Department of Defense Fiscal Year (FY) 2018 Budget Estimates

May 2017



Defense Threat Reduction Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Defense Threat Reduction Agency • Budget Estimates FY 2018 • RDT&E Program

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$Exhibit R-1, RDT \& EPrograms \, Defense$

Threat Reduction Agency Fiscal

Year 2018-2022 President's Budget

Appropriation: RDT&E, Defense-Wide

Date: May 2017

OVERVIEW

Weapons of mass destruction (WMD), improvised explosive devices (IEDs), and asymmetric techniques present immediate, persistent, and evolving threats to our nation's security. Countering weapons of mass destruction (CWMD) and countering improvised threats are at the forefront of Defense priorities and are the Defense Threat Reduction Agency's (DTRA's) primary focus. DTRA safeguards the United States and its allies from WMD and IEDs by integrating, synchronizing, and providing responsive expertise, technologies, and capabilities. This mission is directly aligned to strategic and operational planning guidance in the National Security Strategy, National Military Strategy, Defense Planning Guidance, Department of Defense (DoD) Agency Strategic Plan, Quadrennial Defense Review, 2014 DoD Strategy for Countering Weapons of Mass Destruction, 2014 Independent Review of the Department of Defense Nuclear Enterprise, 2010 Nuclear Posture Review, 2015 Implementation Directive for Better Buying Power 3.0, Assistant Secretary of Defense for Nuclear, Chemical, and Biological (NCB) Defense Programs Strategic Planning Guidance for FY 2018-2022, and DTRA/Strategic Command Center for Combating WMD (SCC-WMD) 2016-2020 Strategic Plan.

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 balances the imperatives of unconstrained exploration, discovery, and experimentation with near- and mid-term priorities arising because 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 U.S. technological superiority in achieving the Countering WMD (CWMD) mission.

The Counter WMD 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 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 Counter WMD 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 Counter WMD Systems Development and 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 2018 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. Additionally, the submission reflects Service Requirement Review Board reductions, as part of the Department of Defense reform agenda, for consolidation and reduction of service contracts.

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Department of Defense FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

			FY 2017		FY 2017	FY 2017	
		FY 2017	Total	FY 2017	Total	Less Enacted	FY 2017
		PB Request	PB Requests*	PB Request	PB Requests*	Div B	Remaining Req
	FY 2016	with CR Adj	with CR Adj	with CR Adj	with CR Adj	P.L.114-254**	with CR Adj
Appropriation	Base + OCO	Base	Base	000	000	000	000
Research, Development, Test & Eval, DW	503,342	461,305	461,305				
Total Research, Development, Test & Evaluation	503,342	461,305	461,305				

R-1C1F: FY 2018 President's Budget Request (Published Version), as of April 25, 2017 at 08:15:11

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Department of Defense FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

Appropriation	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	
Research, Development, Test & Eval, DW	461,305	461,305		461,305	469,957		469,957	
Total Research, Development, Test & Evaluation	461,305	461,305		461,305	469,957		469,957	

R-1C1F: FY 2018 President's Budget Request (Published Version), as of April 25, 2017 at 08:15:11

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Department of Defense FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request - Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

	FY 2016	FY 2017 PB Request with CR Adj	FY 2017 Total PB Requests* with CR Adj	FY 2017 PB Request with CR Adj	FY 2017 Total PB Requests* with CR Adj	FY 2017 Less Enacted Div B P.L.114-254**	FY 2017 Remaining Req with CR Adj
Summary Recap of Budget Activities	Base + OCO	Base	Base	000	0C0	0C0	000
Basic Research	38,288	35,436	35,436				
Applied Research	149,302	154,857	154,857				
Advanced Technology Development	298,123	266,444	266,444				
System Development And Demonstration	7,156	4,568	4,568				
Management Support	10,473						
Total Research, Development, Test & Evaluation	503,342	461,305	461,305				
Summary Recap of FYDP Programs							
Research and Development	503,342	461,305	461,305				
Total Research, Development, Test & Evaluation	503,342	461,305	461,305				

R-1C1F: FY 2018 President's Budget Request (Published Version), as of April 25, 2017 at 08:15:11

Department of Defense FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

Summary Recap of Budget Activities	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total
	35,436	35,436		35,436	37,201		37,201
Basic Research	164 957	154 857		154.857	157,908		157,908
Applied Research	154,857	134,037		201,001	269,697		269 607
Advanced Technology Development	266,444	266,444		266,444	268,607		200,007
System Development And Demonstration	4,568	4,568		4,568	6,241		6,241
Management Support							
Total Research, Development, Test & Evaluation	461,305	461,305		461,305	469,957		469,957
Summary Recap of FYDP Programs							
Research and Development	461,305	461,305		461,305	469,957		469,957
Total Research, Development, Test & Evaluation	461,305	461,305		461,305	469,957		469,957

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Defense-Wide FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

Summary Rocan of Rudget Activities	FY 2016	FY 2017 PB Request with CR Adj Base	FY 2017 Total PB Requests* with CR Adj Base	FY 2017 PB Request with CR Adj OCO	FY 2017 Total PB Requests* with CR Adj OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj OCO
Basic Research	38,288	35,436	35,436				
Applied Research	149,302	154,857	154,857				
Advanced Technology Development	298,123	266,444	266,444				
System Development And Demonstration	7,156	4,568	4,568				
Management Support	10,473						
Total Research, Development, Test & Evaluation	503,342	461,305	461,305				
Summary Recap of FYDP Programs							
Research and Development	503,342	461,305	461,305				
Total Research, Development, Test & Evaluation	503,342	461,305	461,305				

R-1C1F: FY 2018 President's Budget Request (Published Version), as of April 25, 2017 at 08:15:11

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Defense-Wide FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total
35,436	35,436		35,436	37,201		37,201
154,857	154,857		154,857	157,908		157,908
266,444	266,444		266,444	268,607		268,607
4,568	4,568		4,568	6,241		6,241
461,305	461,305		461,305	469,957		469,957
461,305	461,305		461,305	469,957		469,957
461,305	461,305		461,305	469,957		469,957
	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA 35,436 154,857 266,444 4,568 461,305 461,305	FY 2017 FY 2017 Total Total PB Requests** PB Requests* with CR Adj Base+OCO+SAA Base+OCO+SAA 35,436 35,436 35,436 154,857 154,857 266,444 266,444 4,568 4,568 461,305 461,305 461,305 461,305	FY 2017 FY 2017 FY 2017 Total Total Less Enacted PB Requests** PB Requests* Div B with CR Adj with CR Adj P.L.114-254** Base+0C0+SAA Base + 0C0 0C0 35,436 35,436 154,857 154,857 266,444 266,444 4,568 4,568 461,305 461,305 461,305 461,305	FY 2017 FY 2017 FY 2017 Total Total Less Enacted FY 2017 PB Requests** PB Requests* Div B Remaining Req with CR Adj with CR Adj P.L.114-254** with CR Adj Base+0C0+SAA Base + 0C0 OCO Base + 0CO 35,436 35,436 35,436 35,436 154,857 154,857 154,857 154,857 266,444 266,444 266,444 266,444 4,568 4,568 4,568 461,305 461,305 461,305 461,305 461,305 461,305 461,305 461,305	FY 2017 FY 2017 FY 2017 Total Total Less Enacted FY 2017 PB Requests** PB Requests* Div B Remaining Req with CR Adj with CR Adj Base + OCO Base 35,436 35,436 35,436 37,201 154,857 154,857 154,857 157,908 266,444 266,444 266,444 268,607 4,568 4,568 4,568 6,241 461,305 461,305 461,305 469,957 461,305 461,305 461,305 469,957	FY 2017 FY 2017 FY 2017 Total Total Less Enacted FY 2017 PB Requests** With CR Adj PI. UN B Remaining Req Base+0C0+SAA With CR Adj P.L.114-254** with CR Adj FY 2018 Base+0C0+SAA Base + 0C0 Div B Remaining Req OCO Base + 0CO 35,436 35,436 35,436 37,201 State OCO Div B 35,436 35,436 35,436 37,201 State OCO Div B State 35,436 35,436 35,436 37,201 State State OCO Div B State OCO Div B State OCO State OCO Div B State Div B State Div

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Defense-Wide FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

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Appropriation	. FY 2016 Base + OCO	FY 2017 PB Request with CR Adj Base	FY 2017 Total PB Requests* with CR Adj Base	FY 2017 PB Request with CR Adj OCO	FY 2017 Total PB Requests* with CR Adj OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj OCO	
Defense Threat Reduction Agency	503,342	461,305	461,305					
Total Research, Development, Test & Evaluation	503,342	461,305	461,305					

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Defense-Wide FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

Appropriation	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	
Defense Threat Reduction Agency	461,305	461,305		461,305	469,957		469,957	
Total Research, Development, Test & Evaluation	461,305	461,305		461,305	469,957		469,957	

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

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Line No	Program Element Number	Item 	Act	FY 2016 Base + OCO	FY 2017 PB Request with CR Adj Base	FY 2017 Total PB Requests* with CR Adj Base	FY 2017 PB Request with CR Adj OCO	FY 2017 Total PB Requests* with CR Adj OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj OCO	S e C
1	0601000BR	DTRA Basic Research	01	38,288	35,436	35,436					U
	Basic	Research		38,288	35,436	35,436					
20	0602718BR	Counter Weapons of Mass Destruction Applied Research	02	149,302	154,857	154,857					U
	Appli	ed Research		149,302	154,857	154,857					
26	0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	03	298,123	266,444	266,444					U
	Advan	ced Technology Development		298,123	266,444	266,444					
123	0605000BR	Counter Weapons of Mass Destruction Systems Development	05	7,156	4,568	4,568					U
	Syste	m Development And Demonstration		7,156	4,568	4,568					
154	0605502BR	Small Business Innovation Research	06	10,473							U
	Manag	ement Support		10,473							
Total	l Research,	Dévelopment, Test & Eval, DW		503,342	461,305	461,305					

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Defense-Wide FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

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

Line No 	Program Element Number	Item	Act	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	S e c
1	0601000BR	DTRA Basic Research	01	35,436	35,436		35,436	37,201		37,201	U
	Basic	Research		35,436	35,436		35,436	37,201		37,201	
20	0602718BR	Counter Weapons of Mass Destruction Applied Research	02	154,857	154,857		154,857	157,908		157,908	U
	Appli	ed Research		154,857	154,857		154,857	157,908		157,908	
26	0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	03	266,444	266,444		266,444	268,607		268,607	U
	Advan	ced Technology Development		266,444	266,444		266,444	268,607		268,607	
123	0605000BR	Counter Weapons of Mass Destruction Systems Development	05	4,568	4,568		4,568	6,241		6,241	U
	Syste	m Development And Demonstration		4,568	4,568		4,568	6,241		6,241	2
154	0605502BR	Small Business Innovation Research	06								U
	Manag	ement Support									
Total	l Research,	Development, Test & Eval, DW		461,305	461,305		461,305	469,957		469,957	

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Defense Threat Reduction Agency FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

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

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				FY 2017	FY 2017 Total	FY 2017	FY 2017 Total	FY 2017 Less Enacted	FY 2017	
Program				PB Request	PB Requests*	PB Request	PB Requests*	Div B	Remaining Req	S
Line Element			FY 2016	with CR Adj	with CR Adj	with CR Adj	with CR Adj	P.L.114-254**	with CR Adj	е
No Number	Item	Act	Base + OCO	Base	Base	000	000	000	000	С
										-
1 0601000BR	DTRA Basic Research	01	38,288	35,436	35,436					U
Basic Resear	ch		38,288	35,436	35,436					
20 0602718BR	Counter Weapons of Mass Destruction Applied Research	02	149,302	154,857	154,857					U
Applied Rese	arch		149,302	154,857	154,857					
26 0603160BR	Counter Weapons of Mass Destruction Advanced Technology Development	03	298,123	266,444	266,444					U
Advanced Tec	hnology Development		298,123	266,444	266,444					
123 0605000BR	Counter Weapons of Mass Destruction Systems Development	05	7,156	4,568	4,568					U
System Devel	opment And Demonstration		7,156	4,568	4,568					
154 0605502BR	Small Business Innovation Research	06	10,473							U
Management S	Support		10,473							
Cotal Defense T	hreat Reduction Agency		503,342	461,305	461,305					

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Defense Threat Reduction Agency FY 2018 President's Budget Request Exhibit R-1 FY 2018 President's Budget Request Total Obligational Authority (Dollars in Thousands)

25 Apr 2017

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

Program Line Element No Number	Item	Ι	Act	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	S e c
1 000100000		-	01	25 426	25 436		35,436	37,201		37,201	U
1 0601000BR	DTRA Basic Research		01								
Basic Resea	rch			35,436	35,436		35,436	37,201		37,201	
20 0602718BR	Counter Weapons of Mass De	struction	02	154,857	154,857		154,857	157,908		157,908	U
	Applied Research			*							
Applied Res	earch			154,857	154,857		154,857	157,908		157,908	
26 0603160BR	Counter Weapons of Mass De Advanced Technology Develo	struction	03	266,444	266,444		266,444	268,607		268,607	U
· · · · · · · · · · · · · · · · · · ·					266 444		266 444	268 607		268,607	
Advanced Te	chnology Development			200,444	200,444		200,444	200,007		2007007	
123 0605000BR	Counter Weapons of Mass De Systems Development	struction	05	4,568	4,568		4,568	6,241		6,241	U
				4 5 6 9	4 569		4 568	6.241		6.241	
System Deve.	lopment And Demonstration			4,000	4,500		4,500	0/211		0/11:1	
154 0605502BR	Small Business Innovation	Research	06								U
Management	Support										
Total Defense '	Threat Reduction Agency			461,305	461,305		461,305	469,957		469,957	

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Line #	Budget Activity	Program Element Number	Program Element Title Page
1	01	0601000BR	*DTRA Basic ResearchVolume 5 - 1
Appropriat	ion 0400: Researc	h, Development, Test & Evaluation	n, Defense-Wide
Line #	Budget Activity	Program Element Number	Program Element Title Page
20	02	0602718BR	*Counter Weapons of Mass Destruction Applied ResearchVolume 5 - 7
Appropriat	ion 0400: Researc	h, Development, Test & Evaluation	n, Defense-Wide
Line #	Budget Activity	Program Element Number	Program Element Title Page
26	03	0603160BR	*Counter Weapons of Mass Destruction Advanced Technology Development Volume 5 - 41

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

Line #	Budget Activity	Program Element Number	Program Element Title	Page
123	05	0605000BR	*Counter Weapons of Mass Destruction Systems DevelopmentVo	olume 5 - 75

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

Line #	Budget Activity	Program Element Number	Program Element Title	Page
154	06	0605502BR	Small Business Innovation ResearchV	/olume 5 - 83

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Program Element Title	Program Element Number	Line #	BA Page
*Counter Weapons of Mass Destruction Advanced Technology Development	0603160BR	26	03Volume 5 - 41
*Counter Weapons of Mass Destruction Applied Research	0602718BR	20	02Volume 5 - 7
*Counter Weapons of Mass Destruction Systems Development	0605000BR	123	05Volume 5 - 75
*DTRA Basic Research	0601000BR	1	01Volume 5 - 1
Small Business Innovation Research	0605502BR	154	06Volume 5 - 83

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BA# 01: Basic Research

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
1	01	0601000BR	*DTRA Basic Research	216.027	38.288	35.436	37.201	-	37.201
Total: Basic Research					38.288	35.436	37.201	-	37.201

BA# 02: Applied Research

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
20	02	0602718BR	*Counter Weapons of Mass Destruction Applied Research	831.914	149.302	154.857	157.908	-	157.908
Total: Applied F	Resear	ch		831.914	149.302	154.857	157.908	-	157.908

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
26	03	0603160BR	*Counter Weapons of Mass Destruction Advanced Technology Development	1,398.986	298.123	266.444	268.607	-	268.607

Defense Threat Reduction Agency • Budget Estimates FY 2018 • RDT&E Program Exhibit R-1 (Listing by Budget Activity, then Program Element Number)

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Total: Advanced Technology Development (ATD)					298.123	266.444	268.607	-	268.607

BA# 05: System Development & Demonstration (SDD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
123	05	0605000BR	*Counter Weapons of Mass Destruction Systems Development	77.733	7.156	4.568	6.241	-	6.241
Total: System Development & Demonstration (SDD)					7.156	4.568	6.241	-	6.241

BA# 06: RDT&E Management Support

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
154	06	0605502BR	Small Business Innovation Research	38.612	10.473	0.000	0.000	-	0.000
Total: RDT&E	Manag	ement Support		38.612	10.473	0.000	0.000	-	0.000

ACRONYMS

AA-HPRT	Analytics Hard Problem Research Team
ACES	Arms Control Enterprise System
AD	Agent Defeat
ADMB	Agent Defeat Modeling and Simulation Baseline
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
COL	Community of Interest
CONOPS	Concept of Operations
CONUS	Continental United States
COOP	Continuity of Operations
COP	Common Operating Picture
СР	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
JWICS	Joint Worldwide Intelligence Communications System
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
NBCRV	Nuclear Biological Chemical Reconnaissance Vehicle
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
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

Political, Military, Economic, Social, Infrastructure, and Information
Prime Nuclear Airlift Forces
Presidential Policy Directive
Provisional Technical Secretariat
Quadrennial Defense Review
Rapid Reaction Tunnel Detection
Research and Development
Radiation Hardened
Robust Fuzewell Instrumentation System
Radiation Hardened by Design
Radiation Hardened Microelectronics
US radionuclide laboratory
Radiological/Nuclear
Rough Order of Magnitude
Science & Technology
Small Business Innovative Research
Special Operations Command CWMD-Terrorism Support Program
Single Event Effects
System-Generated Electromagnetic Pulse
Second-order Hydrodynamic Automatic Mesh Refinement Code
Supreme Headquarters Allied Powers, Europe
Seismic Hardrock in Situ Test
US Army Space and Missile Development Command
Sandia National Laboratory
Special Nuclear Material
Special Operations Forces
Standoff Operational Exercise
Source Physics Experiment
Short Pulse Gamma
Source Region Electromagnetic Pulse
Strategic Arms Reduction Treaty
Small Business Technology Transfer
TransAtlantic Collaboration Biological Resiliency Demo
Test Bed
Technical Evaluation Assessment and Monitor Site
Technical Nuclear Forensics
Total Obligation Authority
Tube-launched, Optically-tracked, Wireless-guided
Technology Program Management Model
Threat Reduction Advisory Committee
Technology Readiness Level
Technical Support Group
Tag, Track, Locate

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 Iter	m Justificat	ion: FY 201	18 Defense	Threat Rec	luction Age	ncy				Date: May	2017	
Appropriation/Budget Activity 0400: Research, Development, T Research	R-1 Progr PE 060100	am Elemen 00BR / *DTF	t (Number / RA Basic Re	Name) esearch								
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	216.027	38.288	35.436	37.201	-	37.201	37.340	37.563	38.609	39.644	Continuing	Continuing
RU: **Basic Research for Countering WMD	216.027	38.288	35.436	37.201	-	37.201	37.340	37.563	38.609	39.644	Continuing	Continuing
Countering WMD Note "Program Element 0601000BR name changes from DTRA Basic Research Initiative to DTRA Basic Research beginning in FY 2018. "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 Defense Threat Reduction Agency (DTRA) Basic Research 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). DTRA's Basic Research 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 erpoiferation, 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 Science and Technology (S&T) expertise within DTRA, as well as from the Defense Basic Research while eliminating unintended duplication of effort in the broader defense S&T community.												

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 D	duction Agency		Date:	May 2017	
Appropriation/Budget Activity		R-1 Program El	ement (Number/Name)		
Research Development, Test & Evaluation, Defense-V	VIGE I BA 1: Basic	PE 0601000BR /	[^] DTRA Basic Research		
B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	38.436	35.436	38.408	-	38.408
Current President's Budget	38.288	35.436	37.201	-	37.201
Total Adjustments	-0.148	0.000	-1.207	-	-1.207
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
Reprogrammings	-0.075	-			
SBIR/STTR Transfer	-0.073	-			
 Realignments 	-	-	-1.207	-	-1.207

Change Summary Explanation

The decrease in FY 2018 from the previous President's Budget submission is due to a shift in investment priorities to fund Special Test Bed capability requirements for missile defeat in Program Element 0603160BR.

