-2a exhibit.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency					Date: February 2016
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 Initiative*		
B. Program Change Summary ($ in Millions)	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**
Previous President's Budget	37.778	38.436	38.783	-	38.783
Current President's Budget	36.607	38.436	35.436	-	35.436
Total Adjustments	-1.171	0.000	-3.347	-	-3.347
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.171	-			
• Realignments	-	-	-1.047	-	-1.047
• Economic Assumptions	-	-	-0.285	-	-0.285
• Other Reductions	-	-	-2.015	-	-2.015

Change Summary Explanation

The decrease in FY 2017 from the previous President's Budget submission is balance near term operational needs with future technical developments and capabilities. Other reductions were in support of Departmental efficiencies and economic assumptions. Reductions to the RDT&E portfolio impacted investment in efforts with lower return on investment, lower customer demand, or that were early in the development cycle.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601000BR / *DTRA Basic Research Initiative*	Project (Number/Name) RU / **Basic Research for Countering WMD*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RU: **Basic Research for Countering WMD*	179.420	36.607	38.436	35.436	-	35.436	38.408	38.918	39.419	40.185	Continuing	Continuing

Note

*Project RU title changes from Fundamental Research for Combating WMD to Basic Research for Countering WMD beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Basic Research for Countering WMD project as the nation's only basic research solely dedicated to countering weapons of mass destruction (CWMD), is a core strategic investor in future scientific and technological progress across the full spectrum of Defense Threat Reduction Agency's (DTRA) CWMD 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 Initiative aligns with DTRA's strategic objectives that directly support policy and planning guidance from the Office of the President, the Department of Defense, 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; enhancing nuclear forensics; securing vulnerable materials; developing new verification technologies; 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 Department of Defense (DoD) applications; and leveraging science, technology, and innovation through domestic and international partnerships and agreements. This project solicits, coordinates, and conducts basic research aligned to five Thrust Areas. Each Thrust Area Manager coordinates an independently reviewed portfolio of research projects selected for scientific merit, technical quality, and the potential for innovation.

Thrust Area 1: Science of WMD Sensing and Recognition. This thrust area explores novel methodologies to investigate physical properties of sensitive materials as they interact with phenomena associated with WMD, such as ionizing radiation. This research provides the basis for developing capabilities to discover the presence, identity, and quantity of material or energy in the environment that may be significant, in turn providing the means to develop advanced forensic applications that enable detection, characterization, and attribution, particularly in post-detonation radiative environments.

Thrust Area 2: Network Sciences. This thrust area explores analytical, numerical, computational and other mathematical approaches to model and simulate the behavior of layered, interdependent physical networks affected by WMD. This interdisciplinary, theoretical research provides the basis for developing advanced algorithms and analytical frameworks that accurately predict and depict WMD environments by characterizing impacts and vulnerabilities, representing root causes of cascading failures, and assessing robustness, resilience, restoration, and recovery in varying degrees of disruption.

Thrust Area 3: Science for Protection. This thrust area employs experimental, computational, and theoretical approaches to explore and understand the causal mechanisms and deleterious characteristics of ionizing radiation and the tolerance, response, and resistance characteristics of affected sensitive electronic systems and

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research Initiative*	**Project (Number/Name)** RU / **Basic Research for Countering WMD*

microorganisms. This research provides the basis for engineering resilient systems and technologies, offering radical improvements to the survivability and performance of mission-critical electronic equipment and personnel in hostile radiative environments.

Thrust Area 4: Science to Defeat WMD. Through experimentation and computational modeling and simulation, this thrust area investigates phenomena associated with penetration physics, shock propagation and turbulence dynamics, and researches novel energetic and reactive materials for defeat of targets containing WMD. This research provides the scientific foundation necessary to develop advanced solutions for: (1) accessing WMD in hardened and deeply buried infrastructure, (2) defeating (non-nuclear) targets with minimal unintended collateral effects, and (3) predicting post-detonation (non-nuclear) weapon effects.

Thrust Area 5: Science to Secure WMD. This thrust area leverages a wide range of scientific and mathematical disciplines to explore phenomena related to physical, biological and chemical interactions with radioactive particles and waveforms. This research provides the technical basis for development of innovative, unconventional applications to improve security oversight and control of WMD materials and facilities and to improve monitoring and surveillance systems related to arms control and nonproliferation.

The increase from FY 2015 to FY 2016 maintains the investment in basic research to keep pace with inflation. The decrease from FY 2016 to FY 2017 balances near term operational needs with future technical developments and capabilities. Reductions to the RDT&E portfolio impacted investment in efforts with lower return on investment, lower customer demand, or that were early in the development cycle.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Project RU: Basic Research for Countering WMD	36.607	38.436	35.436
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 2015 Accomplishments:*** - Managed over 150 active basic research awards on a three to five year cycle. The Agency's Basic Research portfolio directly addressed specific priorities on Autonomy, Data to Decisions, Electronic Protection, and Engineered Resilient Systems. - Supported the development of the future Science, Technology, Engineering, and Mathematics workforce by supporting world-class talent in WMD research at universities and laboratories. - Conducted an annual technical review of each grant to assess scientific advancements and progress in meeting technical objectives, and to foster collaboration and build relationships within the scientific community. - Conducted an annual external panel review of the basic research program that was open to DoD research stakeholders. The panel assessed program effectiveness in the context of CWMD technical challenges, and assessed coordination of CWMD basic research across the DoD mission space and the broader basic research community to avoid unintended duplication and ensure successful partnerships. - Developed highly sensitive gravity gradiometer that can detect shielded fissile material and deeply buried structures.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research Initiative*	**Project (Number/Name)** RU / **Basic Research for Countering WMD*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Developed spray-on nanoparticle material that emits near-infrared light when exposed to nuclear radiation and that is detectable with Commercial Off-The-Shelf camera technology. ***FY 2016 Plans:*** - Manage over 150 active basic research awards on a three to five year cycle. The Agency's Basic Research portfolio directly addresses the DoD CWMD S&T priority and supports the specific priorities on Autonomy, Data to Decisions, Electronic Protection, and Engineered Resilient Systems. - Support the development of the future Science, Technology, Engineering, and Mathematics workforce by supporting world-class talent in WMD research at universities and laboratories. - Conduct an annual technical review of each grant to assess the scientific advancements and progress in meeting the award's technical objectives and to foster collaboration and build relationships within the scientific community. - Conduct an annual external panel review of the basic research program that is open to DoD research stakeholders. The review will assess the focus and scope of the program concerning CWMD challenges and assess the coordination of CWMD basic research across the DoD mission space and the broader basic research community to avoid duplication and ensure successful partnerships. ***FY 2017 Plans:*** - Manage over 150 active basic research awards on a three to five year cycle. The Agency's Basic Research portfolio directly addresses the DoD priority on CWMD S&T and supports specific priorities on Autonomy, Data to Decisions, Electronic Protection, and Engineered Resilient Systems. - Support the development of the future Science, Technology, Engineering, and Mathematics workforce by supporting world-class talent in WMD research at universities and laboratories. - Conduct an annual technical review of each grant to assess the scientific advancements and progress in meeting the award's technical objectives and to foster collaboration and build relationships within the scientific community. - Conduct an annual external panel review of the basic research program that is open to DoD research stakeholders. The panel will assess the focus and scope of the program related to CWMD challenges and will assess the coordination of CWMD basic research across the DoD mission space and the broader basic research community to avoid duplication and ensure successful partnerships.			
Accomplishments/Planned Programs Subtotals	36.607	38.436	35.436

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601000BR / *DTRA Basic Research Initiative*	**Project (Number/Name)** RU / **Basic Research for Countering WMD*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• *20/0602718BR: *WMD Defeat Technologies*	-	-	-	-	-	-	-	-	-		

Remarks

*See prior year funds related to this this project in program element number 0602718BR.

D. Acquisition Strategy

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

E. Performance Metrics

Project performance is measured via a combination of statistics including the number of publications generated, number of students trained in sciences and engineering supporting DoD educational goals, number of participating research organizations, and percentage of awards transitioned to other programs for further development.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency											Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	684.895	147.019	152.915	154.857	-	154.857	163.514	165.917	167.419	170.628	Continuing	Continuing
RA: *Information Sciences and Applications*	133.953	26.334	29.432	29.127	-	29.127	33.255	33.513	30.990	31.405	Continuing	Continuing
*RD: *Detection Technologies*	0.000	0.000	25.920	15.936	-	15.936	16.332	16.093	17.586	17.940	Continuing	Continuing
RE: *Counter-Terrorism Technologies*	6.714	0.963	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
*RF: *Forensics Technologies*	165.205	31.403	9.356	10.008	-	10.008	10.274	10.505	10.717	10.933	Continuing	Continuing
RG: *Defeat Technologies*	62.127	12.955	11.769	11.304	-	11.304	11.601	11.864	12.103	12.345	Continuing	Continuing
RI: *Nuclear Survivability*	77.615	20.671	29.383	34.051	-	34.051	34.553	35.261	35.978	36.698	Continuing	Continuing
RL: *Nuclear & Radiological Effects*	98.823	31.666	22.698	28.668	-	28.668	31.146	31.829	32.467	33.120	Continuing	Continuing
RM: *WMD Counterforce Technologies*	67.030	12.750	13.295	12.097	-	12.097	12.375	12.814	13.060	13.323	Continuing	Continuing
**RR: *Countering WMD Test and Evaluation*	52.118	10.277	11.062	13.666	-	13.666	13.978	14.038	14.518	14.864	Continuing	Continuing
***RU: *Basic Research for Countering WMD*	21.310	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.310

Note

*Project RF-Detection and Forensics Technologies subdivided into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.
**Project RR title changes from Combating WMD Test and Evaluation to Countering WMD Test and Evaluation beginning in FY 2017.
***Project RU title changes from Fundamental Research for Combating WMD to Basic Research for Countering WMD beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) WMD Defeat Technologies program element funds the expansion and application of basic scientific knowledge in order to develop novel materials, devices, systems, and methods supporting next generation concepts and technologies that enable 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 2017 Defense Threat Reduction Agency	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*

This Applied Research portfolio is aligned with strategic planning objectives as well as with science and technology (S&T) investment direction which is established annually by DTRA and the US Strategic Command Center for Combating Weapons of Mass Destruction (SCC-WMD). The objectives directly support policy and planning guidance from the Office of the President, the Department of Defense (DoD), and the broader WMD threat reduction community.

The portfolio advances DTRA's Countering WMD (CWMD) mission by balancing the following imperatives: 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 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	151.443	155.415	160.701	-	160.701
Current President's Budget	147.019	152.915	154.857	-	154.857
Total Adjustments	-4.424	-2.500	-5.844	-	-5.844
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.500			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.424	-			
• Realignments	-	-	2.674	-	2.674
• Economic Assumptions	-	-	-1.145	-	-1.145
• Other Reductions	-	-	-7.373	-	-7.373

Change Summary Explanation

The decrease in FY 2017 from the previous President's Budget submission is due to the net effect of increased investment in this program element for the revitalization of CWMD test capabilities, targeting support, and threat forecasting, combined with the transition of full effects modeling technology from applied research (6.2) to advanced technology development (6.3), and the balancing of near term operational needs with future technical developments and capabilities. Other reductions were in support of Departmental efficiencies and economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RA / *Information Sciences and Applications*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RA: *Information Sciences and Applications*	133.953	26.334	29.432	29.127	-	29.127	33.255	33.513	30.990	31.405	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Information Sciences and Applications project develops concepts and technologies in the areas of high-speed information processing, modeling and simulation, signal detection, and data-driven decision analysis in support of the Defense Threat Reduction Agency's (DTRA) technical reachback teams. This project develops and maintains continuously improving collaborative architectures and Chemical, Biological, Radiological, Nuclear and High-yield Explosives (CBRNE) modeling & 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 Weapons of Mass Destruction (CWMD) partners. This effort also provides management and support of the Threat Reduction Advisory Committee. The committee is a senior-level Federal Advisory Committee, which provides independent expert advice on CWMD to the Secretary of Defense through the Under Secretary of Defense for Acquisition, Technology and Logistics, and the Assistant Secretary of Defense4 for Nuclear, Chemical and Biological Defense Matters. This effort also funds the Next Generation Nuclear Professionals (NextGen) activities. This is an outreach effort that encourages collaboration between those currently in the nuclear field and those who are considering entering that field. The effort consists of conferences, working groups, a debate series, publications, international outreach, an online presence, and a Nuclear Scholars effort.

