Department of Homeland Security

Domestic Nuclear Detection Office

Budget Overview

Fiscal Year 2018

Congressional Justification

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Domestic Nuclear Detection Office

Appropriation Organization Structure

Organization Name	Level	Fund Type (* Includes Defense Funding)
Domestic Nuclear Detection Office	**Component**	
Operations and Support	**Appropriation**	
Mission Support	PPA	Discretionary - Appropriation
Procurement, Construction, and Improvements	**Appropriation**	
Large Scale Detection Systems	PPA,Investment	Discretionary - Appropriation
Human Portable Rad/Nuc Systems	PPA,Investment	Discretionary - Appropriation
Research and Development	**Appropriation**	
Architecture Planning and Analysis	PPA	Discretionary - Appropriation
Transformational Research and Development	PPA	Discretionary - Appropriation
Detection Capability Development	PPA	Discretionary - Appropriation
Detection Capability Assessments	PPA	Discretionary - Appropriation
Nuclear Forensics	PPA	Discretionary - Appropriation
Federal Assistance	**Appropriation**	
Federal, State, Local, Territorial, and Tribal Support	PPA	Discretionary - Appropriation
Securing the Cities	PPA	Discretionary - Appropriation

Domestic Nuclear Detection Office
Strategic Context

Component Overview

The Domestic Nuclear Detection Office (DNDO) is comprised of the following mission-oriented programs that support achievement of the DHS strategic missions, goals, and objectives.

Architecture Planning and Analysis: The Architecture Planning and Analysis program coordinates the development of an enhanced Global Nuclear Detection Architecture through the implementation of a continuous process of stakeholder engagement involving the operational components of the Department, other federal agencies, and our state, local, tribal, and territorial partners to formulate and adjust program plans and investment options, on an annual basis, to address the threat of nuclear terrorism across the Nation's homeland security enterprise.

Detection Capability Development: The Detection Capability Development program generates advanced technology capabilities through acquisition and development programs and ensures that efficient and effective purchasing agreements are in place. This is accomplished through partnership with industry to acquire and develop radiological and nuclear detection systems and solutions that meet government requirements. For existing systems, the directorate continues to monitor systems performance to ensure continued field capability and provide feedback for future improvements.

Large Scale Detection Systems: The Large Scale Detection System program supports the Departments' efforts to maintain and improve scanning coverage using radiation portal monitors (RPM) at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities. The program deploys and manages the installed RPM inventory and reconfigures sites as required to maintain coverage.

Human Portable Rad/Nuc Systems: The Human Portable Rad/Nuc Systems (HPRDS) program supports DHS Components whose mission is to detect and identify rad/nuc threats. HPRDS scanners are relatively lightweight, easy to use, and of sufficiently low cost to support widespread deployment and can be worn, carried, or moved easily to address potential threats. The objectives of the HPRDS program are to provide more capable and flexible systems to address numerous types of conveyances and cargo to be scanned for rad/nuc material.

Detection Capability Assessments: The Detection Capability Assessments program continually assesses the Global Nuclear Detection Architecture. The program uses a variety of means to identify the effectiveness of planned and deployed programs and operations. Some of the methods are test and evaluation of available and emerging technologies; execution of concept of operations pilots; and red team assessments to deepen the understanding of deployed capabilities.

Nuclear Forensics: The Nuclear Forensics program ensures the operational readiness of the federal nuclear forensics capability to

respond to an event without warning. The program leads the centralized planning, interagency efforts, exercises, assessments, and stewardship of the Nation's nuclear forensics capabilities through collaboration with federal departments and agencies who have assigned responsibilities for nuclear forensics. In addition to the Department of Homeland Security, these include the Department of Justice, Federal Bureau of Investigation, Department of Defense, Department of Energy, Department of State, and the Office of the Director of National Intelligence.

Transformational Research and Development: The Transformational Research and Development program oversees research and development conducted by industry, national laboratories, and academic institutions to improve performance, cost, and operational capability of detectors and systems and to address gaps in the Global Nuclear Detection Architecture and national technical nuclear forensics capabilities. The program collaborates with other federal research and development agencies to coordinate these efforts and maximize efficiency.