Exhibit R-2A, RDT&E Project Ju	on Agency					Date: May	2017					
Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name)Project (NuPE 0601000BR / *DTRA Basic ResearchRU / **Basi				Iumber/Name) sic Research for Countering WMD			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RU: **Basic Research for Countering WMD	216.027	38.288	35.436	37.201	-	37.201	37.340	37.563	38.609	39.644	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's) 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 (DoD), and the broader WMD threat reduction community. The portfolio addresses this guidance through capability enhancements, projects, and Science and Technology (S&T) investments that support CWMD and reduce global nuclear dangers. Specifically, they include: Accelerating the development of standoff radiological/nuclear detection capabilities; researching countermeasures and defenses to non-traditional agents; 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 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 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.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reducti		Date: May 2017	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)
0400 / 1	PE 0601000BR I *DTRA Basic Research	RU / **Bas	ic Research for Countering WMD

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 decrease from FY 2016 to FY 2017 balances near term operational needs with future technical developments and capabilities. The increase from FY 2017 to FY 2018 is due to the relative impact of the decrease in FY 2017.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018			
Title: Project RU: Basic Research for Countering WMD	38.288	35.436	37.201			
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 2016 Accomplishments: Managed 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. 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 the scientific advancements and progress in meeting the award's 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 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. Researchers discovered that cognitive impairment from radiation exposure occurs at much lower levels, and on later timelines than previously thought. New data rewrites the exposure/protection guidelines in consideration of after-battlefield effects. Researchers developed a new model to characterize and assess power grid responses to WMD events on a country-wide scale. The Defense Advanced Research Projects Agency, the National Science Foundation, and Advanced Research Projects Agency-Energy have awarded research grants based on these results. 						
Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reducti	on Agency	Da	te: May 2017			
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Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601000BR / *DTRA Basic Research	Project (Num RU / **Basic R	b er/Name) Research for Coui	Countering WMD		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 20 ⁴	16 FY 2017	FY 2018		
 Researchers found the use of micro-vesicles harvested from normal adult ster induced cognitive impairment. The finding has potential to lead to a new class of exposure. Researchers developed a novel spectroscopic technique to differentiate isotop shortened timelines for developing capabilities to perform rapid in-field isotopic forensics. Researchers developed a new method to reduce noise 100x below the classic in Nature. The findings show the potential to greatly improve gravimetric senso detection. Researchers developed new low-noise contacts for solid-state radiation detect effect. This research has the potential to eliminate the need for cooling, leading radiological/nuclear detectors. This research has transitioned to Iljin Radiation A DTRA-funded researcher was chosen as a DoD National Security Science a researcher was awarded the Presidential Early Career Award for Scientists and Presidential awards showcase the quality of DTRA-funded principal investigator technology mission space. 	n cells could reverse the effects of radiation- of therapeutics to counteract battlefield radiat bic signatures in molecules. The findings sug analysis of nuclear debris, critical for nuclear cal limit for atom interferometric sensors; pub rs for radiological/nuclear search and tunnel tors by taking advantage of a photon-exchar g to the development of field ready, high-reso Engineering for further development. and Engineering Faculty Fellow and another I Engineers. These prestigious DoD and rs working within the CWMD science and	ion ggest lished nge plution				
 FY 2017 Plans: Manage over 150 active basic research awards on a three to five year cycle. addresses the DoD priority on CWMD S&T and supports specific priorities on A and Engineered Resilient Systems. Support the development of the future Science, Technology, Engineering, and talent in WMD research at universities and laboratories. Conduct an annual technical review of each grant to assess the scientific advatechnical objectives and to foster collaboration and build relationships within the conduct an annual external panel review of the basic research program that is will assess the focus and scope of the program related to CWMD challenges ar research across the DoD mission space and the broader basic research communications. FY 2018 Plans: Shape and oversee the CWMD Basic Research portfolio, comprised of approximation three to five year cycle. This portfolio continues to address the DoD priority on C specific priorities on Autonomy, Data-driven Decisions, Electronic Protection, Spinterest. 	The Agency's Basic Research portfolio direct utonomy, Data to Decisions, Electronic Prote Mathematics workforce by supporting world ancements and progress in meeting the awar e scientific community. s open to DoD research stakeholders. The p ad will assess the coordination of CWMD bas unity to avoid duplication and ensure succes kimately 150 active basic research awards of CWMD science and technology, and support ystem Resiliency and other emerging areas of	tly ection, I-class rd's panel sic sful n a s of				

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense T	Threat Reduction Agency	Date: N	1ay 2017				
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601000BR / *DTRA Basic Research	Project (Number/I RU / **Basic Resea	<pre>Dject (Number/Name) I **Basic Research for Countering WMD</pre>				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018			
 Support world-class talent in WMD research at universities and Technology, Engineering, and Mathematics workforce by support Assess entire CWMD Basic Research portfolio on an annual bas Assure progress toward technical objectives and support collabor annual technical review of each grant to assess scientific advance Assess the focus and scope of the program related to CWMD ch across the DoD mission space and the broader basic research co via an External Panel Review. 	laboratories to bolster the development of the future Scien- ting. Isis. Isis. Iorative relationships within the scientific community through the sement. Ihallenges and assess the coordination of CWMD basic res Iommunity to avoid duplication and ensure successful partne	ce, n an earch erships					
	Accomplishments/Planned Programs Sul	btotals 38.288	35.436	37.20			
 C. Other Program Funding Summary (\$ in Millions) N/A <u>Remarks</u> *Prior year funds are related to this project in program element Of <u>D. Acquisition Strategy</u> Procurement methods include competitive selection awards throut <u>E. Performance Metrics</u> Project performance is measured via a combination of statistics is supporting DoD educational goals, number of participating resea 	602718BR. ugh DTRA's Broad Agency Announcement and collaborativ including the number of publications generated, number of arch organizations, and percentage of awards transitioned to	ve funding through ot students trained in so o other programs for	her organizati ciences and e further develo	ons. ngineering opment.			

Exhibit R-2, RDT&E Budget Iten	Threat Red	eduction Agency					Date: May 2017						
Appropriation/Budget Activity0400: Research, Development, Test & Evaluation, Defense-Wide I BA 2:Applied Research					R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research								
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
Total Program Element	831.914	149.302	154.857	157.908	-	157.908	160.417	160.386	162.878	166.692	Continuing	Continuing	
RA: Information Sciences and Applications	160.287	29.133	29.127	30.270	-	30.270	32.325	28.286	29.083	30.077	Continuing	Continuing	
**RD: Detection Technologies	0.000	15.083	15.936	14.769	-	14.769	17.005	18.451	17.677	18.035	Continuing	Continuing	
RE: Counter-Terrorism Technologies	7.677	0.795	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	
**RF: Forensics Technologies	196.608	10.525	10.008	10.274	-	10.274	10.345	10.560	10.771	10.991	Continuing	Continuing	
RG: Defeat Technologies	75.082	10.946	11.304	11.060	-	11.060	11.290	11.530	11.770	12.017	Continuing	Continuing	
RI: Nuclear Survivability	98.286	30.896	34.051	34.103	-	34.103	34.736	35.438	36.161	36.896	Continuing	Continuing	
RL: Nuclear & Radiological Effects	130.489	28.333	28.668	29.228	-	29.228	29.640	30.324	30.999	31.695	Continuing	Continuing	
RM: WMD Counterforce Technologies	79.780	12.873	12.097	14.552	-	14.552	12.612	12.852	13.129	13.395	Continuing	Continuing	
***RR: Countering WMD Test and Evaluation	62.395	10.718	13.666	13.652	-	13.652	12.464	12.945	13.288	13.586	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

*Program Element 0602718BR name changes from WMD Defeat Technologies to Counter Weapons of Mass Destruction Applied Research beginning in FY 2018. **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) Counter Weapons of Mass Destruction (WMD) Applied Research 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 WMD surveillance, detection, defeat, prevention, nonproliferation, counterproliferation, consequence management, and treaty verification.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 De	efense Threat Rec	Juction Agency		Date:	May 2017
Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-W	/ide / BA 2:	R-1 Program El PE 0602718BR	ement (Number/Name) / *Counter Weapons of I	Mass Destruction Applie	ed Research
Applied Research	aina obioctivos as	well as with Scie	nco and Tochnology (S	T) invoctment direction	which is ostablished
annually by DTRA. The objectives directly support policy and	d planning guidan	ce from the Office	of the President, the De	epartment of Defense (I	DoD), and the broader
WMD threat reduction community.			,	· · ·	,,
The portfolio advances DTRA's Countering WMD (CWMD) m the CWMD technology base to maximize future pay-off; capit resolved prior to system-specific technology investigations ar requirements of DTRA, the Military Departments, Combatant	nission by balancir calize on opportun nd development; a Commanders, otl	ng the following in ities to deliver inn and ensure applied her DoD and fede	nperatives: invest in DTI ovative, cost-effective so d research efforts are di ral agencies, and intern	RA's applied research c olutions to technical cha rectly aligned to missior ational partners.	apabilities and increase allenges that must be n-specific capability
B. Program Change Summary (\$ in Millions)	<u>FY 2016</u>	<u>FY 2017</u>	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	152.915	154.857	163.514	-	163.514
Current President's Budget	149.302	154.857	157.908	-	157.908
Total Adjustments	-3.613	0.000	-5.606	-	-5.606
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
Congressional Adds	-	-			
 Congressional Directed Transfers 	-	-			
Reprogrammings	-	-			
SBIR/STTR Transfer	-3.613	-			
Realignments	-	-	-5.606	-	-5.606

Change Summary Explanation

The decrease in FY 2018 from the previous President's Budget submission is due to a shift in investment priorities to fund a test and technology capability gap in this program element and incremental Service Requirement Review Board reductions, as part of the Department of Defense reform agenda, for consolidation and reduction of service contracts.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: May	2017		
Appropriation/Budget Activity 0400 / 2	iation/Budget ActivityR-1 ProgramPE 0602718BMass Destruct						BR I *Counter Weapons of ruction Applied Research			Project (Number/Name) RA I Information Sciences and Applications		
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RA: Information Sciences and Applications	160.287	29.133	29.127	30.270	-	30.270	32.325	28.286	29.083	30.077	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's) 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 through FY 2017. The committee is a senior-level federal advisory committee, which provides independent expert advice on CWMD to the Secretary of Defense for Acquisition, Technology, and Logistics, and the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Matters. This effort also funds the Next Generation Nuclear Professionals (NextGen) activities. This outreach effort 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 2017 to FY 2018 is due to the net effect of increased investment in hazard and effects characterization and technology-driven WMD threat forecasting and decreased investment in advanced analytics and operations analysis, modeling, and simulations.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RA: Information Sciences and Applications	29.133	29.127	30.270
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 2016 Accomplishments: Delivered Integrated Weapons of Mass Destruction Toolset (IWMDT) V4.0 with 100% updated commercial-off-the-shelf software necessary for compliance with Defense Information Systems Agency Information Assurance standards. This release updates and enhances nuclear models, 3D mapping and scenario visualization capabilities, and supports explicit vulnerability modeling for the Defense Intelligence Agency and U.S. Army Nuclear and Chemical Agency. Delivered Virtual Radiation Through Ubiety System (VIRTUS) 1.0 to the Department of Energy Counter Terrorism Operations Support and National Guard Bureau. This baseline virtual training suite of applications for smartphones serves as the basis of curricula training for first responders performing radiation searches and for new sensor familiarization for 57 Weapons of Mass Destruction (WMD) Civil Support Teams. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduc	hibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency						
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RA I Information Sciences and Applications					
B. Accomplishments/Planned Programs (\$ in Millions)		[FY 2016	FY 2017	FY 2018		
 Deployed and provided training on Enhanced Mapping and Positioning Syste CA area with the 9th, 42nd, 91st WMD Civil Support Team (CST), Customs ar Assistance Program Team 7, and Federal Bureau of Investigation. EMAPS is tracking of personnel in GPS-denied settings. The 9th CST will be generating Guard Bureau. Deployed CITRUS text analytic technology to Sandia National Laboratory for technology was demonstrated to be effective in a WMD counter-trafficking mis Collaborated with the U.S. Air Force to successfully connect and distribute da cloud instantiations via a commercial mesh network. This collaboration prepar tests with integrated advanced analytic imagery based-capabilities. Participated in an interagency, large-scale test series of dense gas release. A atmospheric hazard predictions to enhance Consequence Management decisis Developed environmental degradation parameters of airborne chemical ager strike on a WMD facility. In support of the U.S. Strategic Command (USSTRATCOM), developed capa such as infrastructure and economic impacts, from nuclear strike. Developed high fidelity Force-on-Force (phenomenology and effects) compu- integrated with real and virtual sensor responses. Developed high fidelity radiation detection trainer technologies utilizing mobil training with virtual radiation source surrogates. Integrated commercial graphical processor technologies to enable near real- entegrated new first principle high fidelity blast and nuclear fallout codes into suite. Developed a CWMD sensor framework with the Night Vision Laboratory to en modeling and simulation tools. Continued to develop and deploy mobile device-based situational awareness warfighter featuring up-to-date capabilities for route planning, force tracking, a continued to develop and deploy automated methods to consolidate multiple capable of supporting multiple modeling and simulation platforms. FY 2017 Plans: 	em (EMAPS) at training exercises in the San Di nd Border Patrol, Department of Energy Radiolo currently the only capability enabling mapping an official requirement for EMAPS to the Natio r use and evaluation with real world application. ssion. ata from airborne cloud instantiations to ground red two national labs to deploy technology fligh Analyzed data and developed models to improv- ion support. Ints to better characterize collateral effects after abilities to support analysis of higher order effect tational modeling and simulation capabilities le devices and augmented reality displays to er- time high fidelity radiation transport calculations the DOD/DHS/DOE radiation particle transport nable real-time data fusion of deployed sensors s, mission planning, and training tools for the nd geo-tagging items of interest. I-time analysis code with large-scale exercises e geospatial terrain types into a single virtual glo	ego, ogical and nal This t re a cts, a code s with in obe					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct	tion Agency		Date: N	lay 2017	
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Projec RA / //	ct (Number/I	Name) ciences and A	Applications
B. Accomplishments/Planned Programs (\$ in Millions)		Γ	FY 2016	FY 2017	FY 2018
 Initiate development of concepts and explore capabilities for enabling data contended of the conduct a large-scale test series in collaboration with interagency improve atmospheric hazard predictions and consequence management. Development of develop and integrate a CWMD sensor framework in collaboratio CBRN Sensor Interface sponsors (DTRA's Nuclear Technologies and Counter Program Executive Office for Chemical and Biological Defense) to enable real-and simulation tools. Continue to develop environmental degradation parameters of airborne non-tocollateral effects after a strike on a WMD facility. Continue to develop and enhance high fidelity radiation detection training approximate to develop and enhance high fidelity radiation detection training approximate to develop and enhance high fidelity radiation detection training approximate to develop and enhance high fidelity radiation detection training approximate to develop and enhance high fidelity radiation, and data archite from nuclear detonation, to include physical infrastructure, political, and econor Continue to develop automated methods to consolidate multiple geospatial test supporting multiple modeling and simulation platforms. Continue to develop faster-than-real-time analysis code for use in large-scale assessments, and conduct independent validation and verification for DD lew of Continue to manage and support the Threat Reduction Advisory Committee. review of the chemical, biological, and nuclear issues on the Korean Peninsula - Continue to activities. The effort will attempt to expand interest in the non-governmental organizations. 	pollection, fusion, and analysis supporting DTRA y on dense gas release and to develop models relop enhancements and modifications to code on with the Night Vision Laboratory and Common terrorism Technologies Divisions and the Joint time data fusion of deployed sensors with models araditional chemical agents to better characterizes s) computational modeling and simulation plications for use in mobile devices. training with virtual radiation source surrogates of DoD Distributed Common Ground/Surface iant architectures. cture capabilities for analysis of higher order e mic impacts. errain types into a single virtual globe capable of geo-tagging applications to support warfighter e nuclear physical security threat and vulnerabile el accreditation. The Committee will be completing a top to bot a. through the Naval Postgraduate School, and gen nuclear enterprise by engaging the French nuclear nuclear enterprise by engaging the French nuclear solutions is a single virtual solution is a single virtual and vulnerable enclear physical security threat and vulnerable of the virtual solution is a single virtual of the virtual solution is a single virtual and vulnerable of the virtual solution. The Committee will be completing a top to bot a. here and the virtual postgraduate School, and gen nuclear enterprise by engaging the French nuclear is a single virtual solution is a single virtual solution	A's to s on deling ze s. ffects of lity ttom rant clear			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Redu	ction Agency	Date: N	May 2017	
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name)IPE 0602718BR I *Counter Weapons of Mass Destruction Applied ResearchI	Project (Number/ RA / Information S	Name) ciences and A	pplications
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
 Continue to pursue methodologies and explore capabilities for enabling dat analysis / synthesis of emerging and disruptive technology information that s Forecasting program. Continue to develop data anomaly detection and analysis technology as pa System and Intelligence Community Information Technology Enterprise-com Continue to develop enhancements to modeling, simulation, and data archi from nuclear detonation, to include physical infrastructure, political, and ecom Continue maturation of DTRA Experimental Laboratory capabilities in suppredevelopment mission areas. Enhance the software stack to include a minimum of two new nuclear effect Mission Planning Analysis System (MPAS) allowing the use of the user interfwithin the USSTRATCOM operational environment Continue to develop high fidelity Force-on-Force (phenomenology and effect capabilities integrated with real and virtual sensor responses. Continue to conduct a large-scale test series in of with interagency on dense models to improve atmospheric hazard predictions; improvement of models red support of combat operations. Continue to develop and integrate a CWMD sensor framework in collaborat CBRN Sensor Interface sponsors (DTRA's Nuclear Technologies and Counter Program Executive Office for Chemical and Biological Defense) to enable real and simulation tools. Continue to develop and enhance high fidelity radiation detection training an Continue to develop and enhance high fidelity radiation detection training an Supporting multiple modeling and simulation platforms. Continue to develop and enhance high fidelity radiation detection training an Continue to develop and enhance high fidelity radiation detection training an Continue to develop and enhance high fidelity radiation detection training an Continue to develop and enhance high fidelity radiation detection training an Continue to develop and enhance high fidelity radiation detection training an Continue to develop	a collection, toolset automation, and distributed upports the Technology-Driven WMD Threat rt of DoD Distributed Common Ground/Surface pliant architectures. tecture capabilities for analysis of higher order effi- iomic impacts. ort of whole-of-government CWMD research and t phenomenology code capabilities in support of th face and web services to acquire effects assessm cts) computational modeling and simulation e gas release and to develop enhancement of reduces uncertainty of analyses used by staff codes supporting analysis of test results. the non-traditional chemical agents to characterize uces uncertainty in collateral effects from WMD in ion with the Night Vision Laboratory and Commor erterrorism Technologies Divisions and the Joint al-time data fusion of deployed sensors with mode pplications for use in mobile devices. e training with virtual radiation source surrogates. terrain types into a single virtual globe capable of d geo-tagging applications to support warfighter-	ects le ents	20.427	20.070
	Accomplishments/Planned Programs Subto	tals 29.133	29.127	30.270

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: Ma	y 2017	
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied ResearchProject (RA / Info				Number/Name) rmation Sciences and Applications		
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>									
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					Cost To	
Line Item	FY 2016	<u>FY 2017</u>	Base	000	<u>Total</u>	FY 2019	FY 2020	<u>FY 2021</u>	FY 2022	<u>Complete</u>	Total Cost
• 26/0603160BR: Counter	11.494	11.422	10.229	-	10.229	11.983	12.183	12.468	12.733	Continuing	Continuing
Weapons of Mass Destruction											
Advanced Technology Development											
• 154/0605502BR: Small	10.473	-	-	-	-	-	-	-	-	Continuing	Continuing
Business Innovation Research											
<u>Remarks</u>											

D. Acquisition Strategy

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

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency								Date: May 2017				
Appropriation/Budget Activity 0400 / 2				R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) **RD / Detection Technologies				
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
**RD: Detection Technologies	0.000	15.083	15.936	14.769	-	14.769	17.005	18.451	17.677	18.035	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 2016 to FY 2017 is due to increased investment in radiation detection and nuclear threat detection intelligence, surveillance, and reconnaissance. The decrease from FY 2017 to FY 2018 is due to a shift in investment priorities to fund test and technology development requirements and full effects modeling.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RD: Detection Technologies	15.083	15.936	14.769
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 Accomplishments: Discovered/identified nuclear threat signatures, characteristics, and corresponding detection modalities and collection systems. Developed algorithms for rapidly and effectively analyzing all-source intelligence to identify nuclear threats. Developed prototype systems to remotely monitor small and wide areas that may produce or contain nuclear threats. Developed algorithms to synthesize the collection and analysis of multiple nuclear threat signatures to improve assessment confidence and cuing of potential nuclear threat events. Executed 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. Down-selected sensor materials for integration into detection systems. Down-selected detection system algorithms for processing and integration into detection systems to improve user capabilities. Researched and 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. Investigated viability of ultra-low power, long-duration programmable remote radiation monitoring systems. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Rec		Date: N	lay 2017		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Project (**RD / <i>D</i>	Number/I		
B. Accomplishments/Planned Programs (\$ in Millions)		F	Y 2016	FY 2017	FY 2018
- Investigated organic semiconductors and photo-detectors to improve dete	ction system performance.				
 FY 2017 Plans: Continue to develop technologies to identify and catalogue nuclear threat corresponding detection modalities and collection systems. Continue to develop algorithms and tools for rapid analysis of all-source in continue to develop initial technologies and subsystems to remotely moninuclear threats. Continue to develop algorithms and tools to synthesize the collection and to improve assessment confidence and cuing of potential nuclear threat every. Continue to test and evaluate developmental radiation detection systems to techniques for transition to advanced technology development efforts. Develop technologies for next generation nuclear imaging devices with ne enabling warfighters to rapidly pinpoint and identify detected radioisotopes. Develop technologies enabling interoperable architectures for enhanced, pictures within a shared or distributed area of operations. Develop techniques and technologies for alternative signature detection, plocate nuclear threats. Develop novel detection materials and advanced Helium-3 replacement teto increase range, sensitivity, and accuracy of detection and enable warfighters. 	signatures and characteristics and to formulate ntelligence to identify nuclear threats. tor small and wide areas that may produce or con- analysis of multiple nuclear threat signatures in c ents. to identify the best performing technologies and eutron and dual gamma and neutron imaging cap- real-time mission analysis and common operation processing, and exploitation methods to detect ar echnologies into prototype radiation detection sys inters to more rapidly locate targeted material. ims to enhance the range of detectability of targe	ntain order ability, nal tems ted			
 FY 2018 Plans: Continue to develop radiation and nuclear threat detection systems to ider for transition to advanced technology development efforts. Continue to develop technologies for next generation nuclear imaging development to develop technologies to enable interoperable architectures for operational pictures within a shared or distributed area of operations. Continue to develop and integrate novel detection materials and advanced radiation detection systems to increase range, sensitivity, and accuracy of ot targeted material. Continue to develop, integrate, and demonstrate prototype radiation and m communications capabilities to enhance the range of detectability of targeted 	ntify the best performing technologies and technic rices with dual gamma and neutron imaging capa r enhanced, real-time mission analysis and comn d helium-3 replacement technologies into prototy detection and enable warfighters to rapidly locate nuclear threat detection algorithms, electronics ar ed material.	ques bility, non pe nd			