The increase from FY 2015 to FY 2016 is due to increased investment in advanced analytics and modeling and simulation. The decrease from FY 2016 to FY 2017 is due to decreased investment in hazard and effects characterization and technology-driven WMD threat Forecasting.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RA: Information Sciences and Applications	26.334	29.432	29.127
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 2015 Accomplishments:*** - Initiated image processing, multi-INT data fusion, and machine learning projects in collaboration with National Nuclear Security Administration Labs and Office of the Secretary of Defense-Rapid Reaction Technology Office. - Developed and transferred an integrated CBRNE effects analytics capability in support of United States Strategic Command (USSTRATCOM) Mission Planning Analysis System (MPAS). - Developed automated methods to operate DoD/Department of Homeland Security (DHS)/Department of Energy (DOE) radiation particle transport code suite on the DoD high performance computational network. - Developed enhanced geospatial models and synthetic world-wide population simulations supporting more rapid infectious disease forecasting and predictive modeling for Technical Reachback. - Developed automated input capabilities for a nuclear effects technology transfer project that will introduce nuclear effects codes into an OSD-directed campaign analysis model.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RA / *Information Sciences and Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Demonstrated architecture and systems capable of highly automated fusion and dissemination of comprehensive data required to provide real-time global CWMD situational awareness. - Integrated first principle blast and nuclear fallout codes into the DoD/DHS/DOE radiation particle transport code suite. - Implemented design for a common information science and deployment environment, supporting training, operations, and mission support of CBRNE assessment for primary, secondary, and tertiary effects. - Supported the integration of natural language processing applications and configuration management capabilities into the DTRA Experimental Lab and tested for suitability of advanced features into next generation tactical and CWMD cloud architectures. - Supported two training exercises through the Joint Collaborative Analysis Model (JCAM), providing force-on-force simulation and analysis. - Supported the DTRA exploratory development and initial real-time collaborative CBRNE integrated deployment framework. - Conducted strategic analyses and assessments on emerging WMD threats using various strategic research methodologies. - Continued to manage and support the Threat Reduction Advisory Committee.			
FY 2016 Plans: - Participate in an interagency, large-scale testing series of dense gas release. Analyze data and develop models to improve atmospheric hazard predictions to enhance Consequence Management decision support. - Develop environmental degradation parameters of airborne chemical agents to better characterize collateral effects after a strike on a WMD facility. - In support of the USSTRATCOM, develop capabilities to support analysis of higher order effects, such as infrastructure and economic impacts, from nuclear targeting. - Develop high fidelity Force-on-Force (phenomenology and effects) computational modeling and simulation capabilities integrated with real and virtual sensor responses. - Leverage commercial graphical processor technologies to enable near real-time high fidelity radiation transport calculations. - Integrate new first principle high fidelity blast and nuclear fallout codes into the DoD/DHS/DOE radiation particle transport code suite. - Continue to develop and deploy automated methods to consolidate multiple geospatial terrain types into a single virtual globe capable of supporting multiple modeling and simulation platforms. - Build a CWMD sensor framework with the Night Vision Laboratory to enable real-time data fusion of deployed sensors with modeling and simulation tools. - Continue to develop and deploy mobile device-based situational awareness, mission planning, and training tools for the warfighter featuring up-to-date capabilities for route planning, force tracking, and geo-tagging items of interest. - Continue to develop, deploy, and support implementation of faster than real-time analysis code with large scale exercises in support of nuclear physical security threat and vulnerability assessments. - Develop high fidelity radiation detection trainer technologies utilizing mobile devices and augmented reality displays to enable training with virtual radiation source surrogates.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RA / *Information Sciences and Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Sponsor and co-lead CBRNE topics as part of the Defense Advanced Research Projects Agency's XDATA and similar cloud computing challenges supporting the development of new data awareness and large scale anomaly detection capabilities. - Develop CWMD-Situational Awareness and data analysis/anomaly detection technology as part of a DoD Distributed Common Ground/Surface System and Intelligence Community Information Technology Enterprise compliant architectures. - Support advanced research topics including CWMD object-based intelligence, computational reasoning, and knowledge management tool development and testing. - Support research on integration of unclassified and open source data into tools and capabilities supporting "long view" shaping of the CBRNE environment prior to direct integration done in collaboration with the Department of State and Combating Terrorism Technical Support Office. - Support the rapid development of secure software and toolsets through code vulnerability analysis. - Continue activities in support of leveraging evolving Department and commercial cloud capabilities and services. - Continue to develop and mature IT capabilities in support of achieving highly automated fusion and dissemination of comprehensive data necessary for providing global CWMD situational awareness. - Continue to conduct strategic analyses and assessments on emerging WMD threats using various strategic research methodologies. - Bring scientific, technical, and social science faculty/experts together to look into the future and help understand and anticipate WMD capabilities and the technology needed to counter those capabilities. - Continue to manage and support the Threat Reduction Advisory Committee and the NextGen programs.			
FY 2017 Plans: - Initiate development of concepts and explore capabilities for enabling data collection, fusion and analysis supporting the DTRA WMD Technology Threat Forecasting program. - Continue to conduct a large-scale test series in collaboration with interagency on dense gas release and to develop models to improve atmospheric hazard predictions and consequence management. Develop enhancements and modifications to codes supporting analysis of test results. - Continue to develop and integrate a CWMD sensor framework in collaboration with the Night Vision Laboratory and Common CBRN Sensor Interface sponsors (DTRA's Nuclear Technologies and Counterterrorism Technologies Divisions, and the Joint Program Executive Office for Chemical and Biological Defense) to enable real-time data fusion of deployed sensors with modeling and simulation tools. - Continue to develop environmental degradation parameters of airborne non-traditional chemical agents to better characterize collateral effects after a strike on a WMD facility. - Continue to develop high fidelity Force-on-Force (phenomenology and effects) computational modeling and simulation capabilities integrated with real and virtual sensor responses. - Continue to develop and enhance high fidelity radiation detection training applications for use in mobile devices. - Continue to develop augmented reality displays for mobile devices to enable training with virtual radiation source surrogates.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RA / *Information Sciences and Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue to develop data anomaly detection and analysis technology as part of DoD Distributed Common Ground/Surface System and Intelligence Community Information Technology Enterprise-compliant architectures. - Continue to develop enhancements to modeling, simulation, and data architecture capabilities for analysis of higher order effects from nuclear detonation, to include physical infrastructure, political, and economic impacts. - Continue to develop automated methods to consolidate multiple geospatial terrain types into a single virtual globe capable of supporting multiple modeling and simulation platforms. - Continue to develop mobile device-based route planning, force tracking, and geo-tagging applications to support warfighter-unique CWMD missions. - Continue to develop faster-than-real-time analysis code for use in large scale nuclear physical security threat and vulnerability assessments, and conduct independent validation and verification for DoD level accreditation. - Continue to manage and support the Threat Reduction Advisory Committee. The Committee will be completing a top to bottom review of the chemical, biological and nuclear issues on the Korean Peninsula. - Continue Project on Advanced Systems and Concepts for Countering WMD through the Naval Postgraduate School, and grant 20 to 25 research awards that support CWMD efforts. - Continue NextGen activities. The effort will attempt to expand interest in the nuclear enterprise by engaging the French nuclear non-governmental organizations.			
Accomplishments/Planned Programs Subtotals	26.334	29.432	29.127

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	0.250	12.244	11.422	-	11.422	11.323	12.761	13.004	13.266	Continuing	Continuing
• 151/0605502BR: *Small Business Innovation Research*	9.606	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) *RD / *Detection Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
*RD: *Detection Technologies*	0.000	0.000	25.920	15.936	-	15.936	16.332	16.093	17.586	17.940	Continuing	Continuing

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.

A. Mission Description and Budget Item Justification

The Detection Technologies mission is to conduct Research, Development, Test, & Evaluation to 1) identify, develop, and exploit signatures associated with nuclear threat enablers such as nuclear expertise, financing, or unique materials to advance U.S. capabilities to detect and interdict such threats; and 2) locate, identify, and track special nuclear material and improve detection factors such as range, time, sensitivity, or accuracy to enhance Service/Special Mission Unit capabilities. These efforts support Department of Defense (DoD) requirements for countering terrorism, counter/nonproliferation, and homeland defense.

The increase from FY 2015 to FY 2016 is due to the subdivision of Project RF-Detection and Forensics Technologies into Projects RD-Detection Technologies and RF-Forensics Technologies beginning in FY 2016. The decrease from FY 2016 to FY 2017 is due to reduced investment in radiation detection, nuclear threat detection intelligence, surveillance, and reconnaissance technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RD: Detection Technologies	-	25.920	15.936
Description: Project RD develops direct and indirect technologies for the detection of radiation and non-radiative signatures associated with nuclear threats, and to advance warfighter capabilities to rapidly locate, characterize, and counter such threats.			
FY 2016 Plans: - Discover/identify nuclear threat signatures, characteristics, and corresponding detection modalities and collection systems. - Develop algorithms/tools for rapidly and effectively analyzing all-source intelligence to identify nuclear threats. - Prototype systems to remotely monitor small and wide areas that may produce or contain nuclear threats. - Develop algorithms/tools to synthesize the collection and analysis of multiple nuclear threat signatures to improve assessment confidence and cuing of potential nuclear threat events. - Execute robust and operationally relevant testing and evaluation of developmental radiation detection systems to determine and select the best performing technologies and techniques for further development and transition to user groups. - Downselect sensor materials for the most effective/efficient capability and integrate into detection systems. - Downselect detection system algorithms for most effective/efficient processing and integrate into detection systems to improve user capabilities. - Research and develop advanced three-dimensional imaging technologies for high-resolution source characterization and identification to provide new and improved capabilities to detect, locate, identify, and characterize threat materials. - Investigate viability of ultra-low-power, long-duration programmable remote radiation monitoring systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** *RD / *Detection Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Investigate organic semiconductors and photo-detectors to improve detection system performance. ***FY 2017 Plans:*** - Continue to develop technologies to identify and catalogue nuclear threat signatures and characteristics and to formulate corresponding detection modalities and collection systems. - Continue to develop algorithms and tools for rapid analysis of all-source intelligence to identify nuclear threats. - Continue to develop initial technologies and subsystems to remotely monitor small and wide areas that may produce or contain nuclear threats. - Continue to develop algorithms and tools to synthesize the collection and analysis of multiple nuclear threat signatures in order to improve assessment confidence and cuing of potential nuclear threat events. - Continue to test and evaluate developmental radiation detection systems to identify the best performing technologies and techniques for transition to advanced technology development efforts. - Develop technologies for next generation nuclear imaging devices with neutron and dual gamma and neutron imaging capability, enabling warfighters to rapidly pinpoint and identify detected radioisotopes. - Develop technologies enabling interoperable architectures for enhanced, real-time mission analysis and common operational pictures within a shared or distributed area of operations. - Develop techniques and technologies for alternative signature detection, processing, and exploitation methods to detect and locate nuclear threats. - Develop novel detection materials and advanced Helium-3 replacement technologies into prototype radiation detection systems to increase range, sensitivity, and accuracy of detection and enable warfighters to more rapidly locate targeted material. - Develop, integrate, and demonstrate prototype radiation detection algorithms to enhance the range of detectability of targeted material.			
Accomplishments/Planned Programs Subtotals	-	25.920	15.936

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	-	29.893	17.775	-	17.775	17.989	19.047	21.210	21.553	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** *RD / *Detection Technologies*

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RE / *Counter-Terrorism Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RE: *Counter-Terrorism Technologies*	6.714	0.963	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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. See paragraph C. for other program funding.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RE: Counter-Terrorism Technologies	0.963	-	-
Description: Project RE provides research and development (R&D) support to Joint U.S. Military Forces, specifically United States 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, and oversight of counterproliferation R&D resources sent directly to USSOCOM for warfighter-unique counterproliferation technologies. ***FY 2015 Accomplishments:*** - Completed JASON study on Hardened and Deeply Buried Targets (HDBT). Study findings were presented in the "C-WMD/HDBT Game Changer Report" for review by the Department of Defense (DoD) Advanced Capability and Deterrence Panel. JASON is an independent group of scientists which advises the DoD and other federal agencies on science and technology matters that are mainly of a sensitive military nature.			
Accomplishments/Planned Programs Subtotals	0.963	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	105.096	104.284	102.976	-	102.976	105.522	107.530	109.729	111.960	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) *RF / *Forensics Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
*RF: *Forensics Technologies*	165.205	31.403	9.356	10.008	-	10.008	10.274	10.505	10.717	10.933	Continuing	Continuing

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.

A. Mission Description and Budget Item Justification

The Forensics Technologies project develops post-detonation 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 (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 Department of Defense Directive S-2060.04, DTRA serves as the US 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.

The decrease from FY 2015 to FY 2016 is due to the realignment of nuclear threat detection activities into Project RD-Detection Technologies. The increase from FY 2016 to FY 2017 reflects increased investment in nuclear device characterization for forensics and nuclear forensic materials exploitation for attribution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RF: Forensics Technologies	31.403	9.356	10.008
Description: Project RF develops post-detonation 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 2015 Accomplishments: - Transitioned the Man-Portable Detection System, a modular radiation detector kit, to several National Guard Bureau Civil Support Teams. - Transitioned a 3" version of an elpasolite scintillator to a commercial vendor for use in radiation detection devices; commercialization provides a sustainable and affordable supply of new scintillators with combined gamma and thermal neutron detection capabilities to DoD and other federal agencies. - Delivered first iteration prototypes of ultra-low power electronics to an independent performer for testing and evaluation. - Completed initial development of two neutron detection materials as alternatives to Helium-3 neutron detectors. - Completed development of room-temperature high-resolution gamma imaging detector electronics and semiconductor materials. - Completed effort to develop the Mission Planning Tool for operators to design radiological/nuclear search missions based on available equipment, relevant concepts of operation, and anticipated threats. - Completed critical design review for Trace Element Analysis Kit development.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed system requirements review for the next generation Polaris gamma-ray imager (3D Polaris). - Completed experimental campaign for Photon Active Search System in an effort to conclude military utility study of active interrogation technology. - Completed development of the Radiation Signature Tagging, Tracking, and Locating system for remote monitoring of nuclear and radiological sources. - Conducted testing and evaluation of developmental radiation detection systems to determine and select the best performing technologies and techniques for further development and transition to user groups. - Developed, tested, demonstrated, and fielded prototype ground-based sensor capabilities for post-detonation prompt diagnostics under DISCREET OCULUS. - Developed, tested, demonstrated, and fielded (prototype) upgraded technical capabilities for prompt diagnostics, debris collection, sample analysis, and modeling to support technical nuclear forensics conclusions. - Continued to develop advanced three-dimensional imaging technologies for high resolution source characterization and identification to provide new and improved capabilities to detect, locate, and identify threat materials. - Led the interagency MIGHTY SABER 2015 technical nuclear forensics and attribution demonstration and evaluation of DTRA-developed prompt diagnostics and device reconstruction technologies and methodologies.			
FY 2016 Plans: - Accelerate development and evaluate the propagation of prompt diagnostics phenomenology to support the deployment of ground-based sensor capabilities in three US cities for post-detonation prompt diagnostics under the DISCREET OCULUS program. - Develop, test, and demonstrate upgraded technical capabilities for prompt diagnostics, debris collection, sample analysis, modeling to support nuclear device reconstruction, and forensics data to decrease timeline, lower uncertainties, and increase confidence in technical nuclear forensics conclusions.			
FY 2017 Plans: - Develop, test and evaluate new and improved technologies for prompt diagnostics, debris collection, data analysis, debris diagnostics, and technical capability modeling to support nuclear device reconstruction, as well as to decrease timeline, lower uncertainty, and increase confidence in technical nuclear forensics conclusions supporting attribution. - Develop, test, and evaluate new and improved technologies and processes for National Technical Nuclear Forensics validation and verification in order to decrease timeline, lower uncertainty, and increase confidence in technical nuclear forensics conclusions supporting attribution. - Investigate and develop novel concepts enabling radical reductions in the time required to reach target areas, to collect fallout debris and conduct analyses in the field, and to obtain significant forensic results and attribution conclusions. - Investigate and develop techniques and algorithms to analyze, combine and integrate speed-of-light (SoL) and speed-of-sound (SoS) phenomena in an urban environment to increase the effectiveness of nuclear detonation yield determinations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Evaluate and expand current understanding of propagation and transport of prompt diagnostics phenomenologies (SoL, SoS) in an urban environment to support the planned deployment of ground-based sensor capabilities (US Prompt Diagnostics System). - Conduct interagency and international research evaluation events to assess process improvements and identify potential capability gaps in forensic conclusion confidence, timeliness, and accuracy. - Engage with partner nations under appropriate international agreements to improve the understanding of prompt phenomenology, improve modeling tools, and improve sensor technologies. - Expand international collaboration in the area of experiments and modeling in order to improve device reconstruction tools and analysis.			
Accomplishments/Planned Programs Subtotals	31.403	9.356	10.008

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	63.115	38.427	38.540	-	38.540	42.454	43.727	42.518	43.367	Continuing	Continuing
• 121/0605000BR: *WMD Defeat Capabilities*	6.667	7.156	4.568	-	4.568	9.092	8.714	7.782	7.938	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RG / *Defeat Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RG: *Defeat Technologies*	62.127	12.955	11.769	11.304	-	11.304	11.601	11.864	12.103	12.345	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defeat Technologies project 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 Weapons of Mass Destruction (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 Countering WMD (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 the advanced technology development effort under this project. On a limited basis, technology test data is shared with coalition partners.