Federal, State, Local, Territorial, and Tribal Support: The Federal, State, Local, Territorial, and Tribal Support program promotes capability development and sustainment, and fosters strong relationships with state, local, and tribal agency mission stakeholders by sponsored strategic engagements. The major elements of this program include the State and Local Stakeholder Working Group, Executive Steering Council, and Capabilities Integration projects. These activities support partnerships between the Department and the state and local community to strengthen rad/nuc detection capabilities in support of the Global Nuclear Detection Architecture.

Securing the Cities: The Securing the Cities program seeks to reduce the risk of a successful deployment of a rad/nuc terrorist weapon against major metropolitan regions in the United States by establishing sustainable capability within the Global Nuclear Detection Architecture partner agencies to detect, analyze, and report nuclear and other radioactive materials out of regulatory control within their jurisdictions.

Mission Support: The Mission Support program provides enterprise leadership, management, and business administrative services that sustain the day-to-day back office operations. Key capabilities include managing the agency's performance, finances, workforce, physical and personnel security, acquisition of goods and services, information technology, property and assets, communications, legal affairs, and administration.

Component Contributions to Achieving Departmental Missions

The table below shows the alignment of the DNDO programs to the DHS Missions and Mature and Strengthen Homeland Security.

Programs	DHS Missions					*Mature and Strengthen Homeland Security
	*Prevent Terrorism and Enhance Security	*Secure and Manage Our Borders	*Enforce and Administer Our Immigration Laws	*Safeguard and Secure Cyberspace	*Strengthen National Preparedness and Resilience	
Mission Support	51%					49%
Architecture Planning and Analysis	100%					
Detection Capability Development	100%					
Large Scale Detection Systems	100%					
Human Portable Rad/Nuc Systems	100%					
Detection Capability Assessments	100%					
Nuclear Forensics	100%					
Transformational Research and Development	100%					
Federal, State, Local, Territorial, and Tribal Support	100%					
Securing the Cities	100%					

**Totals account for rounding*

Mission 1: Prevent Terrorism and Enhance Security

Resources Requested

DNDO resources supporting *Prevent Terrorism and Enhance Security* are provided in the table below.

$ in thousands

Program Name	FY 2016 Revised Enacted		FY 2017 Annualized CR		FY 2018 President's Budget	
	$	FTE	$	FTE	$	FTE
Architecture Planning and Analysis	15,758	-	15,578	-	15,937	-
Detection Capability Development	21,029	-	20,788	-	15,155	-
Large Scale Detection Systems	51,269	-	53,096	-	62,524	-
Human Portable Rad/Nuc Systems	37,020	-	34,000	-	24,572	-
Detection Capability Assessments	39,503	-	39,051	-	34,127	-
Nuclear Forensics	19,031	-	18,813	-	18,361	-
Transformational Research and Development	64,684	-	63,943	-	60,581	-
Federal, State, Local, Territorial, and Tribal Support	26,168	-	25,560	-	23,384	-
Securing the Cities	21,113	-	21,135	-	21,135	-
Mission Support	26,485	70	26,353	70	27,732	73
Total	322,060	70	318,317	70	303,508	73

Performance Measures

For *Prevent Terrorism and Enhance Security*, two types of performance measures are presented. Strategic Measures represent DNDO measures that gauge achievement for this mission area, and are considered to be our Government Performance and Results Act Modernization Act (GPRAMA) performance measures. Additional Management Measures are displayed, as appropriate, to provide a more thorough context of expected performance results.

Strategic Measures

Measure: Number of people covered by Securing the Cities program preventive radiological and nuclear (rad/nuc) detection capabilities (in millions)						
Description: The Securing The Cities (STC) program provides financial assistance to state, local, and tribal organizations to develop a robust regional radiological/nuclear detection program. For the STC program to count the population as covered by a robust radiological/nuclear detection capability, the region must demonstrate that 10% or more of its standing law enforcement are trained and equipped to conduct primary screening and patrolling as part of their daily routine duties and there are equipped and trained personnel to conduct secondary screening and alarm adjudication. In addition, the region must conduct at least one multi-jurisdictional exercise a year, and allow the exchange of information among regional partners and with federal agencies, and mutually assist each other in performing the radiological/nuclear detection mission. If the measure is met, the entire population from the statistical area is counted as covered.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	N/A	23.0	23.0	37.0	37.0	46.0
Result:	N/A	23.0	23.0	37.0	N/A	N/A