Exhibit R-2A, RDT&E Project Justi	fication: FY	2018 Defens	se Threat Re	eduction Age	ency				Date: M	ay 2017	
Appropriation/Budget Activity 0400 / 2	R-1 Pr PE 06 <i>Mass</i>	R-1 Program Element (Number/Name)ProjPE 0602718BR I *Counter Weapons of Mass Destruction Applied Research**RI					ject (Number/Name) D / Detection Technologies				
B. Accomplishments/Planned Prog	<u>rams (\$ in N</u>	<u>/lillions)</u>						Γ	FY 2016	FY 2017	FY 2018
 Initiate investigation of computer leanuclear threat identification. Initiate investigation of various sens Identify exploitable observables to i presence of nuclear threats. 	arning and co or capabilitie nform technc	omputer visions for far-fielo logy develo	on technolog d identificatio pment and ir	ies to enhan on and tracki nvestigate er	ice nuclear t ng of nuclea nerging tech	hreat situatic r threats. nologies tha	nal awarene t indicate the	ess and			
<u></u>				Accon	nplishments	s/Planned P	rograms Su	btotals	15.083	15.936	14.769
C. Other Program Funding Summa	ry (\$ in Milli	ons)									
Line Item • 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development Remarks	FY 2016 26.415	FY 2017 17.775	<u>FY 2018</u> <u>Base</u> 17.556	<u>FY 2018</u> <u>OCO</u> -	<u>FY 2018</u> <u>Total</u> 17.556	<u>FY 2019</u> 18.530	<u>FY 2020</u> 20.697	<u>FY 202</u> 21.25	<u>1 FY 2022</u> 0 21.68 ⁷	Cost To Complete Continuing	Total Cost Continuing
D. Acquisition Strategy Competitive selection of most approp the Department of Defense and othe	oriate perforn r governmen	ners to fulfill t agency lab	science and	l technology cademia, ind	developmer	it needs. Pe	rformer base artner organi	e includes zations.	best-of-bree	d researchers	s across

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 Ju	stification	FY 2018 D	Defense Thr	eat Reduct	tion Agenc	;y				Date: Mag	y 2017	
Appropriation/Budget Activity 0400 / 2					R-1 Prog PE 0602 Mass De	gram Eleme 718BR / *Co struction Ap	e nt (Numbe ounter Weaµ oplied Resea	r/Name) oons of arch	Project (N RE / Coun	lumber/Na ter-Terroris	me) sm Technolo	gies
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	B FY 2018 Total	3 FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RE: Counter-Terrorism Technologies	7.677	0.795	0.000	0.000) -	- 0.00	00.00	0.000	0.000	0.000	Continuing	Continuing
A. Mission Description and Bud	get Item J	ustification	1									
of Mass Destruction (WMD) thus storage, and weaponization facilit The decrease from FY 2016 to F' sampling tool.	enabling wi ies. See p 7 2017 is di	arfighters to aragraph C ue to the rel	improve th . for other p lative impac	eir ability to rogram fun t of a one-f	o detect, d iding. time increa	isable, inter	dict, neutral	ze, and des t execution i	n FY 2016 t	al, biologica	al, nuclear p ent in a che	roduction, mical
B. Accomplishments/Planned P	rograms (a		<u>s)</u>						Fì	0 705	FY 2017	FY 2018
States Special Operations Comm technologies for warfighters; the U R&D resources sent directly to US FY 2016 Accomplishments: - Developed a chemical sampling the environment.	tool to fit a	COM), in the Countering or warfighte	ment (RdB WMD – Te r-unique co m factor. Th	is tool prev	Vents chen	nical hazard	evice Defeat ersight of co	counterprolife	MD ration and			
					Accomp	lishments/l	Planned Pro	ograms Sub	ototals	0.795	-	-
C. Other Program Funding Sum	<u>mary (\$ in</u>	<u>Millions)</u>	FY	2018 FY	<u>/ 2018 </u>	FY 2018					Cost To	
<u>Line Item</u> • 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Developme <u>Remarks</u>	FY 20 107.2 nt	9 <u>16 FY 2</u> 265 102.	017 E 976 103	3ase 3.869	<u>000</u> -	<u>Total</u> 103.869	<u>FY 2019</u> 105.915	<u>FY 2020</u> 108.099	<u>FY 2021</u> 110.632	<u>FY 2022</u> 112.871	Complete Continuing	Total Cost Continuing
PE 0602718BR: *Counter Weapor	ns of Mass I	Destruction	Арр	UN	ICLASSI	FIED					Vo	lume 5 - 17

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R-1 Line #20

Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Justification: FY 2018	Defense Threat Reduction Agency	Date: May 2017
Appropriation/Budget Activity 400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Project (Number/Name) RE / Counter-Terrorism Technologies
0. Acquisition Strategy N/A		
E. Performance Metrics Number of technologies developed and delivered, and/o success and reduce the number of current gaps in Spec	or proof of concept, or successful Military Utility Assessments conc cial Operations Forces capabilities to counter weapons of mass de	ducted that increase the potential mission estruction.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: May 2017			
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) **RF / Forensics Technologies			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
**RF: Forensics Technologies	196.608	10.525	10.008	10.274	-	10.274	10.345	10.560	10.771	10.991	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 U.S. Government lead for post-detonation National Technical Nuclear Forensics (NTNF) research and development (R&D). As the central NTNF R&D coordinator, DTRA works in consultation with interagency partners to develop and improve ground-based capabilities supporting exploitation and attribution missions.

The decrease from FY 2016 to FY 2017 is due to decreased investment in prompt nuclear effects exploitation for attribution. The increase from FY 2017 to FY 2018 is due to increased investment in nuclear device characterization for forensics.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RF: Forensics Technologies	10.525	10.008	10.274
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 2016 Accomplishments: Accelerated development of the propagation of prompt diagnostics phenomenology to support the deployment of ground-based sensor capabilities in three U.S. cities for post-detonation prompt diagnostics under the DISCREET OCULUS program. Developed, tested, and demonstrated upgraded technical capabilities for prompt diagnostics, debris collection, sample analysis, and modeling to support nuclear device reconstruction, and forensics data to decrease timeline, lower uncertainties, and increase confidence in technical nuclear forensics conclusions. Utilized cooperative R&D relationship with the UK to conduct peer review of nuclear forensics technologies and validation of U.S. DISCREET OCULUS system models. 			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct	tion Agency		Date: N	1ay 2017	
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Projec **RF /	ct (Number/N Forensics Te	Name) echnologies	
B. Accomplishments/Planned Programs (\$ in Millions)		ſ	FY 2016	FY 2017	FY 2018
 Develop, test, and evaluate new and improved technologies for prompt diagn diagnostics, and technical capability modeling to support nuclear device reconsuncertainty, and increase confidence in technical nuclear forensics conclusions Develop, test, and evaluate new and improved technologies and processes for and verification in order to decrease timeline, lower uncertainty, and increase of conclusions supporting attribution. Investigate and develop novel concepts enabling radical reductions in the time debris and conduct analyses in the field, and to obtain significant forensic resule. Investigate and develop techniques and algorithms to analyze, combine, and (SoS) phenomena in an urban environment to increase the effectiveness of null. Evaluate and expand current understanding of propagation and transport of p an urban environment to support the planned deployment of ground-based ser Conduct interagency and international research evaluation events to assess p capability gaps in forensic conclusion confidence, timeliness, and accuracy. Engage with partner nations under appropriate international agreements to in phenomenology, improve modeling tools, and improve sensor technologies. Expand international collaboration in the area of experiments and modeling ir analysis. 	ostics, debris collection, data analysis, debris struction, as well as to decrease timeline, lowe is supporting attribution. or National Technical Nuclear Forensics valida confidence in technical nuclear forensics e required to reach target areas, to collect falle Its and attribution conclusions. integrate speed-of-light (SoL) and speed-of-so clear detonation yield determinations. orompt diagnostics phenomenologies (SoL, So nsor capabilities (U.S. Prompt Diagnostics Sys process improvements and identify potential nprove the understanding of prompt	r tion but bund S) in tem).			
 FY 2018 Plans: Continue to develop and evaluate new and improved prompt diagnostics, determination device modeling concepts and methodologies to support nuclear device reconstructainty of, and increase confidence in technical nuclear forensics conclusion. Continue to engage with partner nations under appropriate international agree phenomenology, improve modeling tools, and improve sensor technologies. Continue to develop and improve techniques and algorithms to analyze, common of-sound (SoS) phenomena in an urban environment to increase the effective methodeterminations and weapon characterizations. Initiate investigation and evaluation of innovative ground-based prompt diagnubiquitous networks and sensors with reduced size, weight, and power consum operational capability and flexibility. Continue to expand international collaboration in the areas of experiments and reconstruction tools and analysis. 	oris collection, analysis and diagnostics, and struction, as well as decrease timelines for, low ons supporting attribution. ements to improve understanding of prompt bine, and integrate speed-of-light (SoL) and sp ness and accuracy of nuclear detonation yield oostic sensor concepts and technologies, such nption, to improve sensor portability and expar	ver beed- as nd			

Exhibit R-2A, RDT&E Project Justif	ication: FY	2018 Defens	se Threat Re	eduction Age	ncy				Date: Ma	iy 2017			
Appropriation/Budget Activity 0400 / 2				R-1 Pi PE 06 <i>Mass</i>	ogram Eler 02718BR / * Destruction /	n ent (Numb Counter Wea Applied Rese	e r/Name) apons of earch	Projec **RF /	roject (Number/Name) RF / Forensics Technologies				
B. Accomplishments/Planned Prog	rams (\$ in N	<u>//illions)</u>						Γ	FY 2016	FY 2017	FY 2018		
 Continue to develop and evaluate ne surrogate debris and representative is and decrease timelines, lower uncerta attribution. Continue to investigate and develop debris collections, conduct analyses i 	sotopes, to s ainties, and i novel conce n the field, a	upport post- increase con epts enabling nd obtain nu	detonation N fidence in te g radical reducear forens	ation technical Tech echnical nucl uctions in the	nical Nucle ear forensice e time requir	ar Forensics conclusions ed to conduc	laboratory and supporting t ground fallo	nalysis out					
,,,,,				Accon	nplishments	s/Planned P	rograms Sul	ototals	10.525	10.008	10.274		
C. Other Program Funding Summa	<u>y (\$ in Milli</u>	<u>ons)</u>											
Line Item • 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development • 123/0605000BR: Counter Weapons of Mass Destruction Systems Development Remarks	FY 2016 40.373 7.156	FY 2017 38.540 4.568	FY 2018 Base 40.286 6.727	<u>FY 2018</u> <u>OCO</u> -	<u>FY 2018</u> <u>Total</u> 40.286 6.727	FY 2019 42.580 6.710	FY 2020 40.925 5.367	FY 202 42.14 5.89	FY 2022 4 43.124 9 6.172	Cost To Complete Continuing Continuing	Total Cost Continuing Continuing		

D. Acquisition Strategy

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

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Ju	eat Reducti	ction Agency				Date: May 2017						
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) RG I Defeat Technologies			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RG: Defeat Technologies	75.082	10.946	11.304	11.060	-	11.060	11.290	11.530	11.770	12.017	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 increase from FY 2016 to FY 2017 is due to increased investment in CWMD weapons technologies. The decrease from FY 2017 to FY 2018 supports the funding profile for CWMD weapons technologies' planned activities.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RG: Defeat Technologies	10.946	11.304	11.060
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 2016 Accomplishments: Developed and demonstrated autonomous air and ground vehicle collaboration for the Modular Autonomous Countering WMD System, Increment B. This demonstration proved interoperability concepts for a robust family-of-systems approach to functionally defeating targets of interest, integrating mapping, improved communications, sensor/payload execution, and intelligence gathering capabilities. Conducted static demonstration of initial capability of access denial and denial-of-use technologies against WMD representative targets. Completed electronics susceptibility to electromagnetic fields algorithm development and characterization testing. Down-selected electromagnetic source and initiated system development and integration. Conducted sub-scale tests to assess capability to accurately measure WMD simulant released in a plume. 			

Exhibit R-2A, RDT&E Project Justifi		Date: May 2017									
Appropriation/Budget Activity 0400 / 2				R-1 P PE 06 <i>Mass</i>	rogram Eler 02718BR / * Destruction	ment (Numb Counter We Applied Res	er/Name) apons of earch	Project (RG / Defe	Number/N eat Techno	ame) logies	
B. Accomplishments/Planned Progr	rams (\$ in N	<u>/lillions)</u>						F	Y 2016	FY 2017	FY 2018
- Continued classified system design a	and integrat	ion work and	d initiated de	monstration	S.						
FY 2017 Plans: - Continue classified component/syste - Continue static demonstrations of ac - Conduct sub-scale tests of new stan - Continue sub-scale tests to assess of - Continue to develop electromagnetic	em design a ccess denial doff weapor capability to c source to f	nd developn and denial- payloads to accurately n unctionally o	nent. of-use techn o defeat che neasure WM defeat WMD	ologies agai mical and bi ID simulant r threats.	nst represer ological war released in <i>a</i>	itative WMD fare targets. i plume.	threats.				
<i>FY 2018 Plans:</i> - Continue static demonstrations of ac - Conduct scaled demonstrations of ac - Continue sub-scale tests of new star - Continue sub-scale tests of emerger	ccess denial ccess denia ndoff weapo nt technolog	and denial- l and denial- n payloads t ies to accura	of-use techn -of-use techr to defeat che ately measur	ologies agai nologies aga emical and b re WMD simi	nst represer inst represe iological war ulant release	ntative WMD ntative WMD fare targets. ed in a plume	threats. threats.				
				Accor	nplishment	s/Planned P	rograms Sι	ubtotals	10.946	11.304	11.060
C. Other Program Funding Summar	y (\$ in Milli	ons)									
Line Item • 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development <u>Remarks</u>	FY 2016 21.002	FY 2017 20.710	FY 2018 Base 22.161	<u>FY 2018</u> <u>OCO</u> -	FY 2018 Total 22.161	<u>FY 2019</u> 22.557	<u>FY 2020</u> 23.031	<u>FY 2021</u> 23.145	FY 2022 23.619	Cost To Complete Continuing	<u>Total Cost</u> Continuing
 D. Acquisition Strategy Competitive selection of most approp DoD and other government agency la E. Performance Metrics Percentage of CWMD technologies set 	riate perforr boratories, elected for t	ners to fulfill academia, ir ransition to a	science and ndustry, and advanced te	l technology internationa chnology de	developmer I partner org velopment (6	nt needs. Pe anizations. 5.3) and adva	rformer base	e includes be onent develo	est-of-bree opment and	d researcher d prototypes	s across (6.4).

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May 2017		
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) RI I Nuclear Survivability			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RI: Nuclear Survivability	98.286	30.896	34.051	34.103	-	34.103	34.736	35.438	36.161	36.896	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, case study reviews, and the Joint Atomic Information Exchange Group. The Human Su

The increase from FY 2016 to FY 2017 is due to the net effect of increased investment in system vulnerability and assessment, nuclear weapons effects experimentation, and nuclear technology analysis support and decreased investment in radiation-hardened nano-electronics.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RI: Nuclear Survivability	30.896	34.051	34.103
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 2016 Accomplishments: Completed redesign and testing of critical communications radios for new fleet of presidential helicopters to meet C3 systems survivability standards for High-Altitude Electromagnetic Pulse (HEMP) events. This technology transitioned to the U.S. Navy and the White House Military Office. Initiated HEMP survivability testing and risk assessments for the F-15E Dual Capable Aircraft platform as part of Continuous Wave Illumination planning and testing efforts. This was the first such test for a combat Dual Capable Aircraft. 			

PE 0602718BR: *Counter Weapons of Mass Destruction App... Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct		Date: N	1ay 2017		
Appropriation/Budget Activity 0400 / 2	ct (Number/I uclear Surviv	lame) ability			
B. Accomplishments/Planned Programs (\$ in Millions)		ſ	FY 2016	FY 2017	FY 2018
 Transitioned Single Event Transient research and mitigation from legacy to 32 Developed innovative techniques to produce 5X improvement in warm x-ray (simulator. Performed a System Generated Electro-Magnetic Pulse radiation effects experiment of Facility (NIF). Initiated development of Satellite System Nuclear Survivability protection desi Initiated a low power design using one 1-D grid design guidelines in a RadHa Conducted electromagnetic pulse assessments on defense critical infrastructure Upgraded electron-beam (cold x-ray) test capability at the DTRA West Coast Updated cost estimates to harden methodology protocols for aircraft, missile, Published MIL-STD-4023, High-Altitude Electromagnetic Pulse Protection for Nuclear Environment military standards. Updated MIL-STD-188-125 -1/2, High-Altitude Electromagnetic Pulse Protection for F Published MIL-HDBK-423 High-Altitude Electromagnetic Pulse Protection for F Published Aircraft High Altitude EMP Protection Handbook. Published Satellite System Nuclear Survivability Protection Military Standard. 	2 nanoscale technology nodes. 10-50 keV) test capability for Double-Eagle eriment for 2-dimensional code validation on the gn handbook. rd foundry. ure for electric power and telecommunications Facility to allow testing at 2X current capability and satellite systems. Maritime Assets and Comprehensive Atmospl ion for Fixed and Transportable Facilities and ixed facilities.	ne /. neric			
 FY 2017 Plans: Complete manufacture of maskless e-beam lithography tool prototype in a true Develop and integrate the latest human radiation exposure models into currer Develop model to evaluate synergistic effects of nuclear weapon combined in Develop advanced warm x-ray source concepts. Develop well-characterized x-ray test environments at the NIF. Continue to develop a RadHard-by-Design microprocessor with less than 22n Evaluate High Altitude Electromagnetic Pulse (HEMP) threat survivability for A ground facilities. Investigate electromagnetic pulse effects on power grid transformers, as part Kingdom on critical civilian and defense infrastructure. Provide nuclear scintillation expertise to DoD and Service Program Executive channel simulators and new survivable satellite communication systems. Publish a Surface/Near-Surface Nuclear Weapon Environment Military Standards 	sted foundry. ht predictive modeling software. juries. m commercial technology. Aegis Ashore-Poland and satellite communicat of a collaborative research effort with the Unite Offices (PEOs) to assist in certification of dist ard to assist DoD and Service PEOs.	tion ed urbed			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct	Date: May 2017					
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Project (Number/I RI / Nuclear Surviv	Number/Name) ear Survivability			
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018		
 Publish update to MIL-STD-188-125-1, HEMP Protection for Ground-Based C Missions: Part 1 Fixed Facilities. Publish Nuclear Disturbed Communications Environment Annex to the Conso Military Standard to assist DoD and Service PEOs. 	C4I Facilities Performing Critical, Time-Urgent	es				
 Initiate nuclear countermeasure and glass penetration injury criteria modeling Radiological & Nuclear Environments (HENRE) R&D computer code and, upor Strategic Command (USSTRATCOM) and DTRA operational codes; this mode selecting and supporting specific nuclear countermeasures. Complete development of and implement a methodology for comprehensive a Radiological, and Nuclear Mission-Critical Reports for nuclear survivability and per DoDI 3150.09. Continue to evaluate High Altitude Electromagnetic Pulse (HEMP) threat survicommunication ground facilities. Continue to investigate electromagnetic pulse effects on power grid transform the United Kingdom on critical civilian and defense infrastructure. Continue to provide nuclear scintillation expertise to DoD and Service Progra of disturbed channel simulators and new survivable satellite communication sy Publish update to MIL-STD-188-125-1, HEMP Protection for Ground-Based C Missions: Part 1 Fixed Facilities and update to MIL-HDBK-423 HEMP Protection 1 Fixed Facilities, Part I. Publish Nuclear Disturbed Communications Environment Annex to the Consor Military Standard to assist DoD and Service PEOs. Continue to develop or initiate development of and demonstrate an advanced and design margins for code validation and electronics certification. Demonstrate an advanced Single Wire Radiator array warm x-ray source on 1 strategic reentry systems survivability. Demonstrate multi-point x-ray sources at the National Ignition Facility to improvimination and electronics certification to improve the provime survivability. 	g in DTRA's existing Health Effects from n validation and verification, update United Sta eling will assist DoD and other federal agencies analysis of the DoD Chemical, Biological, I hardening of Mission-Critical Systems/Equipm vivability for Aegis Ashore-Poland and satellite hers, as part of a collaborative research effort of m Executive Offices (PEOs) to assist in certific stems. C4I Facilities Performing Critical, Time-Urgent on for Ground-based, Mission-Critical Facilities olidated Afloat Networks and Enterprise Servic esile Defense Complex, Ft. Greely, AK. capability at the DTRA West Coast Facility for d warm x-ray spectrometer to reduce uncertain Double-EAGLE at the DTRA West Coast Facil ove cold x-ray test capabilities for strategic and	ates s in nent with cation s Part ces lity for d				