The decrease from FY2015 to FY2016 is due to reduced investment in next generation CWMD technologies to balance other priorities. The decrease from FY 2016 to FY 2017 is due to further reduced investment in next generation CWMD technologies to balance other priorities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RG: Defeat Technologies	12.955	11.769	11.304
Description: Project RG 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.			
FY 2015 Accomplishments: - Matured classified component testing. - Continued classified integration and component design. - Continued development of access denial and denial-of-use technologies for WMD targets. - Continued development and integration of concepts for exploiting susceptibility of electronics to electromagnetic fields.			
FY 2016 Plans: - Conduct static demonstration of initial capability of access denial and denial-of-use technologies against WMD representative targets. - Complete electronics susceptibility to electromagnetic fields algorithm development and characterization testing. - Downselect electromagnetic source and start system development and integration. - Continue classified component/system design and integration and conduct initial demonstrations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RG / *Defeat Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conduct sub-scale tests to assess capability to accurately measure WMD simulant released in a plume.			
FY 2017 Plans: - Continue classified component/system design and development. - Continue static demonstrations of access denial and denial-of-use technologies against representative WMD threats. - Conduct sub-scale tests of new standoff weapon payloads to defeat chemical and biological warfare targets. - Continue sub-scale tests to assess capability to accurately measure WMD simulant released in a plume. - Continue to develop electromagnetic source to functionally defeat WMD threats.			
Accomplishments/Planned Programs Subtotals	12.955	11.769	11.304

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	29.293	22.489	20.710	-	20.710	22.355	22.752	23.227	23.707	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RI / *Nuclear Survivability*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	77.615	20.671	29.383	34.051	-	34.051	34.553	35.261	35.978	36.698	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Nuclear Survivability project develops innovative technologies for the protection of mission-essential personnel, critical military and national defense capabilities, and associated control and support systems during a nuclear event. Research under this project supports the mission critical systems identified under Department of Defense Instruction 3150.09, Chemical, Biological, Radiological, and Nuclear Survivability Policy. The Defense Threat Reduction Agency is designated by the Department of Defense (DoD) as the center of excellence for electromagnetic pulse (EMP) survivability assessments. The System Vulnerability and Assessment effort develops nuclear assessment capabilities to support operational planning, weapons effects predictions, and strategic system design. This activity also provides the DoD's nuclear design and protection standards for new and existing systems, e.g., command and control facilities and aircraft. Key systems include the Nuclear Command and Control System, the net-centric thin-line, and both military and civilian satellites and associated support systems. The radiation hardened nano-electronics effort develops and demonstrates radiation-hardened, high-performance prototype nano-electronics to meet DoD space and strategic system requirements. 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 Support provides detailed planning related to policy, strategy, objectives, and programmatic integration. This project also supports international collaboration, user groups, and 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.

The increase from FY 2015 to FY 2016 is due to the realignment of system vulnerabilities and assessment activities from Project RL-Nuclear & Radiological Effects to Project RI. The increase from FY 2016 to FY 2017 is due to the net effect of increased investment in system vulnerability and assessment and nuclear weapons effects experimentation and decreased investment in radiation hardening nano-electronics.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RI: Nuclear Survivability	20.671	29.383	34.051
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 2015 Accomplishments: - Completed 32nm Product Demonstration Vehicle. - Completed Program Manager's Handbook for Nuclear Survivability. - Delivered new warm x-ray (10-50 keV) test capability on the Double-Eagle and ZR simulators, in collaboration with Naval Research Laboratory and Sandia National Laboratories. - Initiated a <22nm Rad Hard-by-Design effort.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RI / *Nuclear Survivability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Initiated development of maskless e-beam lithography. - Collaborated with the United Kingdom on EMP research on power grid transformers. - Upgraded the Short Pulse Gamma Facility within the West Coast Facility for hardening and validation of satellite and stockpile subsystems and components. - Explored and validated new pulsed-power neutron and dust test capabilities. - Published survivability standards in support of satellite systems, all air domain effects, and source region electromagnetic pulse environment. ***FY 2016 Plans:*** - Upgrade electron-beam (cold x-ray) test capability at the DTRA West Coast Facility to allow testing at 2X current capability. - Develop innovative techniques to produce 5X improvement in warm x-ray (10-50 keV) test capability for DTRA Double-Eagle simulator. - Perform a System Generated Electro-Magnetic Pulse radiation effects experiment for 2-dimensional code validation on the National Ignition Facility (NIF). - Publish MIL-STD-4023, High-Altitude Electromagnetic Pulse Protection for Maritime Assets and Comprehensive Atmospheric Nuclear Environment military standards. - Update MIL-STD-188-125-1/2, High-Altitude Electromagnetic Pulse Protection for Fixed and Transportable Facilities and Systems. - Update MIL-HDBK-423 High-Altitude Electromagnetic Pulse Protection for Fixed facilities. - Publish Aircraft High Altitude EMP Protection Handbook. - Conduct electromagnetic pulse assessments on defense critical infrastructure for electric power and telecommunications networks. - Update cost estimates to harden methodology protocols for aircraft, missile, and satellite systems. - Transition Single Event Transient research and mitigation from legacy to 32 nanoscale technology nodes. - Initiate a RadHard-by-Design development for less than 22nm commercial technology. - Transition maskless e-Beam lithography from Small Business Innovation Research project to trusted Rad Hard foundry. - Publish Satellite System Nuclear Survivability Protection Military Standard. - Initiate development of Satellite System Nuclear Survivability protection design handbook. - Initiate a low power design using one 1-D gridded design guidelines in a Rad Hard foundry. ***FY 2017 Plans:*** - Complete manufacture of maskless e-beam lithography tool prototype in a trusted foundry. - Develop and integrate the latest human radiation exposure models into current DTRA predictive modeling software. - Develop model to evaluate synergistic effects of nuclear weapon combined injuries. - Develop advanced warm x-ray source concepts. - Develop well-characterized x-ray test environments at the NIF.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RI / *Nuclear Survivability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue to develop a RadHard-by-Design microprocessor with less than 22nm commercial technology. - Evaluate High Altitude Electromagnetic Pulse (HEMP) threat survivability for Aegis Ashore-Poland and satellite communication ground facilities. - Investigate electromagnetic pulse effects on power grid transformers, as part of a collaborative research effort with the United Kingdom on critical civilian and defense infrastructure. - Provide nuclear scintillation expertise to DoD and Service Program Executive Offices (PEOs) to assist in certification of disturbed channel simulators and new survivable satellite communication systems. - Publish a surface/near-surface nuclear weapon environment military standard to assist DoD and Service PEOs. - Publish update to MIL-STD-188-125-1, HEMP Protection for Ground-Based C4I Facilities Performing Critical, Time-Urgent Missions: Part 1 Fixed Facilities. - Publish Nuclear Disturbed Communications Environment Annex to the Consolidated Afloat Networks and Enterprise Services Military Standard to assist DoD and Service PEOs.			
Accomplishments/Planned Programs Subtotals	20.671	29.383	34.051

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	5.328	6.191	6.561	-	6.561	6.658	6.738	6.863	7.002	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	98.823	31.666	22.698	28.668	-	28.668	31.146	31.829	32.467	33.120	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Nuclear and Radiological Effects project develops modeling tools to: support military operational planning, weapon 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.

The decrease from FY 2015 to FY 2016 is due to an administrative realignment of the System Vulnerability and Assessment effort to Project RI-Nuclear Survivability due to the nature of those activities. The increase from FY 2016 to FY 2017 is due to the net effect of increased investment in targeting support and decreased investment in nuclear full effects modeling.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RL: Nuclear & Radiological Effects	31.666	22.698	28.668
Description: Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions. ***FY 2015 Accomplishments:*** - Initiated transition of improved airblast, fallout, fire and Source Region Electromagnetic Pulse models to the DTRA net-centric environment for U.S. Strategic Command (USSTRATCOM) and other nuclear targeting and consequences of execution users. - Initiated implementation of first principle modeling tools for nuclear fire initiation and spread in urban and suburban environments. - Delivered upgraded database of foreign nuclear weapon outputs for Department of Defense and the Military Services. - Developed System Generated EMP simulation codes by adapting physics capabilities of the Maxwell's Equations Equivalent Circuit code and the Improved Concurrent EM Particle-In-Cell high performance computing code. - Developed new magnetosphere experiments using microsatellites (CubeSats) for quantification of the artificial radiation belt formation and decay in order to define the source term for damage and degradation of space assets. - Completed engineering level modeling of the response of airborne systems in nuclear dust clouds, and transitioned the capability to nuclear hardness databases. - Released final draft of MIL-STD-3054 Comprehensive Atmospheric Nuclear Environment Standard (CANES) for review by DoD. - Initiated update of MIL-STD-188-125-1, High Altitude Electromagnetic Pulse Protection for Fixed Facilities. - Performed an electromagnetic pulse assessment study on a warship for the U.S. Navy. - Initiated update of MIL-HDBK-423, High Altitude Electromagnetic Pulse protection for fixed facilities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Improved the Electromagnetic Reliability and Effects Prediction (EMREP) tool by adding a Source Region Electromagnetic Pulse capability. - Investigated EMP effects on power grid transformers, as part of a collaborative research effort with the United Kingdom, on critical civilian and defense infrastructure in support of the Weapons Effects Strategic Collaboration (WESC). ***FY 2016 Plans:*** - Deliver airblast, fallout, fire and Source Region Electromagnetic Pulse models to USSTRATCOM (and other nuclear targeting/ consequences of execution users) for improved nuclear targeting using nuclear effects that have not been considered in the past. - Provide improved foreign nuclear weapon outputs, environment models, and Effects Manual 1 (EM-1) chapters. - Develop System Generated Electromagnetic Pulse simulation codes by adapting physics in the Maxwell's Equations Equivalent Circuit code and the Improved Concurrent Electromagnetic Particle-In-Cell high performance computing code. - Further develop a gold standard database with selected historical nuclear weapon output and effects for use in validation of Nuclear Weapons Effects codes. - Via the Nuclear Weapons Effects Network, continue modeling economic and social consequences of nuclear detonation effects and collateral building damage due to nuclear-induced airblast, assess nuclear dust/debris effects on airborne systems, and model nuclear fire initiation, allowing these considerations to be part of the targeting analyses. - Improve high altitude nuclear effects functionality for use in analyzing satellite and missile defense response to a nuclear environment. - Continue implementation of first principle modeling tools for nuclear fire initiation and spread in urban and suburban environments. ***FY 2017 Plans:*** - Deliver initial nuclear induced fire initiation and spread modeling capability. - Develop nuclear weapons effects tools and analyses for effective targeting, including methods to evaluate the consequences of execution of a given course of action. - Develop enhanced High Altitude Radiation Phenomenology functionality for use on modern computer systems. - Develop initial weapon output spectrum extension required by missile defense systems to ensure critical systems can accomplish their designated missions when exposed to a nuclear weapons environment. - Develop a consistent, state-of-the-art combined effects methodology to ensure critical systems can accomplish their designated missions when exposed to a nuclear weapons environment. - Continue to develop an authoritative source of foreign and historical nuclear weapon outputs to aid in the development of uniform nuclear survivability standards, hardening technologies, and the experimental test capabilities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Maintain a virtual interagency and international coalition combining capabilities of existing government and industry organizations into cohesive "networks" of people, knowledge, and infrastructure to synchronize research and development across the nuclear weapon effects community of interest.			
Accomplishments/Planned Programs Subtotals	31.666	22.698	28.668

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603000BR: *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	0.000	0.000	3.528	-	3.528	1.582	1.617	1.658	1.691	Continuing	Continuing
• 121/0605000BR: *WMD Defeat Capabilities*	-	-	-	-	-	-	-	-	-		

Remarks

See prior year funds related to this this project in program element number 0605000BR.

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of Counter WMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) RM / *WMD Counterforce Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RM: *WMD Counterforce Technologies*	67.030	12.750	13.295	12.097	-	12.097	12.375	12.814	13.060	13.323	Continuing	Continuing

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 DTRA Technical Reachback cell. These activities are critical enablers for the development of advanced CWMD planning tools. 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/frag warhead technology.