Exhibit R-2A, RDT&E Project Justif	ication: FY	2018 Defens	se Threat Re	duction Age	ncy				Date: Ma	ay 2017		
Appropriation/Budget Activity 0400 / 2				R-1 Pr PE 060 <i>Mass I</i>	ogram Elei 02718BR / ³ Destruction	nent (Numb Counter We Applied Res	er/Name) apons of earch	Projec RI / Nu	Project (Number/Name) RI / Nuclear Survivability			
B. Accomplishments/Planned Prog	rams (\$ in M	<u>/lillions)</u>						Γ	FY 2016	FY 2017	FY 2018	
 Demonstrate a large-area direct last certification. Complete study of satellite solar power Support Missile Defense Agency continue to develop the 16/14nm R Continue development of Complement radiation hardened micro and nano-eeric continue development of RHBD Sime Signal Devices. Complete development of the Satellite Complete exploration of technology information theory and transition result. 	er impulse te ver array res ld x-ray surv adiation Hard entary e-Bea lectronics. Igle Event Ef ite System N -agnostic rac	est capability ponse phen- ivability expe dened by De im Lithograp fects (SEE) latural & Nuc liation harde	at the Nation omenologies eriments at the sign (RHBD hy (CeBL) te mitigation te clear Enviror ning for Boo	nal Ignition F s in pulsed x- ne National I) Library. echnologies for chniques for ment Protect lean logic ar	Facility for signal for a signa	rategic syste ments. lity. e cost of low tal CMOS ar ird. s using the p	em survivabil volume Do[nd Analog M rinciples of) ixed				
		ין שטו א חוו	ogram.	Accom	nplishment	s/Planned P	rograms Su	btotals	30.896	34.051	34.103	
C. Other Program Funding Summa Line Item • 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development Remarks D. Acquisition Strategy Competitive selection of most approp the DoD and other government agen E. Performance Metrics Percentage of CWMD technologies s	Accomplishments/Planned Programs Subtotal ar Program Funding Summary (\$ in Millions) Line Item FY 2016 FY 2017 Base OCO Total FY 2019 FY 2020 FY 2020								<u>1 FY 2022</u> 2 7.132 best-of-breed	Cost To Complete Continuing	Total Cost Continuing s across (6.4).	
					0.5.5.5							

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May	2017	
Appropriation/Budget Activity 0400 / 2	У				R-1 Progra PE 060271 <i>Mass Dest</i>	am Element 8BR / *Cou ruction Appl	: (Number/I nter Weapo ied Researd	Name) ons of ch	Project (Number/Name) RL <i>I Nuclear & Radiological Effects</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RL: Nuclear & Radiological Effects	130.489	28.333	28.668	29.228	-	29.228	29.640	30.324	30.999	31.695	Continuing	Continuing
<u>A. Mission Description and Bud</u> The Nuclear and Radiological Effe	get Item Ju ects project	istification develops m	nodeling too	ols to: suppo	ort military c	operational p	lanning, we	eapons effe	cts predictio	ons, and str	ategic syste	m 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 increase from FY 2016 to FY 2017 is due to increased investment in targeting support. The increase from FY 2017 to FY 2018 is due to increased investment in full effects modeling.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RL: Nuclear & Radiological Effects	28.333	28.668	29.228
Description: Project RL develops nuclear and radiological assessment modeling tools to support military operational planning, weapons effects predictions, and strategic system design decisions.			
 FY 2016 Accomplishments: Delivered air blast, fallout, fire, and Source Region Electromagnetic Pulse models to United States Strategic Command (and other nuclear targeting and consequences of execution users) for improved nuclear targeting using nuclear effects that have not been considered in the past. Developed 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. Continued to develop a selected historical nuclear weapon outputs and effects standard database for validating Nuclear Weapons Effects codes. Continued implementation of first principle modeling tools for nuclear fire initiation and spread in urban and suburban environments. Via the Nuclear Weapons Effects Network, continued modeling economic and social consequences of nuclear detonation effects and collateral building damage due to nuclear-induced air blast, assessed nuclear dust/debris effects on airborne systems, and modeled nuclear fire initiation, allowing these considerations to be part of targeting analyses. Improved high altitude nuclear effects functionality for use in analyzing satellite and missile defense responses to a nuclear environment. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency Date: May 2017										
Appropriation/Budget Activity 0400 / 2	Project (Number/Name) RL / Nuclear & Radiological Effects									
B. Accomplishments/Planned Programs (\$ in Millions)	Γ	FY 2016	FY 2017	FY 2018						
- Improved foreign nuclear weapon outputs, environment models, and Effects I										
 FY 2017 Plans: Deliver initial nuclear induced fire initiation and spread modeling capability. Develop nuclear weapons effects tools and analyses for effective targeting, in execution of a given course of action. Develop enhanced High Altitude Radiation Phenomenology functionality for u. Develop initial weapon output spectrum extension required by missile defense accomplish their designated missions when exposed to a nuclear weapons environment. Develop a consistent, state-of-the-art combined effects methodology to ensure missions when exposed to a nuclear weapons environment. Continue to develop an authoritative source of foreign and historical nuclear weapons into a survivability standards, hardening technologies, and the experimental to a Maintain a virtual interagency and international coalition combining capabilitie into cohesive "networks" of people, knowledge, and infrastructure to synchronic weapon effects community of interest. 	ncluding methods to evaluate the consequence use on modern computer systems. e systems to ensure critical systems can vironment. re critical systems can accomplish their design weapon outputs to aid in the development of un test capabilities. es of existing government and industry organizate ze research and development across the nucle	es of ated hiform ations ear								
 FY 2018 Plans: Continue to develop nuclear weapons effects tools and analyses for effective consequences of execution of a given course of action. Continue to develop enhanced High Altitude Radiation Phenomenology funct Continue to develop initial weapon output spectrum extension required by mis can accomplish their designated missions when exposed to a nuclear weapons Continue to develop combined effects methodologies to ensure critical system exposed to a nuclear weapons environment. Continue to develop an authoritative source of foreign and historical nuclear weapons nuclear survivability standards, hardening technologies, and experimental test 	targeting, including methods to evaluate the ionality for use on modern computer systems. ssile defense systems to ensure critical system s environment. ns can accomplish their designated missions v weapon outputs to aid in the development of un capabilities.	ns vhen niform								
	Accomplishments/Planned Programs Sub	totals	28.333	28.668	29.228					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: Ma	y 2017	
Appropriation/Budget Activity 0400 / 2	R-1 P I PE 06 <i>Ma</i> ss	R-1 Program Element (Number/Name)Project (IPE 0602718BR / *Counter Weapons ofRL / NucleMass Destruction Applied ResearchRL / Nucle					Number/Name) ear & Radiological Effects				
C. Other Program Funding Summa	ary (\$ in Milli	ons <u>)</u>									
Line Item • 26/0603000BR: Counter Weapons of Mass Destruction Advanced Technology Development	<u>FY 2016</u> 0.000	<u>FY 2017</u> 3.528	FY 2018 Base 3.500	<u>FY 2018</u> <u>OCO</u> -	<u>FY 2018</u> <u>Total</u> 3.500	<u>FY 2019</u> 3.456	<u>FY 2020</u> 3.457	<u>FY 2021</u> 3.455	<u>FY 2022</u> 3.455	Cost To Complete Continuing	Total Cost Continuing
Remarks *Prior year funds related to this this	project in pro	gram eleme	nt number 0	605000BR.							
D. Acquisition Strategy Competitive selection of most appro DoD and other government agency E. Performance Metrics	opriate perforr laboratories,	ners to fulfill academia, ir	science and ndustry, and	t technology internationa	developmer I partner org	nt needs. Pe anizations.	erformer base	e includes be	est-of-breec	I researchers	s across
Percentage of Counter WMD techno	ologies select	ed for transi	tion to advar	nced technol	ogy develop	ment (6.3) a	nd advanced	d component	developme	ent and proto	otypes

(6.4).

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency											Date: May 2017		
Appropriation/Budget Activity 0400 / 2	udget Activity					R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) RM / WMD Counterforce Technologies			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
RM: WMD Counterforce Technologies	79.780	12.873	12.097	14.552	-	14.552	12.612	12.852	13.129	13.395	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 decrease from FY 2016 to FY 2017 is due to the net effect of decreased investment in advanced materials/energetics and increased investment in weapons effects and planning tools. The increase from FY 2017 to FY 2018 is due to increased investment in advanced materials/energetics and weapons effects and planning tools.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RM: WMD Counterforce Technologies	12.873	12.097	14.552
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 2016 Accomplishments: Developed and demonstrated reactive material for enhanced breaching capabilities for Special Operations Forces (SOF). Incorporation of this material into shotgun shells for SOF breaching operations increases operational effectiveness and reduces tactical risk to the warfighter. Performed signature analysis of pilot-scale Chemical Warfare Agent emissions to define chemical search system requirements. This research addresses modeling capability deficits for characterization of pilot-scale emissions and transport, and exploits temporal and spatial signature exploitation opportunities to support prototype development of chemical search tools. Completed calibration of the Computational High-Fidelity Agent Release Model using new test data, improving the current capability to assess CWMD strikes and providing insight into sources of modeling uncertainty being addressed by the Agent Defeat Modeling and Simulation Baseline project. Tested and demonstrated Hybrid Enhanced Blast Explosives and reactive cases for simulated biological agent defeat. Developed and demonstrated small-scale Hybrid Enhanced Blast Explosives. Developed fast running engineering models for dispersion of chemical/biological agents via the Agent Release Model and Complex Hazardous Air Release Model. Conducted component level, small-scale testing for chemical/biological source term modeling. 			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct		Date: May 2017					
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602718BR <i>I</i> *Counter Weapons of Mass Destruction Applied Research	Project (I RM / WM	ect (Number/Name) I WMD Counterforce Technologies				
B. Accomplishments/Planned Programs (\$ in Millions)		F	Y 2016	FY 2017	FY 2018		
 Modeled response of mega columns to near-contact charges. Modeled and tested reactive case technologies for Joint Multi-Effects Warhea Conducted field tests to support optimization and improved effectiveness of e radiological, and nuclear agent defeat. Conducted lab and field tests of two new explosive formulations tailored (tem operations. Improved modeling capability for weapon post-detonation reaction using react Improved modeling capability for agent defeat using novel weapon energetic Enhanced computational fluid and structure codes for chemical/biological source term mode 	efeat						
 FY 2017 Plans: Demonstrate upgraded Hybrid Enhanced Blast Explosives for improved agen Complete medium-scale testing of a new combined effects weapon case that Complete scaled testing of two new explosive formulations tailored (temperatioperations. Complete calculations and tests to develop agent defeat weapon effects mod dynamic pressure/fragment, agent release, thermal effects and defeat, particle and agent fate. Complete calculations and tests to develop hardened structure weapon effect as dynamic pressure, blast propagation through failing walls, blast and fragment in high-strength concrete, bunker collapse, blast and debris environment from on ultra-high performance computing (HPC) requirements collection, HPC resubmission, and HPC resource allocation for improved WMD defeat modeling. 	nts. s leling, such ation nics						
 FY 2018 Plans: Continue to demonstrate upgraded small scale Hybrid Enhanced Blast Explore Deliver agent defeat weapon effects models to include post blast agent release mechanisms, agent mass transport, break-up and phase change, and agent far enhancements. Complete tests to deliver data for updating chemical agent source term mode Assessment (IMEA) and for calibration and validation of Second-order Closure 	sives for improved agent defeat capability. se and dispersion from multiple agent release te for Modeling and Simulation (M&S) planning els within the Integrated Munitions Effects integrated Puff (SCIPUFF).	g tool					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Red					ncy		Date: Ma	Date: May 2017			
Appropriation/Budget Activity 0400 / 2			R-1 Program Element (Number/Name)ProjectPE 0602718BR / *Counter Weapons ofRM / WMass Destruction Applied ResearchRM / W					Number/N 1D Counter	ame) force Techno	logies	
B. Accomplishments/Planned Prog	<u>rams (\$ in N</u>	<u>/lillions)</u>						F	Y 2016	FY 2017	FY 2018
- Complete calculations and mid / lar from embedded detonation, blast dyr	ge-scale test namic pressu	s, and delive re, fragment	er weapons e ation, and bl	effects mode ast through	ls to include blast doors.	blast and de	bris environ	ment btotals	12 873	12.007	14 552
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>		Accon				btotuis	12.070	12.007	14.002
	EV 0040		<u>FY 2018</u>	FY 2018	FY 2018	EV 0040		E V 0004	E)/ 0000	Cost To	Tatal Orac
• 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development <u>Remarks</u>	<u>r 1 2016</u> 19.374	23.138	<u>Base</u> 24.663	<u>000</u> -	<u>10tai</u> 24.663	<u>F 1 2019</u> 25.447	<u>F 1 2020</u> 25.892	<u>P 1 2021</u> 26.473	<u>r 1 2022</u> 27.006	Continuing	Continuing

D. Acquisition Strategy

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

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May 2017			
Opropriation/Budget Activity R-1 Program Element (Number/Name) 00 / 2 PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research						Name) ons of ch	Project (Number/Name) ***RR / Countering WMD Test and Evaluation			I			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
***RR: Countering WMD Test and Evaluation	62.395	10.718	13.666	13.652	-	13.652	12.464	12.945	13.288	13.586	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 2016 to FY 2017 is due to increased investment in environmental compliance, the WMD national test bed, and test and technology support to revitalize DTRA's CWMD test and evaluation capability.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RR: Countering WMD Test and Evaluation	10.718	13.666	13.652
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 2016 Accomplishments: Conducted CWMD testing and demonstration at Nevada National Security Site to defeat credible and threat-based scenarios with transition into several related projects/planned events. Tested 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. Performed tests in support of Treaty Verification Technology program and Source Physics Experiment to support Comprehensive Test Ban Treaty initiatives. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threa	Date: N	Date: May 2017				
Appropriation/Budget Activity 0400 / 2	et Activity R-1 Program Element (Number/Name) P PE 0602718BR / *Counter Weapons of ** Mass Destruction Applied Research E					
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018			
 Initiated testing at Nevada National Security Site in support of the non-Security portfolio. Continued support of WMD sensor testing and developed new test of Monitor Site to detect and prevent nuclear grade material from entering through air, rail, and shipping ports. Continued to maintain current inventory of infrastructure and instrumt possible, to ensure test beds meet customers' advanced technology to continued to document, prioritize, and support test infrastructure rece. Conducted environmental remediation and compliance activities at the Range, and Kirtland AFB in accordance with Environmental Protection major demolition and restoration efforts of major test articles, ensuring. Conducted collection campaigns with interagency participation specient of the security portfolio. Poevelop and test CBRNE sensors, WMD countermeasures, remote designed for surveillance and tracking of WMD targets. Continue to develop technical and testing capabilities in support of the Demonstration, a DoD effort to shape interagency approaches to court. Continue testing at the Nevada National Security Site in support of the Security portfolio. Continue WMD sensor testing at the Technical Evaluation Assessment nuclear grade material. Conduct Special Project CWMD testing and demonstrations at the N based scenarios with transition into several related projects/planned et anvironmental guidelines. Remediate major test articles within accept - Conduct collection campaigns with interagency participation specific - Design diagnostics and instrumentation in support of the Department rechnology program and Source Physics Experiment to support Commoted required test planning, design, execution, and reporting to et Warfighter Capability Strategic Initiative. Reconstitute and sustain the current inventory of research, developed for the constitute and sustain the current inventory of research, developed to the suppart of the constitute and sust	expanding the terminal center for Nuclei capabilities at the Technical Evaluation Assessment ar ing the United States, U.S. territories, and Allied Nation mentation, extending the life-cycle of these items as lor resting needs. quirements. The Nevada National Security Site, White Sands Missill in Agency, safety, and environmental guidelines. Secu- g they are safely closed and sealed at acceptable stan ific to relevant CWMD data collection requirements. geological sensing, and battle management systems the Transatlantic Collaborative Biological Resiliency inter a wide area biological event. The nonproliferation portion of the National Center for N ent and Monitoring site to develop capabilities for deter levada National Security Site to defeat credible and the events. Wexico and Nevada test sites to meet federal and s able standards. to warfighter CWMD data requirements. to fenergy and National Laboratories Treaty Verificat prehensive Test Ban Treaty initiatives. nsure the successful execution of the DTRA Agent De- ment, test and evaluation infrastructure and instrument	ar hd s hg as e ured hdards. luclear hction of reat- htate ion efeat tation.				

PE 0602718BR: *Counter Weapons of Mass Destruction App... Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Three		Date: M	ay 2017		
Appropriation/Budget Activity 0400 / 2	Project (Number/Name) ***RR <i>I Countering WMD Test and</i> <i>Evaluation</i>				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018	
 Continue to support Combatant Commands with development and high-Explosive (CBRNE) sensors, weapons of mass destruction (WM management systems designed for surveillance and tracking of WMI - Support Combatant Command exercises and planning events at the technologies, tools, and capabilities. Continue pursuit of state-of-the-art chemical and biological testing of program, the inter-agency Layered Sensing Initiative, the Integrated Operational Analysis (TSOA) in order to satisfy identified warfighting - Extend testing at the Nevada National Security Site in support of th Security portfolio. Continue to develop nuclear material detection capabilities through Assessment and Monitoring Site. Continue to test and demonstrate credible and threat-based WMD a DTRA and partner agency projects supporting development of warfig - Continue to conduct diagnostics, instrumentation, and explosives h National Laboratories Source Physics Experiments, supporting Treat Treaty initiatives. Initiate reconstitution of instrumentation and diagnostics sensors intechnology development projects. Continue to design and execution of tests characterizing in support of the Defense Threat Reduction Agency (DTRA) Agent D Continue to design and build testbeds in small-, mid-, and large-sca and validate high-fidelity modeling and simulation tools used to predict or approximation for the purpose of deriving signatures that are similar to reconstitute the Photogrammetry Laboratory equipment inventory geology deriving seismic-acoustic signatures, and providing imagery 	testing of Chemical, Biological, Radiological, Nuclear, ar MD) countermeasures, remote geological sensing, and b D targets. e Nevada Test Bed in order to develop existing missile of capabilities with participation in the Integrated Early War Sensor Architecture, and the Army Technical Support ar gaps. e nonproliferation portion of the National Center for Nucl testing of candidate technologies at the Technical Evalu attack scenarios at the Nevada National Security Site for ghter-identified missile defeat capability requirements. andling research in support of Department of Energy an ty Verification Technology and Comprehensive Test Bar frastructure capabilities in support of Counter-WMD a chemical/biological plume generated by an explosive befeat Modeling and Simulation Baseline (ADMB) initiativ ale environments capable of capturing data needed to im ict weapons effects on WMD storage facilities. evelop modern seismic-acoustic data sets at varying level cent nuclear test detonations for treaty verification purpo (static & dynamic) for pre- and post-test characterization for warfighter planning and targeting analyses.	nd attle lefeat ning nd ear lation d n event re. prove els of ses. of	10.740	12.000	42.050
	Accomplishments/Planned Programs Sub	totals	10.718	13.666	13.652
				I	

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: May 2017			
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602718BR / *Counter Weapons of Mass Destruction Applied Research				Project (Number/Name) ***RR <i>I Countering WMD Test and</i> <i>Evaluation</i>			
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>										
			FY 2018	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>		
Line Item	<u>FY 2016</u>	FY 2017	Base	000	<u>Total</u>	<u>FY 2019</u>	FY 2020	<u>FY 2021</u>	<u>FY 2022</u>	Complete	Total Cost	
• 26/0603160BR: Counter	2.000	0.000	12.500	-	12.500	12.500	12.500	12.500	12.500	Continuing	Continuing	
Weapons of Mass Destruction											_	
Advanced Technology Development												
Remarks												

D. Acquisition Strategy

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

E. Performance Metrics

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

Exhibit R-2A, RDT&E Project Ju	ustification:	FY 2018 D	Defense Thr	eat Reduct	ion Agency	/				Date: Mag	y 2017	
Appropriation/Budget Activity 0400 / 2					R-1 Prog PE 06027 Mass Des	ram Elemen 18BR / *Cou struction App	it (Number i unter Weapo blied Resear	Project (N ****RU / B WMD	ect (Number/Name) U I Basic Research for Countering			
COST (\$ in Millions)	Prior Years	Prior FY 2018 FY 2018 FY 2018 FY 2018 FY 2018 FY 2019 FY 2020 FY 2020								FY 2022	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
A. Mission Description and Bud The Basic Research for Counteri (DTRA's) Basic Research Progra and science into applied technolo and emerging technologies for tra technologist.	Fundamenta dget Item Ju ing Weapons am to identify ogy develop ansition to o olete.	al Researcr s of Mass E promising ment efforts ther DTRA	n for Comba Destruction emerging s s focuses up applied tec	(CWMD) pr science with pon increas hnology pro	roject condu n potential sing the sta ograms. Th	esearch for C ucts technolo to be mature bility and util is effort serv	ogy reviews ed into CWM ity of mid- to res as the bi	of the Defe D technolo o long-term ridge betwe	ning in FY a ense Threat gies. The a , moderate en the ben	Reduction dvancemen risk but hig ch scientist	Agency's nt of technol h payoff sci and the app	ogy ence, blied
B. Accomplishments/Planned F	Programs (\$	in Million	<u>s)</u>						F	(2016	FY 2017	FY 2018
Title: RU: Basic Research for Co	untering WN	1D	-							0.000	-	-
Description: This project provide tools and analysis to support CW development. FY 2016 Accomplishments:	es (1) strateg MD researcl	ic studies t n and deve	to support tl lopment inv	ne Departm estments, a	nent of Defe and (3) ear	ense (DoD), ly applied re	(2) decision search for te	support echnology				
					Accompl	ishments/PI	anned Prog	grams Sub	totals	0.000	-	
C. Other Program Funding Sum	nmary (\$ in	Millions)								I		
Line Item • 1/0601000BR: DTRA Basic Research Remarks	<u>FY 20</u> 38.2	<u>16</u> <u>FY 2</u> 88 35.	<u>FY 2</u> 017 <u>E</u> 436 37	2018 FY 3ase 7.201	<u>2018</u> <u>F</u> <u>OCO</u> -	<u>Y 2018</u> <u>Total</u> <u>F</u> 37.201	TY 2019 37.340	<mark>FY 2020</mark> 37.563	<u>FY 2021</u> 38.609	<u>FY 2022</u> -	Cost To Complete Continuing	<u>Total Cost</u> Continuing

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reducti	Date: May 2017			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)		
0400/2	PE 0602718BR / *Counter Weapons of	****RU / Basic Research for Countering		
	Mass Destruction Applied Research	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 customers' requests and results delivered within three months of completion.