The increase from FY 2015 to FY 2016 reflects increased investments in advanced energetics and weapons effects modeling. The decrease from FY 2016 to FY 2017 is due to decreased investment in advanced materials and energetics to balance other priorities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RM: WMD Counterforce Technologies	12.750	13.295	12.097
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 2015 Accomplishments: - Developed Hybrid Enhanced Blast Explosives; demonstrated ability to embed detonator system and disperse along with the fuel to initiate cloud reaction as designed. - Conducted a large-scale test of Hybrid Enhanced Blast Explosives and reactive cases for defeat of biological agents using simulants. - Conducted modeling and testing to optimize and improve reactive case technology for use in Joint Multi-Effects Warhead System, Tube-launched, Optically-tracked, Wireless-guided bunker buster, and Hellfire warheads. - Conducted field tests to support optimization and improve effectiveness of biocidal effect fuels used in explosive formulations, innovative common data methods supporting advanced weapons of mass destruction (WMD) effects modeling, and simulation capabilities for consequence management. - Conducted lab and field tests of two new high explosive formulations for use in Conventional Prompt Global Strike warheads: one optimized for blast/fragmented, one optimized for high speed penetration warheads. - Improved hydrocodes to provide high fidelity capability to model post-detonation energy release from non-ideal detonation and other new advanced energetics systems. - Integrated weapons effects model for blast propagation through bunker walls for inventory weapons into planning tools. - Developed weapons effects debris model from bunker walls subjected to internal detonations with inventory weapons.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conducted testing to validate high fidelity computational methods for predicting progressive collapse analysis of steel buildings. ***FY 2016 Plans:*** - Complete technology gap analysis for chemical/biological source term modeling. - Enhance computational fluid and structure codes for chemical/biological source term modeling. - Conduct component level, small-scale testing for chemical/biological source term modeling. - Develop fast running engineering models for dispersion of chemical/biological agents. - Test modeling of response of mega columns to near-contact charges. - Perform annual cycle of requirements collection, frontier proposals, resource allocation, and technical support through high performance computing. - Develop/demonstrate small-scale Hybrid Enhanced Blast Explosives. - Test/demonstrate Hybrid Enhanced Blast Explosives and reactive cases for simulated biological agent defeat. - Model and test reactive case technologies for Joint Multi-Effects Warhead System and various warheads. - Improve modeling capability for weapon post detonation reaction using reactive case technologies. - Improve modeling capability for agent defeat using novel weapon energetic payloads. - Conduct field tests to support optimization and improve effectiveness of explosive formulations for chemical, biological, radiological, and nuclear agent defeat. - Conduct lab and field tests of two new explosive formulations tailored (temperature, pressure, and outgases) for WMD defeat operations. ***FY 2017 Plans:*** - Demonstrate upgraded Hybrid Enhanced Blast Explosives for improved agent defeat capability. - Complete medium-scale testing of a new combined effects weapon case that provides enhanced blast and reactive fragments. - Complete scaled testing of two new explosive formulations tailored (temperature, pressure, and outgases) for WMD defeat operations. - Complete calculations and tests to develop agent defeat weapon effects models, to include phenomena and events such as dynamic pressure/fragment, agent release, thermal effects and defeat, particle shattering, agent dispersion, combustion modeling and agent fate. - Complete calculations and tests to develop hardened structure weapon effects models, to include phenomena and events such as dynamic pressure, blast propagation through failing walls, blast and fragmentation on structural elements, multi-hit penetration in high-strength concrete, bunker collapse, blast and debris environment from embedded detonation, and penetration mechanics in ultra-high performance concrete. - Complete high performance computing (HPC) requirements collection, HPC modernization program frontier proposal submission, and HPC resource allocation for improved WMD defeat modeling.			
Accomplishments/Planned Programs Subtotals	12.750	13.295	12.097

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	27.099	20.717	23.138	-	23.138	26.057	24.939	24.299	24.721	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) **RR / *Countering WMD Test and Evaluation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
**RR: *Countering WMD Test and Evaluation*	52.118	10.277	11.062	13.666	-	13.666	13.978	14.038	14.518	14.864	Continuing	Continuing

Note

**Project RR title changes from Combating WMD Test and Evaluation to Countering WMD Test and Evaluation beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Countering WMD Test and Evaluation project provides a unique national test bed capability for simulated Weapons of Mass Destruction (WMD) facility characterization, weapon-target interaction, and WMD facility defeat testing. The test bed facility provides structured and systematic end-to-end test event planning, preparation, management, execution, and data analysis. The test bed 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 facility leverages fifty 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 Department of Defense (DoD) and supports the counterproliferation pillar of the National Strategy to Counter WMD.

The increase from FY 2015 to FY 2016 is due to increased investment in test and technology support and the national test bed. The increase from FY 2016 to FY 2017 is due to increased investment in test and technology support to revitalize DTRA's CWMD test and evaluation capability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RR: Countering WMD Test and Evaluation	10.277	11.062	13.666
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 2015 Accomplishments: - Continued CWMD testing/demonstration at Nevada National Security Site to defeat credible and threat-based scenarios; continue with transition into several related projects/planned events through FY 2017. - Continued technical and testing development and demonstration of TransAtlantic Collaboration Biological Resiliency Demo, a DoD capability to shape interagency approach to counter a wide area biological event impacting U.S. and partner nations' key civilian/military infrastructure. - Continued testing in support of "Speed of Sound" nuclear forensics activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** **RR / *Countering WMD Test and Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Supported revitalized Weapons Effects Phenomenology efforts supporting DTRA test activities. - Continued testing in support of the Treaty Verification Technology program and Source Physics Experiment to support Comprehensive Test Ban Treaty initiatives, New START warhead verification, and detection and verification of biological and chemical weapons. - Continued support of WMD sensor testing at the Technical Evaluation Assessment and Monitor Site to detect and prevent nuclear grade material from entering the United States, U.S. territories, and Allied Nations through air, rail, and ship ports. - Continued testing chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) sensors, WMD countermeasures, remote geological sensing, and battle management systems designed for surveillance and tracking targets used for WMD activities. - Continued nuclear detection and forensics testing to prevent weapons grade material/dirty bombs from entering the United States, U.S. territories, and Allied Nations. - Continued environmental test bed remediation and compliance activities at the Nevada National Security Site, White Sands Missile Range, and Kirkland AFB in accordance with Environmental Protection Agency (EPA), safety, and environmental guidelines. Defer major demolition and restoration efforts of major test articles while ensuring they are safely closed and sealed at acceptable standards. - Maintained current inventory of infrastructure and instrumentation, extending the life-cycle of these items as long as possible to ensure test beds meet customers' advanced technology testing needs.			
FY 2016 Plans: - Begin testing at Nevada National Security Site in support of the nonproliferation portion of the National Center for Nuclear Security portfolio. - Conduct CWMD testing/demonstration at Nevada National Security Site to defeat credible and threat-based scenarios with transition into several related projects/planned events. - Continue technical and testing development/support of Transatlantic Collaborative Biological Resiliency Demonstration, a DoD capability to shape interagency approach to counter a wide area biological event impacting U.S. and partner nations' key civilian/ military infrastructure. - Perform testing in support of Treaty Verification Technology program and Source Physics Experiment to support Comprehensive Test Ban Treaty initiatives. - Continue support of WMD sensor testing at the Technical Evaluation Assessment and Monitor Site to detect and prevent nuclear grade material from entering the United States, U.S. territories, and Allied Nations through air, rail, and ship ports. - Test chemical, biological, radiological, nuclear and high explosive (CBRNE) sensors, WMD countermeasures, remote geological sensing, and battle management systems designed for surveillance and tracking targets used for WMD activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** **RR / *Countering WMD Test and Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conduct environmental remediation and compliance activities at the Nevada National Security Site, White Sands Missile Range, and Kirtland AFB in accordance with Environmental Protection Agency, safety, and environmental guidelines. Secure major demolition and restoration efforts of major test articles while ensuring they are safely closed and sealed at acceptable standards. - Continue to maintain current inventory of infrastructure and instrumentation, extending the life-cycle of these items as long as possible, to ensure test beds meet customers' advanced technology testing needs. - Continue to document, prioritize, and support test infrastructure requirements. - Conduct collection campaigns with interagency participation specific to relevant CWMD data collection requirements. ***FY 2017 Plans:*** - Develop and test CBRNE sensors, WMD countermeasures, remote geological sensing, and battle management systems designed for surveillance and tracking of WMD targets. - Continue to develop technical and testing capabilities in support of the Transatlantic Collaborative Biological Resiliency Demonstration, a DoD effort to shape interagency approaches to counter a wide area biological event. - Continue testing at the Nevada National Security Site in support of the nonproliferation portion of the National Center for Nuclear Security portfolio. - Continue WMD sensor testing at the Technical Evaluation Assessment and Monitoring site to develop capabilities for detection of nuclear grade material. - Conduct Special Project CWMD testing and demonstrations at the Nevada National Security Site to defeat credible and threat-based scenarios with transition into several related projects/planned events. - Continue environmental remediation and compliance activities at New Mexico and Nevada test sites to meet federal and state environmental guidelines. Remediate major test articles within acceptable standards. - Conduct collection campaigns with interagency participation specific to warfighter CWMD data requirements. - Design diagnostics and instrumentation in support of the Department of Energy and National Laboratories Treaty Verification Technology program and Source Physics Experiment to support Comprehensive Test Ban Treaty initiatives. - Provide required test planning, design, execution, and reporting to ensure the successful execution of the DTRA Agent Defeat Warfighter Capability Strategic Initiative. - Reconstitute and sustain the current inventory of research, development, test and evaluation infrastructure and instrumentation.			
Accomplishments/Planned Programs Subtotals	10.277	11.062	13.666

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** **RR / *Countering WMD Test and Evaluation*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	12.150	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of CWMD technologies selected for transition to advanced technology development (6.3) and advanced component development and prototypes (6.4).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *WMD Defeat Technologies*	Project (Number/Name) ***RU / *Basic Research for Countering WMD*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
***RU: *Basic Research for Countering WMD*	21.310	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.310

Note

***Project RU title changes from Fundamental Research for Combating WMD to Basic Research for Countering WMD beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Basic Research for Countering Weapons of Mass Destruction (CWMD) project conducts technology reviews of the Defense Threat Reduction Agency's (DTRA's) Basic Research Program to identify promising emerging science with potential to be matured into CWMD technologies. The advancement of technology and science into applied technology development efforts focuses upon increasing the stability and utility of mid-to-long term, moderate risk but high payoff science, and emerging technologies for transition to other DTRA applied technology programs. This effort serves as the bridge between the bench scientist and the applied technologist.

Activities in this project are complete.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RU: Basic Research for Countering WMD	0.000	-	-
Description: This project provides (1) strategic studies to support the Department of Defense (DoD), (2) decision support tools and analysis to support CWMD research and development investments, and (3) early applied research for technology development. ***FY 2015 Accomplishments:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 1/0601000BR: *DTRA Basic Research Initiative*	36.607	38.436	35.436	-	35.436	38.408	38.918	39.419	40.185	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602718BR / *WMD Defeat Technologies*	**Project (Number/Name)** ***RU / *Basic Research for Countering WMD*

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 Department of Energy National Laboratories.

E. Performance Metrics

Project performance is measured via a combination of statistics including the number of publications generated, number of students trained in sciences and engineering supporting DoD's educational goals, number of participating research organizations, and the percentage of participating universities on the U.S. News & World Report "Best Colleges" list. Additional performance indicators include the publication of an annual basic research technical and external programmatic review report. Each study/project will commence within three months of customer's requests and results delivered within three months of completion.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency											Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	1,111.083	287.903	290.310	266.444	-	266.444	259.490	265.359	269.287	274.594	Continuing	Continuing
RA: *Information Sciences and Applications*	21.282	0.250	12.244	11.422	-	11.422	11.323	12.761	13.004	13.266	Continuing	Continuing
*RD: *Detection Technologies*	0.000	0.000	29.893	17.775	-	17.775	17.989	19.047	21.210	21.553	Continuing	Continuing
RE: *Counter-Terrorism Technologies*	446.219	105.096	104.284	102.976	-	102.976	105.522	107.530	109.729	111.960	Continuing	Continuing
*RF: *Forensics Technologies*	293.702	63.115	38.427	38.540	-	38.540	42.454	43.727	42.518	43.367	Continuing	Continuing
RG: *Defeat Technologies*	65.774	29.293	22.489	20.710	-	20.710	22.355	22.752	23.227	23.707	Continuing	Continuing
RI: *Nuclear Survivability*	32.580	5.328	6.191	6.561	-	6.561	6.658	6.738	6.863	7.002	Continuing	Continuing
RL: *Nuclear & Radiological Effects*	-	0.000	0.000	3.528	-	3.528	1.582	1.617	1.658	1.691	Continuing	Continuing
RM: *WMD Counterforce Technologies*	104.036	27.099	20.717	23.138	-	23.138	26.057	24.939	24.299	24.721	Continuing	Continuing
**RR: *Countering WMD Test and Evaluation*	1.902	12.150	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
RT: *Target Assessment Technologies*	145.588	45.572	56.065	41.794	-	41.794	25.550	26.248	26.779	27.327	Continuing	Continuing

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.
**Project RR title changes from Combating WMD Test and Evaluation to Countering WMD Test and Evaluation beginning in FY 2017.

A. Mission Description and Budget Item Justification

The Defense Threat Reduction Agency (DTRA) Counterproliferation Initiatives - Proliferation, Prevention, and Defeat program element funds the development and testing of subsystems and components for integration into prototype systems with the potential to transition into mature, state-of-the-art weapons of mass destruction (WMD) surveillance, detection, defeat, prevention, nonproliferation, counterproliferation, consequence management, and treaty verification capabilities.

The Counterproliferation Initiatives - Proliferation, Prevention, and Defeat portfolio is aligned with strategic planning objectives as well as with science and technology (S&T) investment direction which is established annually by DTRA and the US Strategic Command Center for Combating Weapons of Mass Destruction (SCC-WMD).

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*

The objectives directly support policy and planning guidance from the Office of the President, the Department of Defense (DoD), and the broader WMD threat reduction community.

The portfolio advances 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	291.694	290.654	283.236	-	283.236
Current President's Budget	287.903	290.310	266.444	-	266.444
Total Adjustments	-3.791	-0.344	-16.792	-	-16.792
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.791	-			
• Realignments	-	-	-10.600	-	-10.600
• FFRDC & Economic Assumptions	-	-0.344	-2.155	-	-2.155
• Other Reductions	-	-	-4.037	-	-4.037

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: RG: *Defeat Technologies*		
Congressional Add: *Technology Solutions Supporting Operations in Subterranean Environments*	8.000	-
Congressional Add Subtotals for Project: RG	8.000	-
Congressional Add Totals for all Projects	8.000	-

Change Summary Explanation

The decrease in FY 2017 from the previous President's Budget submission is due to the net effect of the transition of full effects modeling technology from applied research (6.2) to advanced technology development (6.3), decreased investment in detection technologies in (6.3) to fund increased investment in targeting support, and threat forecasting in (6.2). This is part of an overall Agency rebalancing of near term operational needs with future technical developments and

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603160BR *I Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*

capabilities. Other reductions were in support of Departmental efficiencies, Federally Funded Research and Development Centers (FFRDC), and economic assumptions. Reductions to the RDT&E portfolio impacted investment in efforts with lower return on investment, lower customer demand, or that were early in the development cycle.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	Project (Number/Name) RA / *Information Sciences and Applications*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RA: *Information Sciences and Applications*	21.282	0.250	12.244	11.422	-	11.422	11.323	12.761	13.004	13.266	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Information Sciences and Applications project provides technical expertise and reach-back 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.

The increase from FY 2015 to FY 2016 is due to the realignment of funding for Technical Reachback from Project RM to Project RA-Information Sciences and Applications. The decrease from FY 2016 to FY 2017 is due to the net effect of increased investment in hazard and effects characterization and decreased investment in technical reachback.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RA: Information Sciences and Applications	0.250	12.244	11.422
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 2015 Accomplishments: - Provided for upward obligation adjustments supporting contract closeout efforts.			
FY 2016 Plans: - Continue development of global synthetic population and activity database for modeling secondary and tertiary effects using agent-based, socially coupled simulations to enable rapid modeling of infectious disease propagation and impacts of population behaviors and movement after a WMD event. - Develop detailed models of specified nuclear facilities to analyze vulnerabilities and estimate hazards.			
FY 2017 Plans: - Continue to develop the global synthetic population and activity database for modeling infectious disease propagation and impacts of population behaviors and movement after a WMD event. - Continue to develop detailed models of specified nuclear facilities to analyze vulnerabilities and estimate hazards.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RA / *Information Sciences and Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Enhance 64-bit version of CWMD modeling and simulation planning tools for analysis of large data sets.			
Accomplishments/Planned Programs Subtotals	0.250	12.244	11.422

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	26.334	29.432	29.127	-	29.127	33.255	33.513	30.990	31.405	Continuing	Continuing
• 151/0605502BR: *Small Business Innovation Research*	9.606	-	-	-	-	-	-	-	-	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	Project (Number/Name) *RD / *Detection Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
*RD: *Detection Technologies*	0.000	0.000	29.893	17.775	-	17.775	17.989	19.047	21.210	21.553	Continuing	Continuing

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.

A. Mission Description and Budget Item Justification

The Detection Technologies project continues research formerly conducted under project RF. This project develops, integrates and transitions advanced concepts, technologies and subsystems enabling enhanced nuclear and radiological location, identification, and tracking capabilities. Leveraging gains made in applied research efforts, this project produces advancements in range, process time, sensitivity and accuracy. In addition, this project continues the development of novel concepts and technologies enabling the identification and exploitation of non-radiation based signatures associated with nuclear threats (e.g., transportation of nuclear materials, patterns of activity, or unique materials).

The increase from FY 2015 to FY 2016 is due to the subdivision of Project RF-Detection and Forensics Technologies into projects RD-Detection Technologies and RF-Forensics Technologies beginning in FY 2016. The decrease from FY 2016 to FY 2017 is due to decreased investment in radiation detection and nuclear threat detection intelligence, surveillance and reconnaissance technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RD: Detection Technologies	-	29.893	17.775
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 2016 Plans: - Analyze nuclear threat signatures to improve or integrate their collection into sensor systems. - Integrate nuclear threat analysis algorithms into existing systems to test and evaluate their effectiveness in reducing processing time. - Demonstrate, test, and field systems to remotely monitor small and wide areas which may produce or contain nuclear threats. - Design and fabricate prototype passive detection systems for determining the location and signature of nuclear material and test and characterize developmental prototype passive detection systems. - Improve performance of new detector materials; imaging and spectroscopy systems; and signals analysis methods through rigorous laboratory and field testing. - Integrate advances in materials science into lightweight, high-resolution radiation spectrometers for use in field operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RD / *Detection Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Transition near-term technologies to generate prototypes and design packages that will assist operational users. - Conduct advanced/operational testing and evaluation of radiation detection systems to assess their performance. - Develop and build a new high resolution detector with reduced weight and improved form factors that can be concealed in container consistent with the operational environment. - Integrate new cellular technology into the Radiological/Nuclear (R/N) search network to ensure rapid flow of data from detectors. - Exploit the prototype testing of Oak Ridge National Laboratory to develop an operationally useful roadside detector capable of detecting nuclear material in moving vehicles. - Test and evaluate the integration of high resolution detectors with lower resolution detectors to determine the potential to meet threshold R/N detection requirements. ***FY 2017 Plans:*** - Continue to develop and integrate nuclear and radiological signature collections into new sensor systems. - Continue to integrate nuclear threat analysis algorithms into existing systems in order to evaluate accuracy and effectiveness in reducing process time. - Continue to demonstrate, test, and transition systems that remotely monitor nuclear and radiological threat signatures in small and wide areas. - Continue to develop high-fidelity radiation test objects supporting advanced assessment capabilities in order to improve radiation detection prototypes. - Continue to develop, test, and evaluate a hand-held radiation monitor replacement providing radioisotope identification capability and real-time information feed. - Develop and deploy devices enabling low cost operational testing and evaluation of radiation signature detectors against mock special nuclear material sources of interest. - Develop and integrate interoperable systems enabling a true common operational picture among nuclear and radiological search teams, across platforms, and within shared or distributed areas. - Test and evaluate new radiation detection technologies in order to validate capabilities, improve prototypes, and provide required performance data to support follow-on development. - Test and evaluate an operational high resolution gamma-ray imager suited for multiple mission sets to support integration with next generation nuclear imaging systems. - Simulate and evaluate loose nuke scenarios in order to validate nuclear threat mitigation plans developed by Department of Defense and civilian users.			
Accomplishments/Planned Programs Subtotals	-	29.893	17.775

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RD / *Detection Technologies*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	-	25.920	15.936	-	15.936	16.332	16.093	17.586	17.940	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RE: *Counter-Terrorism Technologies*	446.219	105.096	104.284	102.976	-	102.976	105.522	107.530	109.729	111.960	Continuing	Continuing

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 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; (2) USSOCOM CWMD-T Support 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.

The decrease from FY 2015 to FY 2016 is due to the deferment of lower priority projects until further maturation in the technology readiness level. The decrease from FY 2016 to FY 2017 is due to reduced investment in next generation CWMD technologies to balance other priorities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RE: Counter-Terrorism Technologies	105.096	104.284	102.976
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 2015 Accomplishments:*** - Continued planned development and transition of new counterproliferation technologies for Joint U.S. Military Forces to counter WMD, enabling warfighters to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities. - Continued work on successive multi-year efforts to develop high fidelity test articles and enhanced electronic test objects for the Explosive Ordnance Disposal (EOD) Device Defeat. - Developed impeded tools for IED triggers. - Continued to support Combatant Commanders' planning efforts related to countering terrorist use of Weapons of Mass Destruction (CWMD-T). - Continued multi-year efforts to develop and transition innovative CWMD tools designed to locate, identify, characterize, assess, and attack WMD production and storage facilities with minimal-to-no collateral damage or loss of life. - Developed precision shaped charges using a proven manufacturing process through the use or modification of an existing shaped charge design.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Transitioned next generation imaging technologies to allow EOD forces advanced diagnostic capabilities. - Completed evaluation of a baseline system for extracting events related to WMD pathway models. This system will support Natural Language Processing and Machine Reading capabilities for knowledge discovery in the data/information pipeline for Combatant Command CWMD analysis and planning. - Developed Streaming Cloud Analytics Platform (SCALPL) for WMD Pathway model viewing and extraction of information to the knowledge base--integration into the system awaits Information Assurance approval for deployment on the Joint Worldwide Intelligence Communications System (JWICS). - Established collaborative development of the Dynamic Picture of the Operating Environment (DPOE) using the DTRA Experimental Lab (DEL) as the testbed for unclassified systems evaluation through a remotely accessible virtual private network. - Initiated development of a Bayesian Network model to predict intention by non-state actors to use chemical or biological weapons.			
FY 2016 Plans: - Continue other planned development and transition of new counterproliferation technologies for Joint U.S. Military Forces to counter WMD, enabling warfighters to improve their ability to detect, disable, interdict, neutralize, and destroy chemical, biological, and nuclear production, storage, and weaponization facilities. - Continue work on successive multi-year efforts to develop high fidelity test articles and enhanced electronic test objects for EOD Device Defeat. - Develop tools used to impede IED triggers and conduct render safe diagnostics validation tests on emergent threat articles. - Continue to support Combatant Commanders' planning efforts related to CWMD-T - Continue multi-year efforts to develop and transition innovative CWMD tools designed to locate, identify, characterize, assess, and attack WMD production and storage facilities with minimal-to-no collateral damage or loss of life. - Build precision shaped charges using a proven manufacturing process through the use or modification of an existing shaped charge design. - Transition next generation imaging technologies to allow EOD forces advanced diagnostic capabilities. - Begin exploration and application of techniques to extract information from audio, photographic, and videographic files. - Apply rational choice and game theory constructs to prototype advanced Bayesian models.			
FY 2017 Plans: - Integrate enhancements in Natural Language Processing and Machine Reading capabilities into JWICS knowledge management and planning tools. - Integrate, test and deploy socio-cultural and behavioral factor data into the Intent Model to enhance threat prediction capabilities. - Develop applications enabling seamless information sharing between the USSOCOM CWMD Support Program (SCSP) and other intelligence agency databases.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RE / *Counter-Terrorism Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Develop customizable dashboards displaying user-driven data displays and functionality on the SCSP JWICS portal. - Continue to support Combatant Command exercises and planning events in order to enhance existing SCSP tools and databases, and to identify and validate new requirements. - Continue to monitor and collaborate with other agencies, such as the Defense Advanced Research Projects Agency and the Intelligence Advanced Research Projects Agency, on advanced analytics technologies.			
Accomplishments/Planned Programs Subtotals	105.096	104.284	102.976

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	0.963	-	-	-	-	-	-	-	-	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RF / *Forensics Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
*RF: *Forensics Technologies*	293.702	63.115	38.427	38.540	-	38.540	42.454	43.727	42.518	43.367	Continuing	Continuing

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016.

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 US 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; (3) nuclear forensic materials exploitation for attribution.