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Exhibit R-2, RDT&E Budget Item	n Justificat	ion: FY 201	8 Defense	Threat Red	uction Ager	псу			Date: May 2017			
Appropriation/Budget Activity 0400: Research, Development, Te Advanced Technology Developme	est & Evalua ent (ATD)	ition, Defen	se-Wide I B.	A 3:	R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	1,398.986	298.123	266.444	268.607	-	268.607	273.973	277.360	283.382	288.959	Continuing	Continuing
RA: Information Sciences and Applications	21.532	11.494	11.422	10.229	-	10.229	11.983	12.183	12.468	12.733	Continuing	Continuing
*RD: Detection Technologies	0.000	26.415	17.775	17.556	-	17.556	18.530	20.697	21.250	21.681	Continuing	Continuing
RE: Counter-Terrorism Technologies	551.315	107.265	102.976	103.869	-	103.869	105.915	108.099	110.632	112.871	Continuing	Continuing
*RF: Forensics Technologies	356.817	40.373	38.540	40.286	-	40.286	42.580	40.925	42.144	43.124	Continuing	Continuing
RG: Defeat Technologies	95.067	21.002	20.710	22.161	-	22.161	22.557	23.031	23.145	23.619	Continuing	Continuing
RI: Nuclear Survivability	37.908	6.621	6.561	6.658	-	6.658	6.729	6.854	6.992	7.132	Continuing	Continuing
RL: Nuclear & Radiological Effects	0.000	0.000	3.528	3.500	-	3.500	3.456	3.457	3.455	3.455	Continuing	Continuing
RM: WMD Counterforce Technologies	131.135	19.374	23.138	24.663	-	24.663	25.447	25.892	26.473	27.006	Continuing	Continuing
**RR: Countering WMD Test and Evaluation	14.052	2.000	0.000	12.500	-	12.500	12.500	12.500	12.500	12.500	Continuing	Continuing
RT: Target Assessment Technologies	191.160	63.579	41.794	27.185	-	27.185	24.276	23.722	24.323	24.838	Continuing	Continuing

Note

*Program Element 0603160BR name changes from Counterproliferation Initiatives - Proliferation, Prevention and Defeat to Counter Weapons of Mass Destruction Advanced Technology Development beginning in FY 2018.

**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) Counter Weapons of Mass Destruction (WMD) Advanced Technology Development 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 WMD surveillance, detection, defeat, prevention, nonproliferation, counterproliferation, consequence management, and treaty verification capabilities.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Det	fense Threat Redu	uction Agency		Date	May 2017
Appropriation/Budget Activity		R-1 Program Ele	ement (Number/Name)		
0400: Research, Development, Test & Evaluation, Defense-Wi	ide / BA 3:	PE 0603160BR /	*Counter Weapons of I	Mass Destruction Adva	anced Technology
Advanced Technology Development (ATD)		Development			
The Counterproliferation Initiatives - Proliferation, Prevention,	and Defeat portfo	lio is aligned with	n strategic planning obje	ctives as well as with	Science and Technology
(S&T) investment direction which is established annually by D	TRA. The objecti	ves directly supp	ort policy and planning	guidance from the Offi	ce of the President, the
Department of Defense (DoD), and the broader WMD threat re	eduction commun	ity.			
are clearly defined and directly linked to mission-specific capa agencies, and international partners; (2) preliminary assessme producibility upon transition out of S&T research; (3) activities at scale.	by selecting adv bility requirement ents of subsystem demonstrate cost	s of DTRA, the N s and componen effectiveness or	lilitary Department Initiative ts offer the highest pote cost reduction potentia	mbatant Commanders ntial for technological of technologies during	for criteria: (1) Enorts , other DoD and federal feasibility, operability and g field testing or simulation
B. Program Change Summary (\$ in Millions)	FY 2016	<u>FY 2017</u>	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	290.310	266.444	259.490	-	259.490
Current President's Budget	298.123	266.444	268.607	-	268.607
Total Adjustments	7.813	0.000	9.117	-	9.117
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
 Reprogrammings 	14.600	-			
 SBIR/STTR Transfer 	-6.787	-			
 Realignments 	-	-	9.117	-	9.117

Change Summary Explanation

The increase in FY 2018 from the previous President's Budget submission is due to the net effect of a shift in investment priorities to fund the Special Test Bed capability requirements for missile defeat in this program element, a realignment of funds from O&M to RDT&E for the Hard Target Research and Analysis Center (HTRAC) to fund new R&D subject matter expertise to identify, characterize, increased investment in consequence of execution, and incremental Service Requirement Review Board reductions, as part of the Department of Defense reform agenda, for consolidation and understand and exploit vulnerabilities in adversary WMD programs, activities, and capabilities. reduction of service contracts.

Exhibit R-2A, RDT&E Project Ju	ustification	: FY 2018 E	Defense Thr	eat Reduct	ion Agency					Date: May	/ 2017		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name)ProjePE 0603160BR / *Counter Weapons ofRA /Mass Destruction Advanced TechnologyDevelopment					oject (Number/Name) A I Information Sciences and Applications			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
RA: Information Sciences and Applications	21.532	11.494	11.422	10.229	-	10.229	11.983	12.183	12.468	12.733	Continuing	Continuing	
 A. Mission Description and Buc The Information Sciences and Ap Weapons of Mass Destruction (C of Mass Destruction (WMD) in cc Advanced Systems and Concept and concepts suitable for foreign The decrease from FY 2017 to F B. Accomplishments/Planned F 	dget Item Ju oplications p WMD) miss onsultation v s for CWME release. Y 2018 is du Programs (\$	ustification project provi sion space. vith military D at the Nav ue to decrea	ides technic The project and civilian val Postgrad ased investr <u>s)</u>	al expertise performs o planners, v uate Schoo ment in haz	e and reach- continuous n warfighters, ol. The proje card and effe	-back suppo nodeling of a and first res ect also supp ects charact	ort to the Un ad hoc com sponders an ports interna erization an	ited States putational a d leverages ational CWI d technical	and its allie analyses on s research µ MD coopera reachback F Y	es across th the consec performed b ation by dev support.	e Counterin quences of V by the Proje reloping tecl	g Weapons ct on nnologies FY 2018	
<i>Title:</i> RA: Information Sciences a	ind Applicati	ions	-+							11.494	11.422	10.229	
Description: Project RA develop increase decision advantage for t CWMD mission space.	s modeling he United S	and simulat tates and it	tion capabili s allies thro	ties and pro ugh improv	ovides techr ed situation	nical reachb al understai	ack support nding acros	to maintair s the compl	n and ete				
 - Continued development of globa agent-based, socially coupled sim behaviors and movement after a - Continued to develop detailed m - Completed over 500 WMD colla completed 930 Requests for Infor Federal Emergency Management the IMAAC participated and comp and IMAAC analyses provided im across the DoD and Interagency. FY 2017 Plans: 	al synthetic nulations to WMD event nodels of sp teral effects mation (RF t Agency as bleted analy mediate and	population a enable rapi c products ir ls) from acr the Interag ses for 6 ac d direct sup	and activity d modeling ear facilities n support of oss Comba ency Model ctivations an oport to CWI	database fo of infectiou to analyze Central Co tant Comm ing Atmosp d supporte MD operatio	or modeling s disease p e vulnerabilit ommand Are ands, servic oheric Analy d 25 exercis onal plannin	secondary ropagation a ties and esti ea of Respon ces and Inte sis Center (ses. Collate g, incident r	and tertiary and impacts mate hazard nsibility targ ragency; su IMAAC) Op eral effects p response, a	effects usir of populati eting/plann pported the erations Hu products, RI nd training	ng ion ing; b; FIs				

Exhibit R-2A, RDT&E Project Just	ification: FY	2018 Defens	se Threat Re	eduction Age	ency				Date: M	ay 2017			
Appropriation/Budget Activity 0400 / 3	Display="block-space-sp												
B. Accomplishments/Planned Pro	grams (\$ in I	<u>/lillions)</u>						[FY 2016	FY 2017	FY 2018		
 Continue to develop the global syn impacts of population behaviors and Continue to develop detailed mode Enhance 64-bit version of CWMD r 	Continue to develop the global synthetic population and activity database for modeling infectious disease propagation and npacts of population behaviors and movement after a WMD event. Continue to develop detailed models of specified nuclear facilities to analyze vulnerabilities and estimate hazards. Enhance 64-bit version of CWMD modeling and simulation planning tools for analysis of large data sets. Y 2018 Plans:												
FY 2018 Plans: - Continue to develop the global syn impacts of population behaviors and consequence management planning - Continue to develop detailed mode target and consequence manageme - Continue to develop processes, ca Explosives (CBRNE) in order to prov	thetic populat movement a J. Is of specified nt planning. pabilities, and vide tailored s	tion and activ fter a WMD d nuclear fac d expertise ir upport to Do	vity database event in sup cilities to ana n Chemical, l pD with 24/7	e for modelin port of Comb lyze vulnera Biological, R Technical R	ng infectious patant Comr bilities and e adiological, eachback.	disease prop nand force h estimate haza Nuclear, and	bagation and ealth protectio ards in suppor High-yield	on and t of					
				Accon	nplishment	s/Planned P	rograms Sub	ototals	11.494	11.422	10.229		
C. Other Program Funding Summa <u>Line Item</u> • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research • 154/0605502BP: Smoll	ary (\$ in Milli <u>FY 2016</u> 29.133	<u>ons)</u> <u>FY 2017</u> 29.127	FY 2018 Base 30.270	<u>FY 2018</u> <u>OCO</u> -	FY 2018 Total 30.270	<u>FY 2019</u> 32.325	<u>FY 2020</u> 28.286	FY 202 29.08	21 FY 2022 33 30.077	Continuing	Total Cost Continuing		
Business Innovation Research Remarks	10.473	-	-	-	-	-	-			Continuing	Continuing		
D. Acquisition Strategy Assessment and selection of best p researchers across DoD and other g	erformer for c government a	levelopment gency labora	al requireme atories, acac	ents to meet s demia, indust	specific milit try, and inter	ary capability mational part	/ needs. Perfo ner organizat	ormer b ions.	ase includes t	pest-of-breed			
E. Performance Metrics Percentage of completed demonstra Fiscal Years 2015-2018, in support	ation program of Strategic C	s transitionii)bjective 4.1	ng each yea , "Preserve i	r. (This is Pr nvestments	riority Goal 4 to maintain d	.1.2, as cited our decisive t	l in U.S. Depa echnological	artment superio	of Defense Ag rity.")	gency Strateg	jic Plan for		

PE 0603160BR: **Counter Weapons of Mass Destruction Adv...* Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May 2017			
Appropriation/Budget Activity 0400 / 3					R-1 Progra PE 060316 Mass Dest Developme	am Elemen 60BR / *Cou ruction Advi ent	t (Number/ Inter Weapc anced Tech	Name) ons of nology	Project (Number/Name) *RD / Detection Technologies				
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
*RD: Detection Technologies	0.000	26.415	17.775	17.556	-	17.556	18.530	20.697	21.250	21.681	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 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 2016	FY 2017	FY 2018
Title: RD: Detection Technologies	26.415	17.775	17.556
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 Accomplishments: Demonstrated, tested, and fielded systems to remotely monitor small and wide areas which may produce or contain nuclear threats. Designed and fabricated prototype passive detection systems for determining the location and signature of nuclear material and tested and characterized developmental prototype passive detection systems. Transitioned near-term technologies to generate prototypes and design packages that will assist operational users. Developed prototype of a new high resolution detector with reduced weight and improved form factors that can be concealed in container consistent with the operational environment. Conducted advanced/operational testing and evaluation of radiation detection systems to assess their performance. Tested and evaluated the integration of high resolution detectors with lower resolution detectors to determine the potential to meet threshold radiological/nuclear (R/N) detection requirements. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threa		Date: N	1ay 2017						
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) Project (Number/Name) PE 0603160BR / *Counter Weapons of *RD / Detection Technologies Mass Destruction Advanced Technology Development								
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2016	FY 2017	FY 2018				
 Integrated nuclear threat analysis algorithms into existing systems to time. Integrated advances in materials science into lightweight, high-resol Integrated new cellular technology into the Radiological/Nuclear (R/I detectors. Improved performance of new detector materials; imaging and spec rigorous laboratory and field testing. Analyzed nuclear threat signatures to improve or integrate collection 	o test and evaluate effectiveness in reducing processin ution radiation spectrometers for use in field operations N) search network to ensure rapid flow of data from troscopy systems; and signals analysis methods throug n into sensor systems.	g s. gh							
 FY 2017 Plans: Continue to develop and integrate nuclear and radiological signature Continue to integrate nuclear threat analysis algorithms into existing reducing process time. Continue to demonstrate, test, and transition systems that remotely and wide areas. Continue to develop high-fidelity radiation test objects supporting ad detection prototypes. Continue to develop, test, and evaluate a hand-held radiation monitor and real-time information feed. Develop and deploy devices enabling low cost operational testing an special nuclear material sources of interest. Develop and integrate interoperable systems enabling a true common teams, across platforms, and within shared or distributed areas. Test and evaluate new radiation detection technologies in order to v performance data to support follow-on development. Test and evaluate an operational high resolution gamma-ray imager next generation nuclear imaging systems. Simulate and evaluate loose nuke scenarios in order to validate nuclear befores and civilian users. 	e collections into new sensor systems. systems in order to evaluate accuracy and effectivene monitor nuclear and radiological threat signatures in su lvanced assessment capabilities in order to improve rad or replacement providing radioisotope identification cap and evaluation of radiation signature detectors against m on operational picture among nuclear and radiological s ralidate capabilities, improve prototypes, and provide re suited for multiple mission sets to support integration v elear threat mitigation plans developed by Department of al Reconnaissance Vehicle (NBCRV) and Stryker obsol	ss in nall diation bability nock search quired with of							

Exhibit R-2A, RDT&E Project Just	ency				Date: N	lay 2017					
Appropriation/Budget Activity 0400 / 3				R-1 P PE 06 <i>Mass</i> <i>Devel</i>	rogram Ele 03160BR / Destruction opment	ment (Numb *Counter We Advanced Te	er/Name) apons of echnology	Proje *RD /	ct (Number/N Detection Tec	Vame) chnologies	
B. Accomplishments/Planned Pro	grams (\$ in I	<u>//illions)</u>						[FY 2016	FY 2017	FY 2018
 Continue to develop, test, and eval capability and real-time information for the continue to develop and deploy designature detectors against simulate threat mockups. Continue to integrate interoperable teams, across platforms, and within Continue to test and evaluate new validate capabilities, improve prototy Complete testing and evaluation of integration with next generation nuclear material. Transition near-term technologies, and design packages that will meet the conduct advanced, operational test signature collections, and non-radiate continue to integrate radiation and effectiveness in reducing process time. 	uate a handh feed. evices to enab d special nuc systems ena shared or dis radiation and pes, and pro- f an operation ear imaging s terize prototyp such as heliu operational ne sting and eval s such as inter tion nuclear th nuclear threa ne and form f transition sys	eld radiation le low-cost of lear material bling a true of tributed area nuclear three vide required al high resol systems. De passive roo m-3 alternat eeds. uation of rad rnal electron meat signatu at analysis al actors.	monitor rep operational t l sources of common ope sat detection d performand ution gamm badside detection ives and aut liation and n ics and com ire collection lgorithms int	esting and e interest, high erating pictur technologie ce data. a-ray imager ection system tomated part uclear threat munications is into new s o existing sy itor nuclear a	at provides evaluation of h-fidelity rad re among nu is in an oper r suited for r ns to determ ticle identific t detection s capabilities ensor syste rstems to ev and radiolog	radioisotope radiation and iation test ob uclear and ra ationally rele nultiple missi ine the locat ation, to gen ystems to as , nuclear and ms. aluate accura ical threat sig	identification d nuclear thro jects, and re diological se vant environ on sets to su ion and signa erate prototy sess their I radiological acy and gnatures in lo	eat alistic arch ment to upport ature of pes			
				Accor	npiisnment	s/Planned P	rograms Su	Dtotals	26.415	17.775	17.556
C. Other Program Funding Summa Line Item • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research	ary (\$ in Milli <u>FY 2016</u> 15.083	<u>ons)</u> <u>FY 2017</u> 15.936	FY 2018 Base 14.769	<u>FY 2018</u> <u>OCO</u> -	FY 2018 Total 14.769	<u>FY 2019</u> 17.005	<u>FY 2020</u> 18.451	FY 202 17.67	21 FY 202 77 18.03	Cost To 2 Complete 5 Continuing	Total Cost Continuing
PF 0603160BR: *Counter Weapons	of Mass Dest	ruction Adv	_	UNCLAS	SIFIED						

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Exhibit R-2A, RDT&E Project Ju	stification: FY	2018 Defens	e Threat Re	duction Age	ncy			Date: May 2017				
Appropriation/Budget Activity 0400 / 3					ogram Eler 03160BR / * Destruction / opment	n ent (Numb Counter Wea Advanced Te	er/Name) apons of echnology	Project (I *RD / Det	Project (Number/Name) *RD / Detection Technologies			
C. Other Program Funding Sum	<u>mary (\$ in Milli</u>	ons <u>)</u>										
<u>Line Item</u> Remarks	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> Complete	<u>Total Cost</u>	