The decrease from FY 2015 to FY 2016 in Project RF is due to the realignment of nuclear threat detection activities into Project RD-Detection Technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RF: Forensics Technologies	63.115	38.427	38.540
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; (3) technologies to detect, locate, identify, track, and interdict nuclear and radiological threats, including enablers to their acquisition and development.			
FY 2015 Accomplishments: - Identified all-source nuclear threat signatures, characteristics, and corresponding detection modalities; continued the identification and development of the proper tipping, queuing, and data fusion techniques and algorithms to enable the rapid and effective accumulation of all-source intelligence on nuclear threat scenarios. - Designed and fabricated prototype passive detection systems for determining the location and signature of nuclear material; test and characterize developmental prototype passive detection systems. - Initiated integration of recent advances in materials science into lightweight, high-resolution radiation spectrometers for use in field operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Developed, demonstrated, and fielded methods to remotely monitor small and wide areas which may contain nuclear threats. - Developed advanced three-dimensional imaging technologies for high resolution source characterization and identification to provide new and improved capabilities to detect, locate, identify, and characterize threat materials. - Initiated transition of multiple near term technologies to generate prototypes and design packages to assist operational users. - Conducted advanced and operational testing and evaluation of radiation detection systems. - Initiated design, development, and fabrication of new radiological test objects. - Improved performance of new detector materials, imaging and spectroscopy systems, and signals analysis methods through rigorous laboratory and field testing. - Developed, tested, evaluated, and delivered software tools and capabilities to locate and identify the signatures of Special Nuclear Materials on both existing and newly developed hardware platforms. - Continued development, accelerate development where appropriate, demonstrate, and field methods to remotely monitor small and wide areas which may contain nuclear threats. - Developed, tested, demonstrated, and fielded prototype ground-based sensor capabilities for post-detonation prompt diagnostics under DISCREET OCULUS. - Completed installation of prompt diagnostics systems in a second U.S. city. - Continued to develop, test, demonstrate, and field (prototype) upgraded technical capabilities for prompt diagnostics, debris collection, sample analysis, modeling to support nuclear device reconstruction, and forensics data to decrease timeline, lower uncertainties, and increase confidence in technical nuclear forensics conclusions. - Continued near-source strong-motion small-scale tests and high fidelity analyses for detection and identification of low yield and evasive testing. - Developed modular prototype using advanced materials for particulate and gaseous radionuclides detection of evasive testing in support of U.S. and international treaty monitoring requirements. - Provided science and technology development to support onsite inspections. - Transitioned wide area search modular prototypes into an operational configuration to replace the current systems. - Transitioned software improvements to current R/N detector technologies. - Transitioned selected ship search capabilities into an operational configuration for fielding to the Technical Support Groups. - Continued to enhance Countering WMD (CWMD) network technologies by exploiting the operational advantages of DoD's cellular communications program. - Continued to expand non-radiological sensor support for R/N search operations. - Expanded the development of CWMD/Technical Support Group training technologies for R/N search equipment. - Completed the documentation for a JROC approved Radiological/Nuclear modernization program. - Selected a wide area search modular design and developed the operational configuration to replace the current systems. - Implemented 1st generation software improvements to current R/N detector technologies.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed final operational configuration for ship search detectors and initiated maritime evaluation for final fielding decision.			
FY 2016 Plans:			
- Complete development, test, demonstration, and fielding of prototype ground-based sensor capabilities in three U.S. cities for post-detonation prompt diagnostics under DISCREET OCULUS.			
- Continue to develop, test, demonstrate, and field (prototype) upgraded technical capabilities for prompt diagnostics, debris collection, sample analysis, modeling to support nuclear device reconstruction, and forensics data to decrease timeline, lower uncertainties, and increase confidence in technical nuclear forensics conclusions.			
- Continue to develop tools based on near-source small-scale strong-motion science to assist detection and characterization of low yield and evasive testing.			
- Conduct additional laboratory experiments with lasers to assess shock/seismic signatures from underground nuclear tests.			
- Develop international technical partnership for high explosive test calibration of seismic and infrasound elements of international monitoring stations.			
- Develop and flight-certify a modular prototype using advanced materials and techniques to collect and detect gaseous radionuclide signatures of evasive nuclear testing.			
- Develop long-term, optimal, integrated and operational solutions to detect, collect, and analyze gas and radionuclide signatures of nuclear testing.			
- Develop prototype cosmic-ray muon imaging solution for standoff detection of nuclear warheads in storage or deployed on strategic launch and delivery systems that could lead to adoption of this technology for verification of future Strategic Arms Reduction Treaties.			
- Validate alternate signatures of nuclear weapons testing and develop measurement techniques.			
- Evaluate advanced methods to better integrate the collection, detection, and analysis of low-yield or evasive nuclear weapons testing signatures.			
- Provide technical support for implementation and compliance with the Open Skies Treaty.			
- Develop infrastructure and capability for iterative testing, refinement, and integration of national monitoring capabilities.			
- Test and evaluate prototype version of the Knowledge Management Strategic Information System software for future Strategic Arms Reduction Treaty and other treaty database and notification needs.			
- Enhance the on-site inspection system and virtual training tool with additional operational scenarios for nuclear materials production monitoring in support of the Fissile Material Cutoff Treaty and the Army nuclear disablement/elimination mission.			
- Stand up National Monitoring and Verification test-bed ensemble for iterative tool and method testing and refinement.			
FY 2017 Plans:			
- Complete initial operational assessment of advanced prompt diagnostics for ground-based sensor prototype systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Complete plans and carry out associated acquisition activities for the transition of advanced prompt diagnostics sensor prototype systems to the US Prompt Diagnostics System. - Demonstrate advanced technologies for the collection of alternative nuclear detonation signatures, such as electromagnetic pulse and transient ionospheric disturbances, to detect and locate clandestine nuclear testing. - Demonstrate advanced technologies for cosmic ray, muon-excited remote counting of nuclear warheads in delivery vehicles and in storage, supporting treaty monitoring and verification. - Develop, test and demonstrate a portable ground-based sensor prototype for post-detonation prompt diagnostics under DISCREET OCULUS. - Develop, test and demonstrate enhanced prototype technologies for prompt diagnostics, debris collection, data analysis, debris diagnostics, and technical capability modeling to support nuclear device reconstruction and attribution, as well as to decrease timeline, lower uncertainty, and increase confidence in technical nuclear forensics conclusions supporting attribution. - Develop, test and demonstrate enhanced prototype technologies to support validation and verification processes and capabilities in order to decrease timeline, lower uncertainty, and increase confidence in technical nuclear forensics conclusions supporting attribution. - Develop, evaluate and demonstrate surrogate debris materials used in validation and verification technologies and in field and fixed laboratory analytic processes. - Develop advanced radionuclide gas collection technologies in support of counterproliferation and compliance verification for the Non-Proliferation Treaty and the Comprehensive Test Ban Treaty. - Develop advanced technologies to detect and monitor for low-yield nuclear tests, including novel techniques for collecting and observing material emissions and source region seismic signatures. - Continue to develop new prompt diagnostic technologies to improve sensor portability, with emphasis on size, weight and power consumption reduction, and on expanded operational capability. - Prepare and conduct an interagency technology demonstration of end-to-end nuclear forensics capabilities. - Prepare an international technical demonstration of post-detonation nuclear forensics research and development capabilities. - Coordinate with partner nations to improve global US nuclear forensics and attribution capabilities, under appropriate international agreements. - Integrate nuclear threat analysis algorithms into existing systems to test and evaluate their effectiveness in reducing processing time. - Demonstrate, test, and field systems to remotely monitor small and wide areas which may produce or contain nuclear threats. - Design and fabricate prototype passive detection systems for determining the location and signature of nuclear material and test and characterize developmental prototype passive detection systems. - Transition near-term technologies to generate prototypes and design packages that will assist operational users. - Conduct advanced/operational testing and evaluation of radiation detection systems to assess their performance.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** *RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Develop and build a new high resolution detector with reduced weight and improved form factors that can be concealed in container consistent with the operational environment. - Integrate new cellular technology into the R/N search network to ensure rapid flow of data from detectors. - Test and evaluate the integration of high resolution detectors with lower resolution detectors to determine the potential to meet threshold R/N detection requirements.			
Accomplishments/Planned Programs Subtotals	63.115	38.427	38.540

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	31.403	9.356	10.008	-	10.008	10.274	10.505	10.717	10.933	Continuing	Continuing
• 121/0605000BR: *WMD Defeat Capabilities*	6.667	7.156	4.568	-	4.568	9.092	8.714	7.782	7.938	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RG / *Defeat Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RG: *Defeat Technologies*	65.774	29.293	22.489	20.710	-	20.710	22.355	22.752	23.227	23.707	Continuing	Continuing

A. Mission Description and Budget Item Justification

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

The decrease from FY 2015 to FY 2016 is due to the relative effect of the increased investment in FY 2015 as a result of the Congressional Add for Technology Solutions Supporting Operations in Subterranean Environments. This investment was realigned during FY 2015 from Project RE-Counter-Terrorism Technologies to better reflect the nature of the investment. The decrease from FY 2016 to FY 2017 is due to decreased investment in next generation CWMD technologies to balance other priorities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RG: Defeat Technologies	21.293	22.489	20.710
Description: Project RG develops advanced technologies and weapon concepts and validates their applicability to CWMD.			
FY 2015 Accomplishments: - Continued to develop access denial or denial-of-use technologies for WMD targets. - Initiated Next Generation CWMD weapon design. - Initiated sub-scale lethality tests for Next Generation Agent Defeat weapon. - Continued work on functional defeat test-bed with initial test events.			
FY 2016 Plans: - Manufacture initial Next Generation CWMD weapon components and sub-systems and conduct sub-system and initial full scale static test. - Continue development of access denial or denial-of-use technologies for CWMD applications.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RG / *Defeat Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue functional defeat system development and testing. - Conduct Modular Autonomous CWMD System (MACS) follow-on incremental component/system demonstration. - Conduct functional defeat system demonstration. - Transition initial MACS concept to Military Services/Combatant Commanders. - Develop and integrate MACS Family of System Enabling Technologies. - Plan MACS Family of Systems component demonstration. - Mature diagnostic capability to meet emerging needs and field improved capabilities for agent defeat. - Initiate Heated and Mobile Munitions Employing Rockets (HAMMER) Subsystem Test. - Complete HAMMER Weapon Design. ***FY 2017 Plans:*** - Conduct static tests of full-scale HAMMER weapon system and initiate preparation for full-scale dynamic tests in FY 2018. - Conduct static demonstration of initial capability of access denial and denial-of-use technologies against WMD representative targets. - Initiate Agent Defeat Penetrator weapon system design effort. - Initiate access denial weapon concept design effort. - Continue to develop and integrate classified component and system designs. Prepare to conduct initial demonstrations. - Continue to develop and test functional defeat system. - Continue to develop and test diagnostic capability to meet emerging needs for agent defeat.			
Accomplishments/Planned Programs Subtotals	21.293	22.489	20.710

	FY 2015	FY 2016
Congressional Add: Technology Solutions Supporting Operations in Subterranean Environments	8.000	-
FY 2015 Accomplishments: - Formed IPTs and finalized requirements definition in preparation for FY 2016 prototype development and planned demonstrations. - Demonstrated the ability of robotic air and ground platforms to independently collect and deliver data to a collaborative platform to characterize a subterranean environment. - Developed prototype communications package to enable robust, reliable communications in the subterranean environment.		
Congressional Adds Subtotals	8.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RG / *Defeat Technologies*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	12.955	11.769	11.304	-	11.304	11.601	11.864	12.103	12.345	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RI / *Nuclear Survivability*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RI: *Nuclear Survivability*	32.580	5.328	6.191	6.561	-	6.561	6.658	6.738	6.863	7.002	Continuing	Continuing

A. Mission Description and Budget Item Justification

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 nanoelectronics effort develops and integrates radiation-hardened, high-performance prototype nanoelectronics to meet DoD space and strategic system requirements. The Human Survivability 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.

The increase from FY 2015 to FY 2016 is due to increased investment in Nuclear Surety. The increase from FY 2016 to FY 2017 is due to increased investment in radiation hardened nanoelectronics and nuclear weapons stockpile logistics.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RI: Nuclear Survivability	5.328	6.191	6.561
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.			
FY 2015 Accomplishments: - Initiated development of Satellite Protection Standard. - Continued research, development, test, and evaluation on physical security technologies designed to enhance protection of the nuclear stockpile as determined by the Services. - Initiated development for the next generation of Defense Integration and Management of Nuclear Data Services (DIAMONDS) network and infrastructure design, leveraging information technology (IT) improvements, to modernize DIAMONDS software code; conducted preliminary design review.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RI / *Nuclear Survivability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Publish Satellite Protection Standard. - Address 1,000 written atomic veteran claim responses. - Plan and execute Mighty Guardian XVIII force-on-force test to evaluate nuclear security policy at the Navy's Strategic Weapons Facility Pacific, Naval Base Kitsap, WA. - Continue the development of the next generation of DIAMONDS network and infrastructure design. - Leverage IT improvements and recommendations from industry/Agency. - Modernize DIAMONDS software code with design reviews and meetings with users for future needs/requirements. - Field test-bed system at select user sites and continue to evaluate system. ***FY 2017 Plans:*** - Produce technical reports to address DoD concerns for radiogenic disease related to potential ionizing radiation exposure. - Fabricate Pathfinder & Product Demonstration Vehicle to support technology transfer from (6.2) Applied Research to the United States Air Force/Space & Missile Center and National Reconnaissance Office, for maturation in their Productization & Qualification program in 6.4 Advanced Component Development and Prototypes.			
Accomplishments/Planned Programs Subtotals	5.328	6.191	6.561

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	20.671	29.383	34.051	-	34.051	34.553	35.261	35.978	36.698	Continuing	Continuing

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	-	0.000	0.000	3.528	-	3.528	1.582	1.617	1.658	1.691	Continuing	Continuing

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. Note: This is a new funding line established to rapidly transition capabilities to programs of record.

The increase from FY 2016 to FY 2017 is due to the transition of nuclear effects modeling applied research efforts to advanced technology development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RL: Nuclear and Radiological Effects	0.000	0.000	3.528
Description: Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions. ***FY 2015 Accomplishments:*** N/A ***FY 2016 Plans:*** N/A ***FY 2017 Plans:*** - Develop nuclear weapon effects tools specifically designed for transition to military targeting systems. - Develop nuclear weapon effects tools specifically designed to support nuclear survivability and standards formulation.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.528

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	31.666	22.698	28.668	-	28.668	31.146	31.829	32.467	33.120	Continuing	Continuing
• *121/0605000BR: *WMD Defeat Technologies*	-	-	-	-	-	-	-	-	-		

Remarks

See prior year funds related to this this project in program element number 0605000BR.

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RM: *WMD Counterforce Technologies*	104.036	27.099	20.717	23.138	-	23.138	26.057	24.939	24.299	24.721	Continuing	Continuing

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 two core research efforts in this project. 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. 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.

The decrease from FY 2015 to FY 2016 is due to the realignment of funding for Technical Reachback from Project RM to Project RA-Information Sciences and Applications. The increase from FY 2016 to FY 2017 is due to increased investment in WMD reconnaissance technology and weapons effects and planning tools.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RM: WMD Counterforce Technologies	27.099	20.717	23.138
Description: Project RM provides: (1) full-scale testing of CWMD weapon effects, weapon effects modeling, and weapon delivery system optimization; and (2) WMD sensor, surveillance, and data processing technologies.			
FY 2015 Accomplishments: - Developed parallel version of transport and dispersion code to allow faster analysis execution on high performance computing resources. Coupled with FY 2014 enhancements, provided upgraded capability to run faster, finer, and larger analyses. - Developed and integrated agent based modeling capabilities. - Conducted a demonstration of scintillating transformational material for CWMD application within an operational architecture. - Supported U.S. Army Program Manager (PM) Unmanned Arial System in completing WMD Aerial Collection System transition activities, fielding, and procurement. - Designed, integrated, and demonstrated Chemical, Biological, Radiological, Nuclear (CBRN) Air-Droppable, Remotely Deployed Sensor (CARDS) payload captive carry system for CARDS packages. - Conducted a CARDS system demonstration of precision emplacement using representative CBRN sensor packages. - Conducted Phase I demonstration of enhanced near-term bio-search/detection sensors for Department of Defense (DoD) and Intelligence Community customers. - Conducted down-select of multi-mode sensor systems for bio-terrorism threat detection. - Initiated Phase II development of select sensor systems for use in detecting small-scale biological labs.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Delivered the Vulnerability Assessment and Protection Option (VAPO) planning tool with improved infrastructure modeling capabilities, including secondary effects from improved vehicle borne improvised explosive device models and tertiary effects linked with social behavior resulting from WMD insult. - Delivered capabilities developed in FY 2014 (Integrated Munitions Effectiveness Assessment (IMEA) 11.1). - Developed Enhanced Tunnel/ Hard and Deeply Buried Targets defeat modeling capabilities in the areas of High Strength Concrete weapon penetration and Steep Slope cratering/rubble model. - Initiated development of non-kinetic weapons effects and full-spectrum defeat capability. - Developed improved Agent Defeat modeling capabilities for WMD target attack planning. - Delivered Targeting/Weaponeering academics and targeting recommendation packages supporting Combatant Command requirements.			
FY 2016 Plans: - Transition initial biological search technologies (Bio-ISR Spiral 1) to DoD and Interagency end-users. - Continue technology development for enhanced area search, localization, and point detection/ identification tools for biological threats of interest (Spiral 2). - Initiate planning for Bio-ISR Spiral 2 demonstration of improved biological search technologies. - Demonstrate unmanned platform capable of high-altitude/long-range glide, vertical takeoff and landing transition and egress for covert emplacement of CBRN payloads/sensors. - Design, develop, integrate, and test computer vision, autonomous navigation on unmanned systems to enable precise CBRN payload emplacement. - Complete WMD Aerial Collection System transition activities, fielding, and procurement. - Deliver agent defeat modeling capabilities (Human Injury, Dynamic Pressure, and Structural Response) for DTRA's Reachback mission. - Utilize high performance computing capabilities to enhance scalable model fidelity. - Enhance software development architecture for more efficient integration of modeling and simulation capabilities into planning tools. - Deliver prototype 64-bit version of counter WMD modeling and simulation planning tools for analysis of large data sets. - Continue to develop improved agent defeat modeling capabilities for WMD target attack planning. - Deliver Targeting/Weaponeering academics and targeting recommendation packages for Combatant Commands. - Develop and demonstrate a low-visibility sensor/detection device for chemical search missions. - Demonstrate nano-material based sensor/reporting system for detection of biological/chemical threats. - Conduct prototype demonstration of scintillating transformational material for CWMD application.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RM / *WMD Counterforce Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Demonstrate proof of concept for next-generation chemical warfare agent detector. - Demonstrate enhanced WMD sample collection system for low-visibility search operations. - Demonstrate Biological Intelligence Surveillance and Reconnaissance (Bio-ISR) Spiral 2 enhanced area search sensors/ capabilities for counter-bio search missions. - Integrate, test and demonstrate CBRN defeat technologies in a remotely-operated unmanned payload. - Test and validate the Vertical Take-off and Landing Autonomous Precision Emplacement System delivering chemical, biological, radiological and nuclear defeat payloads. - Transition enhanced structural response and WMD agent dispersion/neutralization models, using new software architecture for improved WMD vulnerability assessment and force protection planning capabilities. - Transition final prototype of advanced area search sensor to counter biological warfare threats. - Complete phase one of three new software architecture developments, allowing WMD defeat modeling and simulation planning tools (i.e., IMEA) to enhance integration with partner agency tools. - Publish targeting/weaponeering academics and targeting recommendation packages for Combatant Commands.			
Accomplishments/Planned Programs Subtotals	27.099	20.717	23.138

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	12.750	13.295	12.097	-	12.097	12.375	12.814	13.060	13.323	Continuing	Continuing

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 the DoD and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	Project (Number/Name) **RR / *Countering WMD Test and Evaluation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
**RR: *Countering WMD Test and Evaluation*	1.902	12.150	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

**Project RR title changes from Combating WMD Test and Evaluation to Countering WMD Test and Evaluation beginning in FY 2017.