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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	: FY 2018 E	efense Thr	eat Reducti	ion Agency					Date: May	/ 2017		
Appropriation/Budget Activity 0400 / 3				R-1 Program Element (Number/Name)ProPE 0603160BR / *Counter Weapons ofREMass Destruction Advanced TechnologyDevelopment					Project (Number/Name) RE / Counter-Terrorism Technologies			
COST (\$ in Millions) Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
RE: Counter-Terrorism 551.315 Technologies	107.265	102.976	103.869	-	103.869	105.915	108.099	110.632	112.871	Continuing	Continuing	
 A. Mission Description and Budget Item . The Counter-Terrorism Technologies project (WMD) threats. This project supports the U. Counterproliferation Research and Develop acquisition pathways, to include defeat of the technologies to integrate and synchronize of WMD. This effort supports Commander US The decrease from FY 2016 to FY 2017 is of B. Accomplishments/Planned Programs (<i>Title:</i> RE: Counter-Terrorism Technologies Description: Project RE supports Joint U.S mission-specific WMD defeat, denial, counter FY 2016 Accomplishments: - Transitioned Multi-path COTS/GOTS Softwork upstream of production and capability to mode - Transitioned Very Low Frequency (VLF) re- low-visibility WMD missions. - Transitioned a Special Applications Module - Deployed WMDpedia link onto the Dynamic information on Chemical, Biological, Radiolog - Deployed a Common Operating Picture/Code - Released DPOE V2.6, providing enhancer - Demonstrated sensor collection capability integrated across DoD, the Intelligence Com- 	ustification t develops a S. Special C ment is a co e devices th perations an SOCOM res ue to reduce \$ in Millions wilitary For erproliferation vare Defined nitor, manag ceiver proto e for MODI p c Picture of f gical, Nucle mmon Intell nents for sea (validation a munity (IC),	nd transitio perations C llaborative e emselves, v d activities bonsibilities ed investme b ces, specifi n, and intere Radio. Ov e, and exec type. VLF p roviding spe the Operatin ar (CBRN) f igence Pictu arching, maj nd collection and 17 oth	ns a full spe Command (le effort to dev while minim that preven under the c ent in next g cally USSO diction tech er-the-horiz cute OCON prototype pe ecial enhan ng Environn hreats for a ure enabling oping, and o n) from an o er governm	ectrum of ne USSOCOM velop advan- izing risks to t terrorists a Chairman, J generation C COM, in the nologies. con prototyp US mission ermits capal ced counter nent (DPOE analysts and g users to cl collaboration operational f ent organiza	ew technolog) in two rese ced, warfigh o U.S. forces and rogue na loint Chiefs of WMD technologies WMD technologies wmb technologies e research a from CONL bility to moni- trmeasures.) portal. The planners. reate, share n. facility in a co ations.	gies to cour earch areas ter-unique s; (2) USSC ation states of Staff Unit nologies to b reas of war eep install r JS. itor, manag is tool prov , and consu	ater emerge (1) Counter technologie DCOM CWM from devel fied Comma palance othe palance othe fighter-uniq eceiver e, and exect ides SME-le ume informa n that can b	ent weapons ring WMD- s to defeat in AD-T Support oping, acquand Plan. er priorities. FY ue, sute evel attion. e	s of mass d Terrorism (terrorist WI ort develop iiring, prolif	estruction CWMD-T) MD developr s concepts a erating, or u FY 2017 102.976	ment/ and sing FY 2018 103.869	

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency Date: May								
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development	Project (Number/Name) RE I Counter-Terrorism Technologies						
B. Accomplishments/Planned Programs (\$ in Millions)		FY	2016	FY 2017	FY 2018			
 Demonstrated the DARPA Deep Exploration and Filtering of Text (DEFT) Aut capability to show how information from multiple formats could be combined to by analysis and synthesis rather than by reading the document. Transitioned next generation imaging technologies to enhance Explosive Ord capabilities. Developed tools used to impede Improvised Explosive Device (IED) triggers tests on emergent threat articles. Developed precision shaped charges using a proven manufacturing process shaped charge design. Initiated the development of rational choice and game theory algorithms and support of probabilistic forecasting. Continued development of new counterproliferation technologies for Joint U.S warfighters to improve their ability to detect, disable, interdict, neutralize, and c storage, and weaponization facilities. Continued multi-year efforts to develop innovative CWMD technologies and t assess, and attack WMD production and storage facilities with engineered cap damage. Continued work on multi-year efforts to develop high fidelity test articles and o Defeat. 	tomated World Actor Knowledge Extractor (AV o create a capability for analysts to research a dnance Disposal (EOD) forces advanced diagr and conducted render safe diagnostics validat through the use or modification of an existing integrated into advanced Bayesian models in S. Military Forces to counter WMD, enabling destroy chemical, biological, and nuclear produ ools designed to locate, identify, characterize, pabilities to minimize loss of life and collateral enhanced electronic test objects for EOD Devi	VAKE) topic nostic ion uction,						
 - Integrate enhancements in Natural Language Processing and Machine Read Communications System (JWICS) knowledge management and planning tools - Integrate, test, and deploy socio-cultural and behavioral factor data into the Ir capabilities. - Develop applications enabling seamless information sharing between the US other intelligence agency databases. - Develop customizable dashboards displaying user-driven data displays and f - Continue to support Combatant Command exercises and planning events in databases, and to identify and validate new requirements. - Continue to monitor and collaborate with other agencies, such as the Defense Intelligence Advanced Research Projects Agency, on advanced analytics tech. 	ling capabilities into Joint Worldwide Intelligent s. Intent Model to enhance threat prediction SOCOM CWMD Support Program (SCSP) an Functionality on the SCSP JWICS portal. order to enhance existing SCSP tools and e Advanced Research Projects Agency and th nologies.	ce d						

PE 0603160BR: *Counter Weapons of Mass Destruction Adv... Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Just	ification: FY	2018 Defen	se Threat Re	eduction Age	ency				Date: M	ay 2017	
Appropriation/Budget Activity 0400 / 3				R-1 P I PE 06 <i>Mass</i> <i>Devel</i>	rogram Eler 03160BR / 3 Destruction opment	m ent (Numt Counter We Advanced T	per/Name) apons of echnology	Project RE / Co	t (Number/N ounter-Terrol	lame) rism Technolo	gies
B. Accomplishments/Planned Pro	grams (\$ in N	<u>lillions)</u>							FY 2016	FY 2017	FY 2018
 Continue to develop offensive cou Continue to develop threat specific Continue to develop technologies Continue to develop lighter, smalle Continue to develop next generation Continue to develop WMD facility Continue to develop WMD facility Continue to develop WMD render Continue to develop WMD render Continue to develop WMD pathwa Perform prototype testing of mach Generation Joint Worldwide Intellige Integrate High Performance Comp improve accuracy of emerging WMI Develop and test technologies for data inferencing, and system-generic Develop Graphic Analytics and Kniise develop DPOE Knowle Develop Course of Action models 	nter proliferation test articles a chat defeat uni- ir, more effection preaching tech- oreaching tech- ogical, and Cho- safe technologico to maneuver ir y (process & fri- ne learning to ance Commun- uting (HPC) ir D threat foreca evaluating largicated cueing ar owledge-Base enhance Disco edge Graphic for anticipator	on, counter- intended rac ive breachin by technolog anology app emical (NBC gies. n a WMD er acility) defer ols for integ ications Sys to the JWIC ists. ge quantities ad alerting c e Reasoning over & Searc and Predicti y adversaria	WMD technols for Tiered ⁻ lio emissions og capabilitie y application lications. C) defense te vironment. at technologi ration with the tem (JWICS CS operating s of data and apabilities. HPC applic ch component ve Analytics I actions.	ologies. Threat Mode s. s. s. s. echnologies. ies. ne USSOCO) Portal. environmen I intelligence ations. nts of the An	ling Archive M CWMD S t to provide information ticipatory W n Unknowns	upport Prog more robust to improve s MD Analyst	ram's (SCSF data analyti smart discov Reasoning	²) Next cs and ery,			
				Accor	nplishment	s/Planned F	Programs Su	ubtotals	107.265	102.976	103.869
C. Other Program Funding Summ <u>Line Item</u> • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research <u>Remarks</u>	<u>ary (\$ in Millio</u> <u>FY 2016</u> 0.795	<u>ons)</u> FY 2017 -	<u>FY 2018</u> <u>Base</u> -	<u>FY 2018</u> <u>OCO</u> -	<u>FY 2018</u> <u>Total</u> -	<u>FY 2019</u> -	<u>FY 2020</u> -	<u>FY 202</u> ′ -	<u>FY 202</u> -	<u>Cost To</u> 2 <u>Complete</u> Continuing	<u>Total Cost</u> Continuing
PE 0603160BR: *Counter Weapons	of Mass Dest	ruction Adv.		UNCLAS	SIFIED						

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction	Date: May 2017		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR <i>I</i> *Counter Weapons of Mass Destruction Advanced Technology Development	Project (N RE / Count	umber/Name) ter-Terrorism 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 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 U.S. 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: FY 2018 Defense Threat Reduction Agency									Date: May 2017			
Appropriation/Budget Activity 0400 / 3				R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development				Project (Number/Name) *RF / Forensics Technologies				
COST (\$ in Millions) Prior Years FY 2016 FY 2017 Base						FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
*RF: Forensics Technologies	40.286	-	40.286	42.580	40.925	42.144	43.124	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 U.S. Government lead for post-detonation National Technical Nuclear Forensics (NTNF) research and development (R&D). As the central NTNF R&D coordinator, DTRA works in consultation with interagency partners to develop and improve ground-based capabilities supporting exploitation and attribution missions. NTNF R&D supports advanced research in the following areas: (1) Prompt nuclear effects exploitation for attribution; (2) nuclear device characterization for forensics; (3) nuclear forensic materials exploitation for attribution.

The decrease from FY 2016 to FY 2017 is due to decreased investment in monitoring and verification technology, device characterization for forensics, and materials exploitation for attribution. The increase from FY 2017 to FY 2018 is due to the relative impact of reduction in FY 2017.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RF: Forensics Technologies	40.373	38.540	40.286
 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 2016 Accomplishments: Completed final set of DISCREET OCULUS installations in the Washington DC metropolitan area, enabling the capture of prompt diagnostic data signatures in the event of a nuclear or radiological detonation. Two of three city/region area installation efforts are complete, with a third ongoing in NYC/Newark in preparation for transition to the USAF U.S. Prompt Diagnostics System in FY 2018. 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Rec	Date: N	/lay 2017						
Appropriation/Budget Activity 0400 / 3	Proje *RF /	Project (Number/Name) *RF <i>I Forensics Technologies</i>						
B. Accomplishments/Planned Programs (\$ in Millions)		ĺ	FY 2016	FY 2017	FY 2018			
 B. Accomplishments/Planned Programs (\$ in Millions) Tested and demonstrated performance of DISCREET OCULUS speed-of- history using the Sandia National Laboratories High-Energy Radiation Mega as a simulated nuclear detonation source. Transitioned advanced gamma spectroscopic capabilities to the operation several fission/activation products directly, with no radiochemical separation measure these nuclides. Completed a major joint experimental campaign with the National Nuclear Criticality Experiments Research Center (NCERC) within the Device Assem material diagnostic information to the nuclear forensics community. Developed a modular prototype using advanced materials and techniques of evasive nuclear testing. Developed and delivered tools to DoD operational units for estimation of p gases from underground nuclear tests. Developed prototype cosmic-ray muon imaging solution for standoff detect strategic launch and delivery systems. Enhanced detection capabilities cou future Strategic Arms Reduction Treaties. Developed infrastructure and capability for iterative testing, refinement, an Continued to develop, test, demonstrate, and field upgraded prototypes for analysis; modeling to support nuclear forensics conclusions. Continued to develop tools based on near-source small-scale strong-motif low yield and evasive nuclear testing. Conducted laboratory experiments with lasers to assess shock/seismic sign Evaluated advanced methods to better integrate the collection, detection, 	Hight sensors and ability to determine reaction time avolt Electron Source (HERMES) III accelerator fa al user providing reliable forensic analytical result ins, significantly reducing the time and cost require Security Administration (NNSA) at the National ably Facility (DAF) at NNSS providing vital nuclea to collect and detect gaseous radionuclide signa probable delay times before escape of radio isotop rtainty in detection and discrimination of nuclear t ation of nuclear warheads in storage or deployed of Id lead to adoption of this technology for verification of integration of national monitoring capabilities. In prompt diagnostics, debris collection, and samp data to decrease timeline, lower uncertainties, an on science to assist detection and characterizatio gnatures from underground nuclear tests. and analysis of low-yield or evasive nuclear weap	ie acility Is on ed to r tures bic esting on of on of d wn of	FY 2016	FY 2017	FY 2018			
testing signatures. - Continued to develop long-term operational solutions to detect, collect, an testing	lear							
testing. - Validated alternate signatures of nuclear weapons testing and developed measurement techniques. - Enhanced 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.								

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Redu	Date: N	<i>l</i> lay 2017						
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR <i>I</i> *Counter Weapons of Mass Destruction Advanced Technology Development	ame) Project (Number/Name) is of *RF I Forensics Technologies ology						
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018					
- Provided technical support for certification of compliance of foreign digital e	electro-optical sensors with Open Skies Treaty lin	nits.						
 FY 2017 Plans: Complete initial operational assessment of advanced prompt diagnostics for Complete plans and carry out associated acquisition activities for the transisystems to the U.S. Prompt Diagnostics System. Demonstrate advanced technologies for the collection of alternative nucleapulse and transient ionospheric disturbances, to detect and locate clandestir Demonstrate advanced technologies for cosmic ray, muon-excited remote of in storage, supporting treaty monitoring, and verification. Develop, test, and demonstrate a portable ground-based sensor prototype DISCREET OCULUS. Develop, test, and demonstrate enhanced prototype technologies for prompt diagnostics, and technical capability modeling to support nuclear device record timeline, lower uncertainty, and increase confidence in technical nuclear fore. Develop, test, and demonstrate enhanced prototype technologies to suppor capabilities in order to decrease timeline, lower uncertainty, and increase consupporting attribution. Develop, evaluate, and demonstrate surrogate debris materials used in valifixed laboratory analytic processes. Develop advanced radionuclide gas collection technologies in support of consumption reduction, and on expanded operational capability. Prepare and conduct an interagency technology demonstration of end-to-ei. Prepare an international technical demonstration of post-detonation nuclear coordinate with partner nations to improve global U.S. nuclear forensics are international agreements. Integrate nuclear threat analysis algorithms into existing systems to test an time. Demonstrate, test, and field systems to remotely monitor small and wide are international agreements. 	or ground-based sensor prototype systems. tion of advanced prompt diagnostics sensor prot r detonation signatures, such as electromagnetic ne nuclear testing. counting of nuclear warheads in delivery vehicles for post-detonation prompt diagnostics under pt diagnostics, debris collection, data analysis, de postruction and attribution, as well as to decrease ensics conclusions supporting attribution. rt validation and verification processes and infidence in technical nuclear forensics conclusio idation and verification technologies and in field a punterproliferation and compliance verification for tests, including novel techniques for collecting a r portability, with emphasis on size, weight, and p ind nuclear forensics capabilities. r forensics research and development capabilities d evaluate their effectiveness in reducing proces eas which may produce or contain nuclear threa	totype c s and ebris e and r the and power es. ssing tts.						

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Rec	Date: N	/lay 2017			
Appropriation/Budget Activity 0400 / 3	ect (Number/Name) I Forensics Technologies				
B. Accomplishments/Planned Programs (\$ in Millions)		[FY 2016	FY 2017	FY 2018
 Design and fabricate prototype passive detection systems for determining and characterize developmental prototype passive detection systems. Transition near-term technologies to generate prototypes and design pach - Conduct advanced/operational testing and evaluation of radiation detection - Develop and build a new high-resolution detector with reduced weight and container consistent with the operational environment. Integrate new cellular technology into the Radiological/Nuclear (R/N) sear Test and evaluate the integration of high-resolution detectors with lower rethreshold R/N detection requirements. 	the location and signature of nuclear material an kages that will assist operational users. on systems to assess their performance. d improved form factors that can be concealed in rch network to ensure rapid flow of data from dete esolution detectors to determine the potential to m	d test ctors. neet			
 FY 2018 Plans: Continue to develop, test, and demonstrate enhanced prototype technolog and diagnostics, and device and modeling to support nuclear device reconstimeline, lower uncertainty, and increase confidence in technical nuclear for Complete preparations and conduct an interagency technology demonstrat nuclear forensics capabilities. Evaluate surrogate debris materials as part of a demonstration and evaluat diagnostics processes. Develop, evaluate, and demonstrate surrogate debris materials to validate realistically exercise field and fixed laboratory analytic and diagnostic processes. Continue to develop, test, and demonstrate prototype ground-based promportability, with emphasis on size, weight, and power consumption reductio Initiate transition of advanced prompt diagnostics sensor prototype system Expand identification and documentation of improvised nuclear device (IN experiments, and develop tools and capabilities to support the attribution of a Evaluate capability to rapidly rule-in/rule-out known foreign devices using realistic technology demonstration. Continue to coordinate with partner nations to enhance and improve global under appropriate international agreements. Initiate simulation of and assess source and propagation data for site-speunderground nuclear explosions. Continue to develop algorithms and tools for collection and high-fidelity m evasive and low-yield nuclear tests. 	gies for prompt diagnostics, debris collection, and struction and attribution, as well as to decrease rensics conclusions supporting attribution. ation and evaluation of end-to-end post-detonatio ation of field/fixed laboratory analysis and debris e and verify newly developed capabilities, and to esses. upt diagnostic technologies that improve sensor n, and expand operational capability. ns to the U.S. Prompt Diagnostics System. ID) signatures through modeling, simulation, and f IND detonations. prompt and radiochemical signatures in a simulat al U.S. nuclear forensics and attribution capabilities cific signatures from evasive and low-yield odeling and analysis of local seismic signatures of	lysis n ted es,			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May 2017			
Appropriation/Budget Activity 0400 / 3			R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology DevelopmentProject (Number 							r/Name) Fechnologies			
B. Accomplishments/Planned Pro	<u>grams (\$ in I</u>	<u> Millions)</u>						Γ	FY 2016	FY 2017	FY 2018		
 Collect and analyze physical responsible yield, evasive underground nuclear Continue to develop advanced, more compliance verification for the Non-I 	onse data fron explosions. (odular radionu Proliferation T	n natural and Compare the Iclide gas co Treaty and th	l man-made se data with llection tech e Comprehe	events that results prod nologies in s nsive Test E	provide sign uced by con support of co Ban Treaty.	als similar to oputer simula unterprolifera	those from I ation of the e ation goals a	ow- vents. nd					
- Continue to develop advanced tech collecting and observing material an													
				Accon	nplishment	s/Planned P	rograms Su	btotals	40.373	38.540	40.286		
C. Other Program Funding Summ	ary (\$ in Milli	ons <u>)</u>	FY 2018	FY 2018	FY 2018					Cost To			
Line Item	FY 2016	FY 2017	Base	000	Total	FY 2019	FY 2020	FY 202	1 FY 2022	Complete	Total Cost		
• 20/0602718BR: Counter Weapons of Mass Destruction Applied Research	10.525	10.008	10.274	-	10.274	10.345	10.560	10.77	10.991	Continuing	Continuing		
• 123/0605000BR: Counter 7.156 4.568 6.727 - 6.727 6.710 5.367 5.899 Weapons of Mass Destruction Systems Development											Continuing		
Remarks													
D. Acquisition Strategy Assessment and selection of best p researchers across DoD and other	erformer for o government a	levelopment gency labora	al requireme atories, acad	ents to meet : lemia, indust	specific milit try, and inter	ary capability national part	y needs. Perl ner organiza	former ba tions.	ase includes b	est-of-breed			

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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: FY 2018 Defense Threat Reduction Agency										Date: May	2017	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name)IPE 0603160BR / *Counter Weapons ofIMass Destruction Advanced TechnologyIDevelopmentI				Project (Number/Name) RG I Defeat Technologies			
COST (\$ in Millions)	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost			
RG: Defeat Technologies	logies 95.067 21.002 20.710 22.16						22.557	23.031	23.145	23.619	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 2016 to FY 2017 is due to decreased investment in next generation CWMD technologies to balance other priorities. The increase from FY 2017 to FY 2018 is due to the relative impact of reductions in FY 2017.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RG: Defeat Technologies	21.002	20.710	22.161
Description: Project RG develops advanced technologies and weapon concepts and validates their applicability to CWMD.			
 FY 2016 Accomplishments: Completed design refinements to and initiated demonstration of Heated and Mobile Munitions Employing Rockets (HAMMER) weapon system and subsystems and integration through analysis and testing up to and including full scale static testing to achieve Technology Readiness Level (TRL) 4/5. HAMMER provides a concept demonstration for penetrating weapons which mitigate collateral contamination effects through: low overpressure, minimal target structure damage, and no aerosolization. Conducted Modular Autonomous CWMD System Increment A (MACS-A) Risk Reduction Test 2, which demonstrated increased supervised autonomous technologies addressing multiple payload configurations to enhance combating WMD and included navigation in an underground facility in extreme obscurants with limited communications. MACS-A addresses the ability to enable plug-and-play technologies as a force multiplier. Transitioned initial MACS-A concept to U.S. Army for further development. Demonstrated a highly resilient weapon design that survived two separate shock environments at different velocities, enabling detailed prototype work on other sub-systems with a known shock environment to meet TRL 6 specifications prior to 			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency Date: May 2017									
Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name) 0400 / 3 PE 0603160BR / *Counter Weapons of RG / Defeat Technologies Mass Destruction Advanced Technology Development RG / Defeat Technologies									
B. Accomplishments/Planned Programs (\$ in Millions)	ſ	FY 2016	FY 2017	FY 2018					
transition. Additionally, the body of knowledge resulting from the construction specifications of analogous high fidelity soil-codes, penetration tools, and build investigating earth penetrating weapons and ground sensor designs. - Continued development of access denial or denial-of-use technologies for CN - Continued functional defeat system development, testing, and demonstration	neet erest								
FY 2017 Plans: - Conduct static tests of full-scale HAMMER weapon system and initiate prepa - Conduct static demonstration of initial capability of access denial and denial- targets.	ration for full-scale dynamic tests. of-use technologies against WMD representativ	/e							
 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. 									
 FY 2018 Plans: Conduct dynamic sled tests of full-scale HAMMER weapon system and prepare Conduct full scale demonstration of access denial and denial-of-use technologies. Accomplish static testing of a full-scale Agent Defeat Penetrator weapon system and testing of a new access denial weapon concept. Continue to develop technologies in support of agent defeat and associated the Continue to develop and test diagnostic capability to meet emerging needs for Conduct functional defeat system demonstration. Conduct functional defeat system demonstration. Develop and integrate MACS Family of Systems Enabling Technologies in provide the system of t	are for technology transition starting in FY 2019 ogies against WMD representative targets. tem against a representative WMD target. facilities. or agent defeat.).							
	Accomplishments/Planned Programs Subt	otals	21.002	20.710	22.161				
		t							

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency										Date: May 2017			
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology DevelopmentProvide 					Project (Number/Name) RG I Defeat Technologies			
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>											
			<u>FY 2018</u>	<u>FY 2018</u>	FY 2018					Cost To			
Line Item	<u>FY 2016</u>	<u>FY 2017</u>	Base	000	<u>Total</u>	FY 2019	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Complete</u>	Total Cost		
• 20/0602718BR: Counter Weapons of Mass Destruction Applied Research <u>Remarks</u>	10.946	11.304	11.060	-	11.060	11.290	11.530	11.770	12.017	Continuing	Continuing		

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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: FY 2018 Defense Threat Reduction Agency											2017	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development				Project (Number/Name) RI <i>I Nuclear Survivability</i>			
COST (\$ in Millions) Prior Years FY 2016 FY 2017 Base						FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RI: Nuclear Survivability 37.908 6.621 6.561 6.658						6.658	6.729	6.854	6.992	7.132	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 nano-electronics effort develops and integrates radiation-hardened, high-performance prototype nano-electronics 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 decrease from FY 2016 to FY 2017 is due to decreased investment in Nuclear Surety.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RI: Nuclear Survivability	6.621	6.561	6.658
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 2016 Accomplishments:			
- Executed Mighty Guardian XVIII force-on-force test to evaluate nuclear security policy at the Navy's Strategic Weapons Facility Pacific, Naval Base Kitsap, WA.			
 Published Hazard Prediction Analysis Capability Health Effects from Nuclear and Radiological Environments Version 1.0 Technical Reference Manual. 			
 Continued the development of the next generation of Defense Integration and Management of Nuclear Data Services (DIAMONDS) network and infrastructure design. 			
- Modernized DIAMONDS software code with design reviews and meetings with users for future needs/requirements.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: May 2017					
Appropriation/Budget Activity 0400 / 3				R-1 Pr PE 060 Mass I Develo	rogram Eler 03160BR / 3 Destruction opment	nent (Numb Counter Wea Advanced Te	er/Name) apons of echnology	me) Project (Number/Name) of RI / Nuclear Survivability ogy						
B. Accomplishments/Planned Pro - Fielded and continued to evaluate	grams (\$ in I test-bed syste	<u>Millions)</u> em at select	user sites.						FY 2016	FY 2017	FY 2018			
FY 2017 Plans: - Produce technical reports to addre - Fabricate Pathfinder & Product De States Air Force/Space & Missile Ce program in 6.4 Advanced Compone	ss DoD conce monstration V enter and Nati nt Developme	erns for radic /ehicle to su onal Reconr ent and Proto	ogenic disea oport techno naissance Of otypes.	se related to logy transfer ffice, for mat	potential io from (6.2) / uration in th	nizing radiati Applied Rese eir Productiz	on exposure earch to the L ation & Quali	Jnited fication						
FY 2018 Plans: - Continue producing technical repo- historical veteran radiation exposure - Complete development of the Sate - Initiate development of a Satellite S - Complete update of the NATO Allie and Installations.	rts addressing and present Illite System N System Natura ed Engineerin	g DoD radiog day radiolog latural & Nuc al & Nuclear g Publicatior	jenic disease ical exposur clear Environ Environmen n AEP-04 Nu	e concerns; v res of the Do nment Protection it Protection iclear Surviv	which addre D-affiliated ction Standa Handbook. rability Criter	ss Congress population. ird. ia for Armed	ional interest Forces Mate	: in erial						
				Accon	nplishment	s/Planned P	rograms Su	btotals	6.621	6.561	6.658			
C. Other Program Funding Summ Line Item • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research	ary (\$ in Milli <u>FY 2016</u> 30.896	<u>ons)</u> <u>FY 2017</u> 34.051	FY 2018 Base 34.103	<u>FY 2018</u> <u>OCO</u> -	FY 2018 Total 34.103	<u>FY 2019</u> 34.736	FY 2020 35.438	FY 202 36.16	<u>1 FY 2022</u> 1 36.896	Cost To Complete Continuing	<u>Total Cost</u> Continuing			
<u>Kemarks</u> <u>D. Acquisition Strategy</u> Assessment and selection of best p researchers across DoD and other g <u>E. Performance Metrics</u> Percentage of completed demonstrations Fiscal Years 2015-2018, in support	erformer for c government a ation program of Strategic C	levelopment gency labora is transitionir objective 4.1	al requireme atories, acac ng each year , "Preserve i	ents to meet s lemia, indust r. (This is Pr nvestments t	specific milit try, and inter iority Goal 4 to maintain 6	ary capability national part 1.2, as cited our decisive	/ needs. Peri ner organiza I in U.S. Dep technologica	former ba tions. artment o	ise includes b of Defense Ag ity.")	est-of-breed jency Strateg	ic Plan for			

Exhibit R-2A, RDT&E Project Ju	stification:	FY 2018 D	efense Thr	eat Reducti	ion Agency					Date: May	/ 2017	
Appropriation/Budget Activity 0400 / 3					R-1 Progra PE 060316 Mass Dest Developme	am Elemen 60BR / *Cou ruction Adva ent	t (Number/ Inter Weapo anced Tech	Project (Number/Name) RL <i>I Nuclear & Radiological Effects</i>				
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RL: Nuclear & Radiological Effects	0.000	0.000	3.528	3.500	-	3.500	3.456	3.457	3.455	3.455	Continuing	Continuing
 A. Mission Description and Bud The Nuclear and Radiological Effe processes. The assessment mode nuclear response, supporting inte social, infrastructure, and informa second and third order effects. The reliable consequence assessmen The increase from FY 2016 to FY B. Accomplishments/Planned Pi Title: RL: Nuclear and Radiologica Description: Project RL develops weapons effects predictions, and s FY 2016 Accomplishments: N/A FY 2017 Plans: - Develop nuclear weapon effects - Develop nuclear weapon effects - Develop nuclear weapon effects - Continue to add militarily signification 	get Item Ju ects project eling tools p ragency str tion (PMES ese activition 2017 is du rograms (\$ al Effects anuclear an strategic sy tools specific tools specific ant nuclear	ustification develops, i provide critic ategic and f ill) factors a es/efforts su nse informa e to the tran in Millions d radiologic stem design fically design weapon eff	integrates, a cal analytics tactical deci and their inte upport Com ation. nsition of nu s) cal assessm n decisions. gned for tran gned for tran gned to supp fects to tools	and transition of for Conse sion makin eraction, ex batant Com clear effect clear effect ent modeli sition to mi port nuclear	ons nuclear quence of E g. These CO tending ana mands and ts modeling ng tools to s ilitary targeti r survivabilit	and radiolo execution (C DE consider lytical capa other Depa applied rese support milit ng systems y and stand for transitio	gical assess OE) consid rations can bilities beyc intment of D earch efforts ary operations ary operations ards formul n to military	sment mode lerations du include the ond commo pefense (Do s to advanc onal plannin ation.	eling tools fo ring nuclear full range o n damage a D) organiza red technolo FY Ig,	or use in m targeting f political, r ssessmen tions by pr gy develop 2016 0.000	ilitary plann and post-de nilitary, eco practices a oviding acc oment. FY 2017 3.528	ing etonation nomic, and into urate and FY 2018 3.500
systems. - Continue to add militarily signification standards formulation.	ant nuclear	weapon eff	fects to tool	s specifical	ly designed	to support r	nuclear surv	vivability and	d			
					Accomplie			<u> </u>				

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency											Date: May 2017		
Appropriation/Budget Activity 0400 / 3					ogram Elen 03160BR / * Destruction / opment	n ent (Numb Counter Wea Advanced Te	Project (I RL / Nucl	Number/Name) lear & Radiological Effects					
C. Other Program Funding Summa	ary (\$ in Milli	ons <u>)</u>											
<u>Line Item</u> • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research • *123/0605000BR: Counter Weapons of Mass Destruction Systems Development	<u>FY 2016</u> 28.333	<u>FY 2017</u> 28.668 -	FY 2018 Base 29.228	FY 2018 OCO -	FY 2018 Total 29.228	FY 2019 29.640	FY 2020 30.324	FY 2021 30.999	FY 2022 31.695	Cost To Complete Continuing 0.000	Total Cost Continuing 64.199		
Remarks Prior year funds related to this this p D. Acquisition Strategy N/A E. Performance Metrics	roject in prog	ram elemen	t number 06	05000BR.									

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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 J	ustification	: FY 2018 E	efense Thre	eat Reduct	ion Agency					Date: May	/ 2017	
Appropriation/Budget Activity 0400 / 3					R-1 Progra PE 060316 Mass Dest Developme	am Elemen 60BR / *Cou truction Adva ent	t (Number / Inter Weapo anced Tech	Project (N RM / WMD	bject (Number/Name) 1 / WMD Counterforce Technologies			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RM: WMD Counterforce Technologies	131.135	19.374	23.138	24.663	-	24.663	25.447	25.892	26.473	27.006	Continuing	Continuing
A Mission Description and Bu	daot Itom Ju	ustification			1				1		1	
effort provides wartighters with a Unmanned Aerial System paylo integrates modeling and simulat The increase from FY 2016 to F FY 2017 to FY 2018 is due to in	apabilities to ads. The Con ion software Y 2017 is du creased inve	o find, chara untering WI to optimize e to increas estment in w	Acterize, and AD (CWMD) the executions and investme reapons effe	assess W weapons on of WMD ent in WME ects and pla	MD threats. effects effor) and associ) reconnaise anning tools	This effort of t develops r iated hard ta sance techn technology	develops an modernized arget defeat ology and v developme	nd integrate , fast-runnir : operations veapons eff ent.	s sensing teng, validated	anning tool	s with multi-r anning tools s. The increa	and
B. Accomplishments/Planned	Programs (<u>s)</u>						FY	2016 I	FY 2017	FY 2018
Description: Project RM provide delivery system optimization; an	echnologies es: (1) full-sc d (2) WMD s	ale testing o ensor, surv	of CWMD we eillance, and	eapons effe d data proc	ects, weapo essing tech	n effects mo nologies.	odeling, and	d weapon		19.374	23.130	24.003
FY 2016 Accomplishments: - Validated correlation between I training aid and high priority biolo biological warfare search capabi - Developed first generation Bio- end-users with a field presumptir - Developed and transitioned Gr operator CWMD target engagem - Transitioned initial biological set 1) to DoD and Interagency end-u technologies. - Transitioned models for blast p and the hazard to people and eco Republic of Korea (ROK) Agence	Biological Int ogical warfar lities meeting ISR Loop Mo ve identificat anite Toupee ent dwell tim arch technol users. Initiate ropagation th uipment. A y for Defense	elligence, S e agent; thi g customer ediated Isot ion capabili e CWMD sy nes and incl logies (Biok ed planning nrough failir stand-alone	urveillance, s successful requirement hermal Amp ty for biologi stem (GT) P reases opera ogical-Intellig for Bio-ISR ng blast door fast running ent.	and Recor I test was c s. Iffication (L cal warfare Phase I to n ator safety gence, Sur Spiral 2 de rs, sufficier g model (F	AMP) Bio Id AMP) Bio Id threat agen neet emerge during neut veillance an monstration to predict RM) was de	(Bio-ISR) M ontinued dev dentifier; the nts. ent custome ralization of id Reconnai of improve both the res livered to U	obile Grour velopment o e LAMP sys r requireme WMD mate ssance (Bio d biological sponse of th .S. Forces	nd Sensor (I of counter- tem will pro ents; GT rec erials. o-ISR) Spira search ne blast doo Korea and t	MGS) vide luces l r he			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct		Date: May 2017						
Appropriation/Budget Activity 0400 / 3	Project (N RM / WMI	ject (Number/Name) I WMD Counterforce Technologies						
B. Accomplishments/Planned Programs (\$ in Millions)		F۱	2016	FY 2017	FY 2018			
 Completed Integrated Munitions Effectiveness Assessment (IMEA) 11.1, sup adobe structures, barrier walls, scalable equipment), ground operations (e.g., of fragment, and crater debris effects and visualization), and air delivered weapour reduction for follow-on weapons, and hard target void sensing fuse updates), a use of IMEA 11.1 for Targeting Weaponeering Assistance Cell Reachback sup - Supported Army Program Manager for Unmanned Systems in performing and activities, fielding, and procurement. Delivered prototype 64-bit version of CWMD modeling and simulation plannir - Delivered Targeting/Weaponeering academics and targeting recommendatio - Delivered agent defeat modeling capabilities (Human Injury, Dynamic Pressu Reachback mission. Demonstrated unmanned platform capable of high-altitude/long-range glide, v for covert emplacement of Chemical, Biological, Radiological, and Nuclear (CE - Demonstrated nano-material based sensor/reporting system for detection of I - Designed, developed, integrated, and tested computer vision and autonomous precise CBRN payload emplacement. Initiated the development of a low-visibility sensor/detection device for chemic - Continued to develop technology for enhanced area search, localization, and threats of interest (Spiral 2). Continued to develop improved agent defeat modeling capabilities for WMD to Provided U.S. Central Command, Air Forces Central Command, and the Comwith over 300 Target Recommendation Packages. 	porting target characterization (e.g., 4D process Concept Development and Experimentation (CI n planning (e.g., GPS jamming, slab strength along with DTRA informal accreditation to allow oport. alysis of WMD Aerial Collection System transition of tools for analysis of large data sets. In packages for Combatant Commands. Irre, and Structural Response) for DTRA's vertical takeoff, and landing transition, and egre BRN) payloads/sensors. biological and chemical threats. Is navigation on unmanned systems to enable cal search missions. point detection/identification tools for biological target attack planning. nbined Joint Task Force Operation Inherent Re	ses, DE), the on sss						
 FY 2017 Plans: Demonstrate proof of concept for next-generation chemical warfare agent detered a Demonstrate enhanced WMD sample collection system for low-visibility searched a Demonstrate Biological Intelligence Surveillance and Reconnaissance (Bio-IS capabilities for counter-bio search missions. Integrate, test and demonstrate CBRN defeat technologies in a remotely-opeeration validate the Vertical Take-off and Landing Autonomous Precision Entradiological and nuclear defeat payloads. Transition enhanced structural response and WMD agent dispersion/neutralizimproved WMD vulnerability assessment and force protection planning capability 	tector. ch operations. SR) Spiral 2 enhanced area search sensors/ rated unmanned payload. mplacement System delivering chemical, biolog zation models, using new software architecture lities.	iical, for						

Exhibit R-2A, RDT&E Project Jus	tification: FY	2018 Defens	se Threat Re	eduction Age	ency				Date: N	lay 2017					
Appropriation/Budget Activity 0400 / 3				R-1 P I PE 06 <i>Mass</i> <i>Devel</i>	rogram Eler 03160BR / * Destruction opment	nent (Numb Counter We Advanced Te	er/Name) apons of echnology	Projec RM / V	Project (Number/Name) RM / WMD Counterforce Technologies						
B. Accomplishments/Planned Pro	ograms (\$ in N	<u>/lillions)</u>							FY 2016	FY 2017	FY 2018				
 Transition final prototype of advantion Complete phase one of three new tools (i.e., IMEA) to enhance integration Publish targeting/weaponeering advantional set of the se	ced area sear software arch ation with partr cademics and	ch sensor to itecture deve ner agency to targeting rec	counter bio elopments, a ools. commendatio	logical warfa allowing WM on packages	are threats. D defeat mo s for Combat	deling and s ant Commar	imulation pla nds.	nning							
 FY 2018 Plans: Demonstrate sample extraction pr Continue to demonstrate enhance Demonstrate mission planning an attribution. Design, test and integrate Granite efficiency and effectiveness. Conduct Hydra Spear End-User E for final system production. Conduct Hydra Shield Operational representative environments. Begin phase two of three new soft tools (i.e., IMEA, VAPO) to more quinternational allies. Conduct proof of concept demonstimistions. 	ototype capab d WMD sampl d analytical too Toupee Phas valuation to ga I Evaluation to ware architect uckly and effic trations for enl	ility for rapid le collection ols for chem- e II agitation ain operator determine s ure develop iently enhan hanced area	sampling of and analysis search oper and injectio perspective system effect ments, allow ce integratio search sens	f hazardous s systems fo rations, inclu on system up and catalog tiveness and ving WMD de on with plann sors and cap	chemicals fr r low-visibilit ding sensor grades to in recommend d operational efeat modelin ing tools use pabilities for	om solid stor y search ope emplacemer crease targe ed prototype utility agains ng and simul ed by partner biological we	rage. erations. at and source t prosecution system upg st WMD targe ation plannin agencies ar eapon search	e rades ets in ng nd							
				Accor	nplishment	s/Planned P	rograms Su	btotals	19.374	23.138	24.663				
C. Other Program Funding Summ Line Item • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research Remarks	nary (\$ in Milli FY 2016 12.873	ons) FY 2017 12.097	FY 2018 Base 14.552	<u>FY 2018</u> <u>OCO</u> -	<u>FY 2018</u> <u>Total</u> 14.552	<u>FY 2019</u> 12.612	FY 2020 12.852	FY 202 13.12	21 FY 202 29 13.39	Cost To 2 Complete 5 Continuing	<u>Total Cost</u> Continuing				
PE 0603160BR: *Counter Weapons Defense Threat Reduction Agency	of Mass Desti	ruction Adv		UNCLAS Page 27	SIFIED		R-1 Line	#26		Vo	olume 5 - 67				

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reducti	on Agency	Date: May 2017
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development	Project (Number/Name) RM / WMD Counterforce Technologies

D. Acquisition Strategy

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

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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.")

Appropriation/Budget Activity 0400 / 3					R-1 Progr PE 060310 <i>Mass Dest</i> <i>Developm</i>	am Element 60BR / *Cou truction Adva ent	t (Number/Name) Countering WMD Test and tion					
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
**RR: Countering WMD Test and Evaluation	14.052	2.000	0.000	12.500	-	12.500	12.500	12.500	12.500	12.500	Continuing	Continuing
A Mission Description and Budg Project RR provides a unique nati WMD facility defeat testing to resp the Combatant Commanders and civilian systems and targets. The decrease from FY 2016 to FY Nevada National Security Site for missile defense.	ombating V get Item Ju onal test be oond to ope other Fede 2017 is du sensor dev	VMD Test a <u>ustification</u> ed capability erational nece eral Agencie ue to a relat velopment a	nd Evaluation y for simulation eds by devertes to evaluation tive impact of and testing.	en to Coun ed weapor loping and te the impli- te the impli- of increased The increa	tering WMD ns of mass of maintaining cations of V d investmen ase from FY	destruction (g test beds u VMD, conve t in FY 2016 2017 to FY	WMD) facili used by the ntional, and o for crane o 2018 is due	eginning in ty characte Departmen other spec operations a e to increas	FY 2017. rization, we t of Defense ial weapon and build-ou ed investme	apon-targe e (DoD), th use agains at of the tes ent in the S	et interaction e Military Se st U.S. milita t bed structu pecial Test I	, and ervices, ry or ures at the Bed for
B. Accomplishments/Planned Pr	rograms (\$	6 in Millions	s <u>)</u>						FY	2016	FY 2017	FY 2018
Title: RR: Countering WMD Test a	and Evalua	tion								2.000	0.000	12.500
Description: Project RR provides interaction, and WMD facility defea	a unique n at testing.	ational test	bed capabi	lity for simu	ulated WMD	facility char	racterizatior	n, weapon-t	arget			
FY 2016 Accomplishments: - Initiated crane operations 7 and 8 development and testing. FY 2017 Plans:	8 and the b	ouild-out of t	est bed stru	ctures at th	ne Nevada N	National Sec	curity Site fo	or sensor				
N/A												
FY 2018 Plans: - Support Combatant Command ex- technologies, tools, and capabilities - Develop interagency capabilities	xercises ar es. and specia	nd planning al tests in su	events at th upport of nat	e Nevada ⁻ ional priori	Test Bed in ty programs	order to dev and missio	velop missil n requireme	e defeat ents.				