A. Mission Description and Budget Item Justification

Project RR provides a unique national test bed capability for simulated weapons of mass destruction (WMD) facility characterization, weapon-target interaction, and WMD facility defeat testing to respond to operational needs by developing and maintaining test beds used by the Department of Defense (DoD), the Military Services, the Combatant Commanders and other Federal Agencies to evaluate the implications of WMD, conventional, and other special weapon use against U.S. military or civilian systems and targets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RR: Countering WMD Test and Evaluation	12.150	-	-
Description: Project RR provides a unique national test bed capability for simulated WMD facility characterization, weapon-target interaction, and WMD facility defeat testing. ***FY 2015 Accomplishments:*** - Completed improvements at the Technical Evaluation Assessment and Monitor Site (TEAMS) on Kirtland AFB, NM enhancing the security and protection of Special Nuclear Materials at that location. - Performed architectural and engineering (A&E) study that resulted in a 10 year growth plan for TEAMS that will support mission programs. - Provided government/contractor test team support and test data acquisition systems support to classified program at Nevada National Security Site (NNSS), NV. - Upgraded the electrical system at Drift 06 NNSS, NV. - Initiated test infrastructure development effort at NNSS, NV to support a new DoD high-priority test-bed, to include A&E for studies for Drift 07/08 and test support facilities and completion of upgrade to Drift 06.			
Accomplishments/Planned Programs Subtotals	12.150	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** **RR / *Countering WMD Test and Evaluation*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *Defeat Technologies*	10.277	11.062	13.666	-	13.666	13.978	14.038	14.518	14.864	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	Project (Number/Name) RT / *Target Assessment Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RT: *Target Assessment Technologies*	145.588	45.572	56.065	41.794	-	41.794	25.550	26.248	26.779	27.327	Continuing	Continuing

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 and to (2) assess in real time the results of physical and functional defeat operations (such as a direct attack). These novel, dynamic capabilities enable Combatant Commands and the intelligence community (IC) to hold at risk high value targets possessed by adversaries.

The increase from FY 2015 to FY 2016 reflects the continuing investment in the development and integration of high-priority find, characterize and assess sensor technologies and supporting algorithms and software. The decrease from FY 2016 to FY 2017 is due to the projected completion of the development and integration of high-priority find, characterize, and assess sensor technologies and supporting algorithms and software.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RT: Target Assessment Technologies	45.572	56.065	41.794
Description: Project RT provides Combatant Commands 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.			
FY 2015 Accomplishments: - Delivered Find, Characterize, and Assess detection and characterization on-node data fusion algorithm improvements in support of near-real time target update capabilities. - Delivered Find, Characterize, and Assess Underground Targeting and Analysis System (UTAS) tool suite interface improvement for near real time support of IC target characterization and assessment. - Developed Adversarial Route Analysis Tool with Global Expansion for support of Counter-WMD (CWMD) intelligence analysis. - Developed Full Operational Capability (FOC) for UTAS thermal process modeling capability in support of IC target analysis. - Developed Find, Characterize, and Assess detection and characterization hardware and software to support near-real time target update capabilities.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RT / *Target Assessment Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Develop, and demonstrate Nuclear WMD Defeat Model for support of IC CWMD analysis and functional defeat targeting. - Develop and demonstrate Chemical–Biological Weapons Emerging Threats Model capability for support of IC CWMD analysis and course of action selection. - Demonstrate FOC for UTAS thermal process modeling capability for support of IC functional vulnerability analysis of hard or deeply buried WMD related targets. - Demonstrate sensor detection hardware and characterization software integration to support IC near-real time target characterization updates for time critical targeting of WMD related targets. - Conduct developmental demonstration and testing of Spiral 1 prototype sensor nodes in a realistic mission-representative environment. - Conduct Spiral 1 operational assessment of deployable sensor nodes in a realistic mission-representative environment with operational personnel in accordance with the designed concept of operations. - Deliver 24 Spiral 1 prototype deployable sensor units. - Develop new and enhanced (range/sensitivity) detection capabilities and enhanced delivery capabilities as Spiral 2 of the deployable sensor project. - Produce additional prototype sensor units for follow-on (Spiral 2) integration testing and algorithm validation. ***FY 2017 Plans:*** - Demonstrate range and sensitivity detection capabilities and enhanced delivery system for a deployable remote ground sensor. - Conduct integration testing and algorithm validation of a deployable prototype ground sensor. - Integrate deployable ground sensor data outputs into Dynamic Characterization Modeling Tools to support time-dependent target analysis. - Develop processes and approaches for characterization of Underground Facility (UGF) "Pattern of Life" based upon multiple modalities of data input. - Develop analytical processes for planning Functional Defeat of UGFs based on "Pattern of Life" analysis and near-real-time information updates. - Continue to develop WMD complex process models into target facility characterizations. - Continue to develop geo-technical soil and rock models for use in target characterization and sensor deployment planning.			
Accomplishments/Planned Programs Subtotals	45.572	56.065	41.794

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603160BR / *Counterproliferation Initiatives - Proliferation, Prevention, and Defeat*	**Project (Number/Name)** RT / *Target Assessment Technologies*

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 the Department of Defense and other government agency laboratories, academia, industry and international partner organizations.

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in US Department of Defense Agency Strategic Plan for Fiscal Years 2015-2018, in support of Strategic Objective 4.1, "Preserve investments to maintain our decisive technological superiority.")

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	71.066	6.667	7.156	4.568	-	4.568	9.092	8.714	7.782	7.938	Continuing	Continuing
RF: *Forensics Technologies*	6.867	6.667	7.156	4.568	-	4.568	9.092	8.714	7.782	7.938	Continuing	Continuing
RL: *Nuclear & Radiological Effects*	64.199	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	64.199

Note

*Project RF-Detection and Forensics Technologies subdivides into Projects RD-Detection Technologies and RF-Forensics Technologies in FY 2016. This impacts these projects in PE 0602718BR and PE 0603160BR. See C. Other Program Funding Summary below.

A. Mission Description and Budget Item Justification

The WMD Defeat Capabilities program element supports the development and demonstration of verification and monitoring technologies and systems for the Countering Weapons of Mass Destruction (CWMD) mission. This funding specifically supports International Monitoring System technology requirements under the Nuclear Arms Control Technology program. Through FY 2014, funding also supported the development of collaborative CWMD analysis capabilities between the Department of Defense and key interagency and international partners through a globally accessible net-centric framework in the form of the Integrated Weapons of Mass Destruction Toolset.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	6.887	7.156	7.340	-	7.340
Current President's Budget	6.667	7.156	4.568	-	4.568
Total Adjustments	-0.220	0.000	-2.772	-	-2.772
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.220	-			
• Other Reductions	-	-	-2.772	-	-2.772

Change Summary Explanation

The decrease in FY 2017 from the previous President's Budget submission was due to a re-phasing of program activities to FY 2018 and FY 2019. Other reductions were in support of departmental efficiencies.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RF / *Forensics Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RF: *Forensics Technologies*	6.867	6.667	7.156	4.568	-	4.568	9.092	8.714	7.782	7.938	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

*Project RF-Detection and Forensics Technologies subdivides into projects RD-Detection Technologies and RF-Forensics Technologies beginning in FY 2016.

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, Technology, and Logistics. 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.

The increase from FY 2015 to FY 2016 is due to investment in research on radionuclide sampling and analytical capabilities. The decrease from FY 2016 to FY 2017 is due to re-phasing of program activities to FY 2018 and FY 2019.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RF - Forensics Technologies	6.667	7.156	4.568
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 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continued to improve the sustainability, reliability, and effectiveness of the 36 IMS stations. - Completed Provisional Technical Secretariat certification of U.S. IMS Infrasound monitoring station on Wake Island and Auxiliary Seismic monitoring station on Shemya Island, Alaska. - Continued to improve U.S. IMS operations efficiency, capabilities, and quality of monitoring data and decrease false alarms. - Continued support of Office of the Secretary of Defense (OSD) treaty management objectives. - Continued participating in International CTBT Organization Office Provisional Technical Secretariat sponsored technology development exchanges and field exercises. - Continued research and development to inform required design-build-test activities across the monitoring system. - Continued IMS prototype sensor and station calibration capabilities development. - Continued development of monitoring station in-situ calibration and performance monitoring capabilities. - Continued performing experiments or field demonstrations to evaluate monitoring system performance. - Continued to enhance baseline radionuclide particulate and noble gas detection capabilities, efficiency, and reliability. - Continued development and calibration of infrasound and seismic propagation models. - Continued field experiments to collect data required to calibrate and constrain and validate IMS relevant propagation models. - Continued U.S. IMS sensor event signal identification technique research and development of the transportable xenon laboratory.			
FY 2016 Plans: - Continue support of Office of the Secretary of Defense (OSD) Threat Reduction and Arms Control treaty management objectives. - Continue development and implementation of IMS sensor and station calibration capabilities. - Continue development and implementation of in-situ calibration concepts. - Participate in CTBT Organization Provisional Technical Secretariat sponsored technology development exchanges. - Sponsor U.S. specific technology development exchanges. - Develop and implement U.S. IMS specific life-cycle management software to enable cost effective and efficient spare part replacement and long-range recapitalization. - Develop and implement concepts to improve the reliability of the radionuclide stations. - Develop and implement concepts to improve radionuclide and infrasound signal to noise. - Improve and develop system of health monitoring software.			
FY 2017 Plans: - Optimize IMS technology and operations to comply with CTBT language and evolving operational manual requirements and to increase cost efficiency. - Validate alternative filter media against Provisional Technical Secretariat certification standards for U.S. IMS particulate radionuclide sensor to enhance aerosol collection efficiency for the Radionuclide Aerosol Sampler/Analyzer system. - Conduct Analysis of Alternatives for Hydroacoustic monitoring.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RF / *Forensics Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Annually, provide analysis of up to 800 additional International Atomic Energy Agency verification samples in support of the OSD, Nuclear, Chemical and Biological Threat Reduction Advisory Committee. - Complete evaluation of U.S. IMS operational options determined from life-cycle modeling and simulation to determine most cost-effective operational models. - Evaluate alternative backup power options for arctic to improve reliability and performance in remote locations as defined by CTBT Operations Manuals. - Participate in CTBT Organization Provisional Technical Secretariat sponsored technology development exchanges. - Finalize testing for Provisional Technical Secretariat qualification of alternative infrasound waveform sensor that improves efficiency, reliability, or cost effectiveness at equal or greater data quality objectives. - Run models and simulations to improve understanding of CTBT IMS network viability/limitations.			
Accomplishments/Planned Programs Subtotals	6.667	7.156	4.568

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	31.403	9.356	10.008	-	10.008	10.274	10.505	10.717	10.933	Continuing	Continuing
• 27/0603160BR: *Proliferation Prevention and Defeat*	63.115	38.427	38.540	-	38.540	42.454	43.727	42.518	43.367	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.