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency

Date: May 2017

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: M	ay 2017		
Appropriation/Budget Activity R-1 Program Element (Number/Name) 0400 / 3 PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology Development								Projec **RR / Evalua	Project (Number/Name) **RR <i>I Countering WMD Test and</i> <i>Evaluation</i>			
B. Accomplishments/Planned Pro	grams (\$ in N	<u>/lillions)</u>						ſ	FY 2016	FY 2017	FY 2018	
- Augment scheduling, test planning demonstrations.	, maintenance	e and analys	is capabilitie	s for missile	defeat tech	nology tests	and					
				Accon	nplishments	s/Planned P	rograms Su	btotals	2.000	0.000	12.500	
C. Other Program Funding Summ	ary (\$ in Milli	<u>ons)</u>										
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					Cost To		
Line Item	FY 2016	<u>FY 2017</u>	Base	000	<u>Total</u>	<u>FY 2019</u>	FY 2020	FY 202	<u>FY 2022</u>	2 Complete	Total Cost	
• 20/0602718BR: Counter Weapons of Mass Destruction Applied Research	10.718	13.666	13.652	-	13.652	12.464	12.945	13.28	8 13.586	6 Continuing	Continuing	
Remarks												
D. Acquisition Strategy							unanda Davi	fa		and of brand		

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

E. Performance Metrics

Percentage of completed demonstration programs transitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. 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 Ju	stification	FY 2018 D	efense Thre	eat Reducti	iction Agency					Date: May 2017			
Appropriation/Budget Activity 0400 / 3						R-1 Program Element (Number/Name) PE 0603160BR / *Counter Weapons of Mass Destruction Advanced Technology DevelopmentProj 					o ject (Number/Name) I Target Assessment Technologies		
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
RT: Target Assessment Technologies	191.160	63.579	41.794	27.185	-	27.185	24.276	23.722	24.323	24.838	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 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. The decrease from FY 2017 to FY 2018 is due to decreased investment reflecting the transition of the previously mentioned high-priority sensor technology and supporting algorithms to the combatant commands.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RT: Target Assessment Technologies	63.579	41.794	27.185
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 2016 Accomplishments:			
- Completion of two developmental demonstrations/exercises (Grane Ops 5 and Grane Ops 6) to gather sensor data, develop signatures, and conduct sensor phenomenology analysis in support of further program development.			
- Designed, built, and delivered realistic test article to enhance fidelity of sensor demonstrations and testing.			
- Developed new and enhanced (range/sensitivity) detection capabilities and enhanced delivery capabilities of the deployable			
- Developed and demonstrated Nuclear WMD Defeat Model for support of IC CWMD analysis and functional defeat targeting.			
- Developed and demonstrated Chemical-Biological Weapons Emerging Threats Model capability for support of IC CWMD			
analysis and course of action selection.			
- Conducted validation and verification of thermal process modeling capability for support of IC functional vulnerability analysis of			
hard or deeply buried WMD related targets.			

PE 0603160BR: **Counter Weapons of Mass Destruction Adv...* Defense Threat Reduction Agency

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency				Date: May 2017			
propriation/Budget Activity R-1 Program Element (Number/Name) Proje 00 / 3 PE 0603160BR / *Counter Weapons of RT / Mass Destruction Advanced Technology Development Proje				e ct (Number/Name) Target Assessment Technologies			
B. Accomplishments/Planned Programs (\$ in Millions)		F	Y 2016	FY 2017	FY 2018		
 Demonstrated initial soil composition and layering penetration prediction mode planning. 	el for support of target characterization and mi	ssion					
 FY 2017 Plans: Demonstrate range and sensitivity detection capabilities and enhanced deliver. Conduct integration testing and algorithm validation of a deployable prototype. Integrate deployable ground sensor data outputs into Dynamic Characterization analysis. Develop processes and approaches for characterization of "Pattern of Life" based of information updates. Continue to develop WMD complex process models into target facility character. Continue to develop geo-technical soil and rock models for use in target character. FY 2018 Plans: Complete prototype development, final documentation, and technical report in ground sensor project. Develop detailed feasibility study and program plan for WMD and Hard Target. Continue to develop comprehensive soil model library for support of geotechnical integrate functional defeat and "pattern of life" models into automated target of the protocype development. 	ry system for a deployable remote ground sensor. on Modeling Tools to support time-dependent ased upon multiple modalities of data input. on "Pattern of Life" analysis and near-real-time rerizations. acterization and sensor deployment planning. In preparation for transition of a deployable rem t automated characterization capability. ical site characterization of WMD target sites. automated target characterization. haracterization capability. C and Combatant Commands.	sor. target ote					
	Accomplishments/Planned Programs Sub	totals	63.579	41.794	27.185		
 <u>C. Other Program Funding Summary (\$ in Millions)</u> N/A <u>Remarks</u> <u>D. Acquisition Strategy</u> Assessment and selection of best performer for developmental requirements to researchers across DoD and other government agency laboratories, academia 	o meet specific military capability needs. Perfo , industry, and international partner organizati	rmer base ons.	e includes l	pest-of-breed			

nibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency		Date: May 2017
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603160BR <i>I</i> *Counter Weapons of Mass Destruction Advanced Technology Development	Project (Number/Name) RT <i>I Target Assessment Technologies</i>
. Performance Metrics		
Percentage of completed demonstration programs trans Fiscal Years 2015-2018, in support of Strategic Objectiv	sitioning each year. (This is Priority Goal 4.1.2, as cited in U.S. Deve 4.1, "Preserve investments to maintain our decisive technologic	epartment of Defense Agency Strategic Plan al superiority.")

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Defense Threat Reduction Agency							Date: May 2017					
Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)			R-1 Program Element (Number/Name) PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development							nt		
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	77.733	7.156	4.568	6.241	-	6.241	6.216	4.864	5.388	5.652	Continuing	Continuing
**RF: Forensics Technologies	13.534	7.156	4.568	6.241	-	6.241	6.216	4.864	5.388	5.652	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

*Program Element 0605000BR name changes from WMD Defeat Capabilities to Counter Weapons of Mass Destruction Systems Development beginning in FY 2018. **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 Counter Weapons of Mass Destruction (WMD) Systems Development 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 (NACT) 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	7.156	4.568	9.092	-	9.092
Current President's Budget	7.156	4.568	6.241	-	6.241
Total Adjustments	0.000	0.000	-2.851	-	-2.851
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
 Reprogrammings 	-	-			
 SBIR/STTR Transfer 	-	-			
 Realignments 	-	-	-2.851	-	-2.851

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Defense Threat Reduction Agency		Date: May 2017										
Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0605000BR / *Counter Weapons of Mass Destruction Systems Development											
Change Summary Explanation The decrease in FY 2018 from the previous President's Budget submission is due to realignment of RDT&E to O&M in support of station operations for NACT and a realignment of funds from DTRA to the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD (AT&L)) for support services necessary to meet oversight responsibilities.												
Exhibit R-2A, RDT&E Project Ju	stification	: FY 2018 D	efense Thre	eat Reducti	on Agency				Date: May 2017			
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Appropriation/Budget Activity 0400 / 5	ation/Budget Activity					am Element 00BR / *Cou truction Syst	t (Number/l nter Weapo ems Develo	Name) ons of opment	Project (Number/Name) **RF / Forensics Technologies			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
**RF: Forensics Technologies	13.534	7.156	4.568	6.241	-	6.241	6.216	4.864	5.388	5.652	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

<u>Note</u>

*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 decrease from FY 2016 to FY 2017 is due to re-phasing of program activities to FY 2018 and FY 2019. The increase from FY 2017 to FY 2018 is due to the net effect of re-phasing of program activities from FY 2017, a realignment of RDT&E to O&M in support of station operations for NACT, and a realignment of funds from DTRA to the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD (AT&L)) for support services necessary to meet Congressional oversight responsibilities.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Title: RF - Forensics Technologies	7.156	4.568	6.241

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduct	ion Agency	Date: N	/lay 2017	
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605000BR <i>I *Counter Weapons of</i> <i>Mass Destruction Systems Development</i>	Project (Number/ **RF / Forensics T	Name) echnologies	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Description: Project RF supports the NACT Program, conducting RDT&E to m CTBT implementation, compliance, monitoring, inspection, and other emerging	neet IMS technology requirements in support of nuclear arms control activities.			
 FY 2016 Accomplishments: Completed installation of additional infrasound elements, seismic elements, a for Acceptance, Calibration, and Testing at Sandia Labs (SNL). These systems nuclear-explosion monitoring equipment before integration into the U.S. IMS. Developed and implemented concepts to improve the reliability of the radionu infrasound signal to noise ratios that will enhance strategic deterrence by lower nuclear-explosion detection thresholds and data availability for forensics analys. Continued support of Office of the Secretary of Defense (OSD) Threat Reduct objectives, providing regular IMS assessments, quarterly program management with the Comprehensive Test Ban Treaty Organization Provisional Technical S Continued development and implementation of IMS sensor and station calibration standardize calibration capability using novel algorithms and automated softwareplacement and long-range recapitalization. Sponsored and participated in CTBT technology development exchanges in or the potential to optimize performance and cost effectiveness of the IMS. 	nd wind noise reduction systems at the Facility s support the testing and verification/validation of clide stations and improve radionuclide and ring the U.S International Monitoring System ses. tion and Arms Control Treaty management at reviews, and supporting all OSD engagement ecretariat. ation software and in-situ calibration concepts, to re. re to enable cost effective and efficient spare p order to discover emerging technologies that ha	of s o art ve		
 FY 2017 Plans: Optimize IMS technology and operations to comply with CTBT language and increase cost efficiency. Validate alternative filter media against Provisional Technical Secretariat certi radionuclide sensor to enhance aerosol collection efficiency for the Radionuclide Conduct Analysis of Alternatives for Hydroacoustic monitoring. Annually, provide analysis of up to 800 additional International Atomic Energy OSD, Nuclear, Chemical and Biological Threat Reduction Advisory Committee. Complete evaluation of U.S. IMS operational options determined from life-cyce effective operational models. Evaluate alternative backup power options for arctic to improve reliability and CTBT Operations Manuals. Participate in CTBT Organization Provisional Technical Secretariat sponsored 	evolving operational manual requirements and fication standards for U.S. IMS particulate de Aerosol Sampler/Analyzer system. Agency verification samples in support of the de modeling and simulation to determine most of performance in remote locations as defined by d technology development exchanges.	to cost-		

Exhibit R-2A, RDT&E Project Justi	fication: FY	2018 Defens	se Threat Re	eduction Age	ncy				Date: Ma	ay 2017		
Appropriation/Budget Activity 0400 / 5				R-1 Pr PE 060 <i>Mass I</i>	ogram Eler 05000BR / * Destruction	nent (Numb Counter Wea Systems Dev	er/Name) apons of velopment	Projec **RF / /	ct (Number/Name) Forensics Technologies			
B. Accomplishments/Planned Prog	grams (\$ in N	<u>lillions)</u>							FY 2016	FY 2017	FY 2018	
 Finalize testing for Provisional Tech efficiency, reliability, or cost effective Run models and simulations to imp 	nnical Secreta ness at equa rove understa	ariat qualifica l or greater o anding of CT	ation of altern data quality o BT IMS net	native infraso objectives. work viability	ound wavefo /limitations.	orm sensor th	at improves					
 Continue the optimization of IMS terequirements in order to increase eff Conduct testing of waveform station demonstration in a relevant environn Continue development of improved indication of pending failures and rece Establish a Radionuclide Test-bed Continue to participate in CTBT Orgonal to provide synergy for R&D activities Conduct Entry-into-Force Readines risks and the costs of mitigation. Advance the state of health monitor cost effectiveness. Evaluate self-calibrating infrasound Evaluate the implementation of a signal to the sustainment of the Reading to the sustainment of the sustainment of the Reading to the sustainment of the sust	chnology and iciencies, sus n components nent. state of heal quired mainte capability for ganization Pro- ti High Reliabi s, Rapid Res ring capability sensors for u andard config	l operations tainability ar s and system th monitoring nance. rapid resolu ovisional Ter lity Power S ponse risk a r for wavefor use at IMS s guration for t	to comply w nd cost effect ns at the Fac g software for tion system chnical Secr ources for an assessment, m and radio tations. the Central F Pacific Nort	ith CTBT lan stiveness. cility for Acce or use on rad faults. etariat spons rctic operatio and Operatio nuclide station Recording Fa	eptance, Cal ionuclide sta sored techno onal environr onal Tableto ons to increa	evolving ope ibration, and ations to prov plogy develop ments. op Exercises ase reliability	rational man Testing Site vide a predic oment excha in order to q , sustainabili ons.	ual as a tive nges uantify ty, and				
		10 (11210) ut		Accon	nplishment	s/Planned P	rograms Su	btotals	7.156	4.568	6.241	
C. Other Program Funding Summa Line Item • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research • 26/0603160BR: Counter Weapons of Mass Destruction	FY 2016 10.525 40.373	ons <u>)</u> FY 2017 10.008 38.540	FY 2018 Base 10.274 40.286	<u>FY 2018</u> <u>OCO</u> -	FY 2018 Total 10.274 40.286	FY 2019 10.345 42.580	FY 2020 10.500 40.925	FY 202 10.77 42.14	I FY 2022 1 10.991 4 43.124	Cost To Complete Continuing Continuing	Total Cost Continuing Continuing	
PE 0605000BR: *Counter Weapons of	of Mass Destr	uction Sys		UNCLAS	SIFIED							

Exhibit R-2A, RDT&E Project Ju	se Threat Re	duction Age	ncy								
Appropriation/Budget Activity 0400 / 5				R-1 Pr PE 06 <i>Mass</i>	ogram Eler 05000BR / * Destruction	n <mark>ent (Numb</mark> Counter Wea Systems Der	er/Name) apons of velopment	Project (Number/Name) **RF <i>I Forensics Technologies</i>			
C. Other Program Funding Sum	mary (\$ in Milli	ons <u>)</u>									
<u>Line Item</u> <u>Remarks</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> Complete	Total Cost

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-2A, RDT&E Project Ju	stification	FY 2018 D	efense Thr	eat Reduct	tion Agency	у				Date: Ma	y 2017	
Appropriation/Budget Activity 0400 / 5					R-1 Prog PE 06050 Mass De	ram Elem 000BR / *C struction S	ent (Number counter Weap ystems Deve	/ Name) ons of lopment	Project (N RL / Nucle	Sumber/Na ear & Radic	m e) blogical Effec	cts
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	B FY 201 Total	8 FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RL: Nuclear & Radiological Effects	64.199	0.000	0.000	0.000) -	0.0	0.000	0.000	0.000	0.00	0.000	64.199
Quantity of RDT&E Articles	-	-	-	-	-			-	-	-		
through a net-centric framework. international partners through a g Defense Threat Reduction Agence Countering Weapons of Mass De and high-yield explosives (CBRN deployments which are validated The decrease in FY 2015 is due to	It provided lobally acce cy's (DTRA's estruction (C E) framewo and accred	near-real tir essible net- s) chemical WMD) deci rk in the wo ited for ope letion of Inte	ne collabora centric fram , biological, sion suppo orld that pro- rational use	ative analyse ework known radiologica rt capabiliti vided capa by interna apons of M	sis capabil wn as the I al, and nuc es. The fra bilities thro ational, nati	ities betwe Integrated V lear (CBRN mework w bugh web a ional, state	en the Depar Weapons of I N) modeling a as the only of pplications, r , and local au set investme	tment of De Mass Destru Ind simulation Derational ch Det-centric w Inthorities.	fense (DoE ction Tools on codes to nemical, bio eb services	 and key in set. This too provide an blogical, rac s, and stand 	nteragency a olset migrate i integrated s diological, nu d-alone mob	and ed the suite of uclear, ile
B. Accomplishments/Planned P	rograms (in Million	<u>s)</u>	-					F	Y 2016	FY 2017	FY 2018
Title: RL: Nuclear & Radiological	Effects					ŗ		DT	-	0.000	-	-
CBRNE modeling and simulation	codes to pr	ovide an int	egrated sui	te of CWM	D decision	support ca	apabilities.	ates the DT	RA			
FY 2016 Accomplishments: NA												
					Accompl	ishments/	Planned Pro	grams Sub	totals	0.000	-	-
C. Other Program Funding Sum Line Item • 20/0602718BR: Counter Weapons of Mass Destruction Applied Research	<u>mary (\$ in</u> <u>FY 20</u> 28.3	<u>Millions)</u> 1 <u>6 FY 2</u> 33 28.	<u>FY 2</u> 017 <u>E</u> 668 29	2018 FY 3ase .228	<u>′ 2018</u> <u>OCO</u> -	<mark>FY 2018</mark> <u>Total</u> 29.228	<u>FY 2019</u> 29.640	<u>FY 2020</u> 30.324	<u>FY 2021</u> 30.999	<u>FY 2022</u> 31.695	Cost To Complete Continuing	<u>Total Cost</u> Continuing
PE 0605000BR: *Counter Weapor	ns of Mass I	Destruction	Sys	UN		FIED					Vo	lume 5 - 81

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Defense Threat Reduction Agency

R-1 Line #123

Exhibit R-2A, RDT&E Project Justif	ication: FY	2018 Defens	se Threat Re	duction Age	ncy			Date: May 2017				
Appropriation/Budget Activity	Appropriation/Budget Activity					nent (Numb	er/Name)	Project (N	umber/Na	me)		
040075					05000BR / *	Counter Wea	apons of	RL / Nucle	lear & Radiological Effects			
				Mass	Destruction	Systems De	elopment					
C. Other Program Funding Summar	r <mark>y (\$ in Milli</mark> ∉	ons <u>)</u>										
			FY 2018	FY 2018	<u>FY 2018</u>					Cost To		
Line Item	<u>FY 2016</u>	FY 2017	Base	000	<u>Total</u>	<u>FY 2019</u>	FY 2020	<u>FY 2021</u>	FY 2022	<u>Complete</u>	Total Cost	
• 26/0603160BR: Counter	0.000	3.528	3.500	-	3.500	3.456	3.457	3.455	3.455	Continuing	Continuing	
Weapons of Mass Destruction												
Advanced Technology Development												
<u>Remarks</u>												

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-2, RDT&E Budget Item	n Justificati	i on: FY 201	8 Defense	Threat Red	uction Ager	ncy			Date: May 2017			
Appropriation/Budget Activity 0400: Research, Development, Te RDT&E Management Support	est & Evalua	tion, Defen	se-Wide I B	A 6:	R-1 Progra PE 060550	am Elemen)2BR <i>I Sma</i>	t (Number/ Il Business	Name) Innovation I	Research			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	38.612	10.473	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
RA: Information Sciences and Applications	38.612	10.473	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

<u>Note</u>

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.

<u>B. Program Change Summary (\$ in Millions)</u>	<u>FY 2016</u>	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	10.473	0.000	0.000	-	0.000
Total Adjustments	10.473	0.000	0.000	-	0.000
 Congressional General Reductions 	-	-			
 Congressional Directed Reductions 	-	-			
 Congressional Rescissions 	-	-			
 Congressional Adds 	-	-			
 Congressional Directed Transfers 	-	-			
 Reprogrammings 	-	-			
 SBIR/STTR Transfer 	10.473	-			

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 Ju	eat Reducti	on Agency				Date: May 2017						
Appropriation/Budget Activity 0400 / 6					R-1 Progr a PE 060550 <i>Research</i>	am Elemen)2BR / Sma	t (Number / Il Business	Iumber/Name) mation Sciences and Applications				
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RA: Information Sciences and Applications	38.612	10.473	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
<u>Note</u> *Funding is not allocated until the	year of exe	ecution. Pro	ogram Elem	ent 060550	2BR "Smal	l Business I	nnovative F	esearch (S	BIR)" is use	ed in reporti	ng year-end	l actual

A. Mission Description and Budget Item Justification

expenses only.

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 2016	FY 2017	FY 2018
Title: RA: Information Sciences and Applications	10.473	-	-
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 2016 Accomplishments: - Manufactured, tested, and modeled bulk metal glass high speed projectiles ballistic performance for potential WMD target defeat applications.			
Phase I contract awards from qualified proposals:			
SBIR 14.3 solicitation: 8 awards			
SBIR 15.2 solicitation: 22 awards			
STTR 16.A solicitation: 8 awards			
Phase II contract awards from qualified proposals: SBIR 13.3 solicitation: 2 awards			
			-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Threat Reduction Agency									Date: Ma	ay 2017	
Appropriation/Budget Activity 0400 / 6				R-1 P I PE 06 <i>Resea</i>	r ogram Eler 05502BR / S arch	nent (Numb Small Busine	er/Name) ss Innovation	Project (Number/Name) RA I Information Sciences and App			pplications
B. Accomplishments/Planned Prog	<u>rams (\$ in I</u>	<u>Millions)</u>							FY 2016	FY 2017	FY 2018
SBIR 12.1 solicitation: 1 award											
				Accon	nplishment	s/Planned P	rograms Sub	totals	10.473	-	-
C. Other Program Funding Summa	ry (\$ in Milli	ons <u>)</u>									
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>	
Line Item	<u>FY 2016</u>	<u>FY 2017</u>	Base	000	<u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	FY 2022	<u>Complete</u>	Total Cost
20/0602718BR: Counter Weapons of Mass	29.133	29.127	30.270	-	30.270	32.325	28.286	29.083	30.077	Continuing	Continuing
• 26/0603160BR: Counter Weapons of Mass Destruction Advanced Technology Development	11.494	11.422	10.229	-	10.229	11.983	12.183	12.468	12.733	Continuing	Continuing
Remarks											
<u>D. Acquisition Strategy</u> N/A <u>E. Performance Metrics</u>											
N/A											

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