E. Performance Metrics

The goal of the NACT RDT&E program is to enable full compliance of all emerging data quality requirements and other requirements as documented in CTBT treaty language, CTBT-issued Radionuclide and Waveform Operations Manuals, other CTBT Organization communications, and DOD Treaty Implementation Manager directives. RDT&E is conducted in support of NACT's operational mission to operate, maintain, and sustain the Provisional Technical Secretariat certified waveform and radionuclide CTBT monitoring stations and radionuclide laboratory in accordance with CTBT requirements. CTBT IMS data availability/timeliness performance specifications are currently 98% data availability for IMS waveform and 95% for IMS radionuclide systems. Data quality metrics continue to evolve as the entire CTBT IMS capability is exercised and tested.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RF / *Forensics Technologies*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 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	2.317	1.265	Apr 2015	1.478	Jun 2016	1.000	Jun 2017	-		1.000	Continuing	Continuing	Continuing
Waveform Analysis Technology	C/Various	Space and Missile Defense Labs : Huntsville, AL	1.669	0.086	Mar 2015	0.045		0.000		-		0.000	0.000	1.800	1.800
Radionuclide Sensor, Station, and Network Improvements	C/CPFF	General Dynamics : Fairfax, VA	0.500	0.494	Jul 2015	0.494	Mar 2016	0.229	Jun 2017	-		0.229	Continuing	Continuing	Continuing
Seismic and Infrasound Sensor, Station, and Network Improvements	C/CPFF	University of Alaska : Fairbanks, AK	-	0.093	Jul 2015	0.093	Apr 2016	0.100	Apr 2017	-		0.100	Continuing	Continuing	Continuing
Seismic and Infrasound Sensor, Station, and Network Improvements, Validation, and Verification Testing	FFRDC	Sandia National Laboratory : Albuquerque, NM	0.506	2.259	Apr 2015	1.600	Mar 2016	1.304	Apr 2017	-		1.304	Continuing	Continuing	Continuing
Sample Analysis	MIPR	Air Force Technical Application Center : Patrick AFB, FL	0.800	0.800	Mar 2015	0.800	Aug 2016	0.800	Jun 2017	-		0.800	Continuing	Continuing	Continuing
Station failure and logistics modeling and simulation	C/CPFF	Systems Exchange, Inc. : Carmel, CA	-	0.196	Mar 2015	0.035	Mar 2016	0.035	Mar 2017	-		0.035	Continuing	Continuing	Continuing
Station and network improvements	C/Various	Lockheed Martin : Bethesda, MD	-	0.165	Jan 2016	1.511	Mar 2015	0.000		-		0.000	Continuing	Continuing	Continuing
Seismic and Infrasound Sensor, Station, and Network Improvements	MIPR	Naval Research Laboratory : Washington, DC	-	0.204	Oct 2015	0.000		0.000		-		0.000	0.000	0.204	0.204
Engineering & Technical Services	C/CPFF	TASC, Inc. : Chantilly, VA	0.800	0.800	Dec 2014	0.800	Dec 2015	0.760	Dec 2016	-		0.760	Continuing	Continuing	Continuing
		Subtotal	6.592	6.362		6.856		4.228		-		4.228	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RF / *Forensics Technologies*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advisory & Assistance Services Support to Program Office	C/CPFF	TASC, Inc. : Chantilly, VA	0.200	0.200	Apr 2015	0.200		0.200		-		0.200	Continuing	Continuing	Continuing
Travel	C/Various	Various : Various	0.075	0.105		0.100		0.140		-		0.140	Continuing	Continuing	Continuing
		Subtotal	0.275	0.305		0.300		0.340		-		0.340	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.867	6.667		7.156		4.568		-		4.568	-	-	-

Remarks

The Defense Threat Reduction Agency (DTRA) Nuclear Arms Control program installs, operates, maintains, and sustains the waveform and radionuclide nuclear detonation detection stations comprising the U.S. portion of the International Monitoring Systems (IMS) in order to deliver data to the U.S. monitoring and verification community and to enable U.S. compliance to the terms of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) in support of U.S. and Department of Defense (DOD) nonproliferation objectives. The project addresses weapons of mass destruction (WMD) monitoring requirements validated by the Office of the Under Secretary of Defense, Acquisition, Technology, and Logistics. This project conforms to the administration's research and development priorities as 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, and provide the data required to inform compliance assessments, and support U.S. monitoring policy and decision-makers, and negotiation teams. NOTE: As this program and its requirements mature and legacy contract vehicles expire, the composition of the performer base under DTRA program management will be dynamic.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RF / *Forensics Technologies*

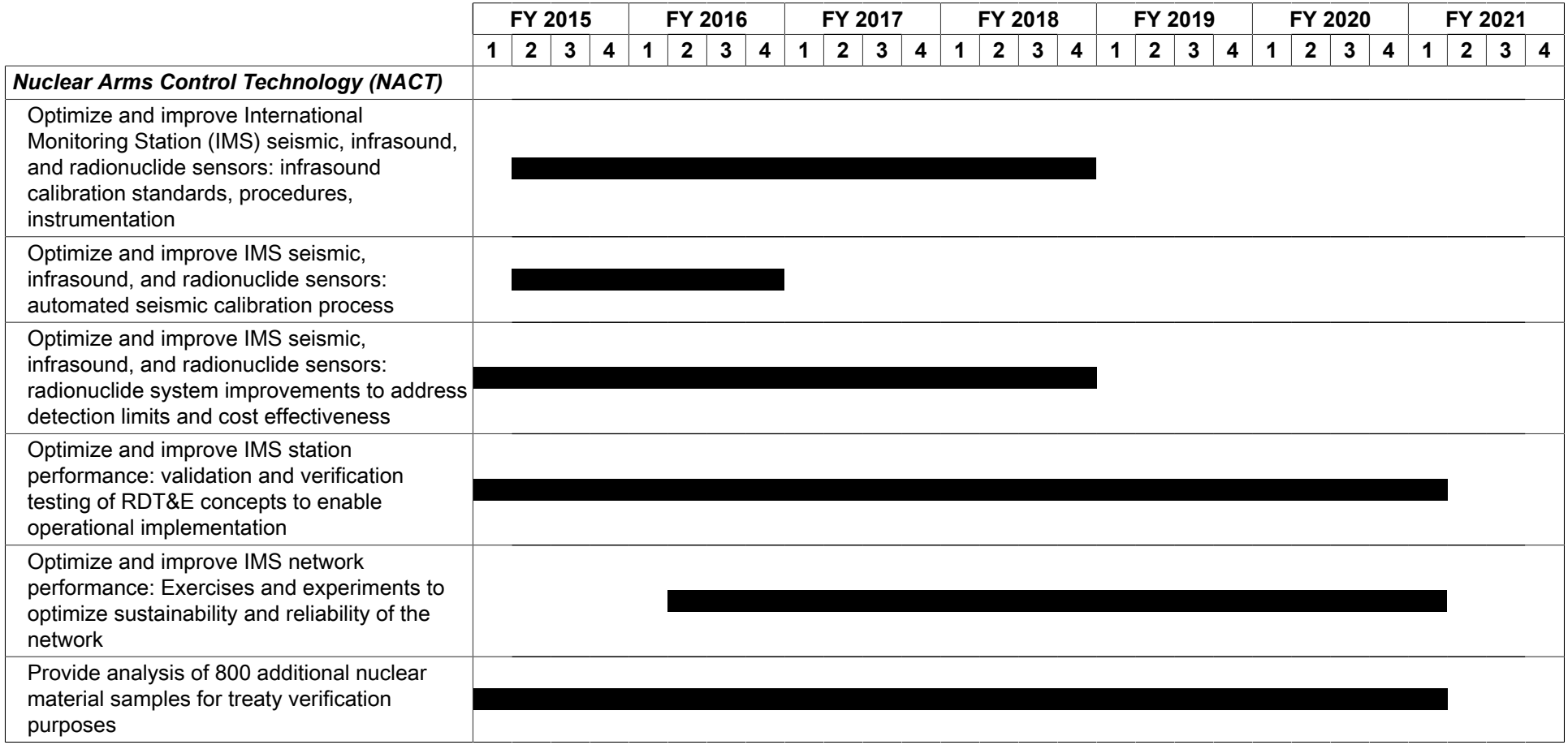

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RF / *Forensics Technologies*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Nuclear Arms Control Technology (NACT)				
Optimize and improve International Monitoring Station (IMS) seismic, infrasound, and radionuclide sensors: infrasound calibration standards, procedures, instrumentation	2	2015	4	2018
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: automated seismic calibration process	2	2015	4	2016
Optimize and improve IMS seismic, infrasound, and radionuclide sensors: radionuclide system improvements to address detection limits and cost effectiveness	1	2015	4	2018
Optimize and improve IMS station performance: validation and verification testing of RDT&E concepts to enable operational implementation	1	2015	1	2021
Optimize and improve IMS network performance: Exercises and experiments to optimize sustainability and reliability of the network	2	2016	1	2021
Provide analysis of 800 additional nuclear material samples for treaty verification purposes	1	2015	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RL: *Nuclear & Radiological Effects*	64.199	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	64.199
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Efforts in this project were completed in FY 2014. Under Project RL, the Net-Centric Architecture program integrated legacy capabilities and facilitated data sharing through a net-centric framework. It provided near-real time collaborative analysis capabilities between the Department of Defense (DoD) and key interagency and international partners through a globally accessible net-centric framework known as the Integrated Weapons of Mass Destruction Toolset. This toolset migrated the Defense Threat Reduction Agency's (DTRA's) chemical, biological, radiological, and nuclear (CBRN) modeling and simulation codes to provide an integrated suite of Countering Weapons of Mass Destruction (CWMD) decision support capabilities. The framework was the only operational chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) framework in the world that provided capabilities through web applications, net-centric web services, and stand-alone mobile deployments which are validated and accredited for operational use by international, national, state, and local authorities.

The decrease in FY 2015 is due to the completion of Integrated Weapons of Mass Destruction Toolset investments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RL: Nuclear & Radiological Effects	0.000	-	-
Description: Project RL develops and provides a real-time globally accessible net-centric framework which migrates the DTRA CBRNE modeling and simulation codes to provide an integrated suite of CWMD decision support capabilities.			
FY 2015 Accomplishments: N/A			
Accomplishments/Planned Programs Subtotals	0.000	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	31.666	22.698	28.668	-	28.668	31.146	31.829	32.467	33.120	Continuing	Continuing
• 27/0603160BR: *Proliferation, Prevention, and Defeat*	0.000	0.000	3.528	-	3.528	1.582	1.617	1.658	1.691	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

D. Acquisition Strategy

The program for Integrated Weapons of Mass Destruction Toolset was executed through a competed cost plus fixed-fee contract. This contract was a 3-year effort for software development, test, and integration.

E. Performance Metrics

Demonstrate and provide over 80% of the customer-required CBRN modeling and simulation capabilities over networks, e.g., DoD Global Information Grid. Integrate mission-required legacy DTRA CBRNE codes into a net-centric architecture through a process-controlled verification, validation, and accreditation standards-based method necessary to promote the National Strategy for Countering Biological Threats.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Development - IWMDT	C/CPAF	Leidos : San Diego, CA	21.280	-		-		-		-		-	0	21.280	21.280
System Development - NuCS	C/CPFF	Applied Research Associates : Raleigh, NC	5.880	-		-		-		-		-	0	5.880	5.880
System Development - COE	C/CPFF	Titan : Kingstowne, VA	5.533	-		-		-		-		-	0.000	5.533	5.533
System Development - Component Contracts	C/Various	Various : Various	5.073	-		-		-		-		-	0	5.073	5.073
		Subtotal	37.766	-		-		-		-		-	0.000	37.766	37.766

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Configuration Management	C/CPAF	Leidos : San Diego, CA	0.941	-		-		-		-		-	0	0.941	0.941
Software Integration	C/CPAF	Leidos : San Diego, CA	7.550	-		-		-		-		-	0	7.550	7.550
Technical Data	C/CPAF	Leidos : San Diego, CA	0.739	-		-		-		-		-	0	0.739	0.739
Engineering Services	C/CPAF	Leidos : San Diego, CA	2.601	-		-		-		-		-	0	2.601	2.601
Accreditation & Certification	C/CPAF	Leidos : San Diego, CA	1.387	-		-		-		-		-	0	1.387	1.387
		Subtotal	13.218	-		-		-		-		-	0.000	13.218	13.218

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Defense Threat Reduction Agency			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR / *WMD Defeat Capabilities*	Project (Number/Name) RL / *Nuclear & Radiological Effects*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	C/CPAF	Leidos : San Diego, CA	2.984	-		-		-		-		-	0	2.984	2.984
Operational Test & Evaluation	C/ FFPLOE	Leidos : San Diego, CA	2.421	-		-		-		-		-	0	2.421	2.421
		Subtotal	5.405	-		-		-		-		-	0.000	5.405	5.405

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	C/Various	TASC, Inc. : Lorton, VA	3.389	-		-		-		-		-	0	3.389	3.389
Travel	C/Various	Various : Various	1.618	-		-		-		-		-	0	1.618	1.618
Overhead	C/Various	Various : Various	2.803	-		-		-		-		-	0	2.803	2.803
		Subtotal	7.810	-		-		-		-		-	0.000	7.810	7.810

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	64.199	-		0.000		-		-		-	0.000	64.199	64.199

Remarks

IWMDT was funded in 2004 by a competitive Cost Plus Award Fee (CPAF) contract for $12.425M over a 3-year period. At end of FY 2006, its follow-on contract was awarded with an initial $0.300M increment. IWMDT efforts continued into FY 2013 with $58.555M applied. The Joint Collaborative Analysis Model, a subcomponent within IWMDT was openly competed under one of the new DTRA Indefinite Delivery/Indefinite Quantity contracts for approximately $2.500M for FY 2014.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

	FY 2008				FY 2009				FY 2010				FY 2011				FY 2012				FY 2013				FY 2014			
	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
Integrated Weapons of Mass Destruction (IWMDT)																												
IWMDT-System Development, Test, and Integration-Phase III																									[redacted]			

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Integrated Weapons of Mass Destruction (IWMDT)																												
IWMDT-System Development, Test, and Integration-Phase III																												

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Defense Threat Reduction Agency		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605000BR / *WMD Defeat Capabilities*	**Project (Number/Name)** RL / *Nuclear & Radiological Effects*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Integrated Weapons of Mass Destruction (IWMDT)				
IWMDT-System Development, Test, and Integration-Phase III	1	2014	3	2014

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Defense Threat Reduction Agency	Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	29.006	9.606	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
RA: *Information Sciences and Applications*	29.006	9.606	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	9.606	0.000	0.000	-	0.000
Total Adjustments	9.606	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	9.606	-			

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 2017 Defense Threat Reduction Agency			Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
RA: *Information Sciences and Applications*	29.006	9.606	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
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

This project provides 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. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: RA: Information Sciences and Applications	9.606	-	-
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. ***FY 2015 Accomplishments:*** - Improved microchip production methods applicable to radiation hardened components. - Developed non-Helium-3 neutron/gamma detectors (PM nominated for R&D 100 award, received Value Engineering Award) Phase I contract awards from qualified proposals - SBIR 14.3 solicitation: 8 awards - STTR solicitation: 10 awards Phase II contract awards from qualified proposals - SBIR 12.2 solicitation: 7 awards - SBIR 10.2 solicitation: 2 awards			
Accomplishments/Planned Programs Subtotals	9.606	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Defense Threat Reduction Agency		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 20/0602718BR: *WMD Defeat Technologies*	26.334	29.432	29.127	-	29.127	33.255	33.513	30.990	31.405	Continuing	Continuing
• 27/0603160BR: *Counterproliferation Initiatives - Proliferation, Prevention and Defeat*	0.250	12.244	11.422	-	11.422	11.323	12.761	13.004	13.266	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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