Measure: Percent of cargo conveyances that pass through radiation portal monitors upon entering the nation via land border and international rail ports of entry						
Description: This measure gauges the proportion of cargo scanned by radiation detection equipment deployed to the Nation's land border crossing ports of entry and international rail ports of entry. It is expressed in terms of the percent of cargo conveyances scanned by radiation portal monitors (RPM) which enter the Nation through land ports of entry and by international rail. The Domestic Nuclear Detection Office (DNDO) procures and/or installs RPMs at ports of entry, and the U.S. Customs and Border Protection (CBP) conducts the cargo scanning using RPMs to prevent nuclear and other radioactive materials that are out of regulatory control from entering the country via cargo conveyances.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	FOUO	FOUO	FOUO	FOUO	FOUO	FOUO
Result:	FOUO	FOUO	FOUO	FOUO	N/A	N/A

Measure: Percent of containerized cargo conveyances that pass through radiation portal monitors at sea ports of entry						
Description: This measure gauges the amount of containerized cargo scanned by the radiation detection equipment deployed to the Nation's sea ports of entry. It is expressed in terms of the percent of containerized cargo conveyances that are scanned by radiation portal monitors (RPM) entering the nation through sea ports of entry. The Domestic Nuclear Detection Office (DNDO) procures and/or installs RPMs at sea ports of entry and the U.S. Customs and Border Protection (CBP) conducts the cargo scanning using the RPMs to prevent nuclear and other radioactive materials that are out of regulatory control from entering into the country via cargo containers at sea ports of entry.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	FOUO	FOUO	FOUO	FOUO	FOUO	FOUO
Result:	FOUO	FOUO	FOUO	FOUO	N/A	N/A

Management Measures

Measure: Number of comprehensive evaluations and demonstrations of new and improved technologies to protect against nuclear terrorism						
Description: This measure includes several technology development activities: feasibility evaluations completed of proposed radiological and nuclear (rad/nuc) detection and forensics technologies through the Academic Research Initiative and the Exploratory Research Program; proof-of-concept demonstrations completed of emerging rad/nuc detection and forensics technologies through the Exploratory Research Program; technology demonstrations and characterizations completed of promising rad/nuc detection and forensics technologies in an operationally relevant environment through the Advanced Technology Demonstration program; and test campaigns planned and executed for systems development testing and commercial systems evaluation testing. Development and acquisition programs are supported by a rigorous and objective test and evaluation program to characterize technologies and systems to understand technical performance, operational effectiveness, and system limitations.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	23	65	65	45	45	50
Result:	42	48	48	53	N/A	N/A

Measure: Number of exercises, assessments, and deployments to enhance federal, state, local and tribal agencies' readiness to combat nuclear terrorism						
Description: Number of operational support exercises, assessments, and deployments conducted by DNDO that enhance the Global Nuclear Detection Architecture (GNDA) by assisting federal, state, local and tribal partners to improve their rad/nuc detection tactics, techniques and procedures. This measure also includes the number of interagency nuclear forensics exercises in which DNDO serves as the Lead Planner. In leading these nuclear forensics exercises, DNDO ensures a consistent and comprehensive approach to assessing the government's operational capability to perform the nuclear forensics mission.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	61	110	144	164	164	162
Result:	106	161	248	266	N/A	N/A

Measure: Number of undergraduate, graduate, and post-doctorate fellowships and internships, early-career awards, and academic research awards in nuclear forensics and radiation detection-related specialties						
Description: This measure gauges the total number of undergraduate, graduate, and post-doctorate fellowships in nuclear forensics- and radiation detection-related sciences, research internships in nuclear forensics, and education awards and junior faculty awards per fiscal year to support nuclear-related academic programs. Recipients of the various Nuclear Forensics Fellowships and Faculty Award programs are selected from a competitive, merit-based application process. The Academic Research Initiative is a collaborative program with the National Science Foundation. These programs seek to advance fundamental knowledge for nuclear and radiological threat detection and related sciences with emphasis on fundamental research to develop human capital for the nuclear science and engineering professions.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	63	65	51	51	51	51
Result:	71	72	76	72	N/A	N/A

Measure: Percent of international air cargo, including special express commercial services cargo and mail, that passes through radiation detection systems upon entering the nation at air ports of entry						
Description: This measure gauges the proportion of international air cargo and international air mail scanned by radiation detection equipment deployed to the Nation's international cargo aviation airports (U.S. air ports of entry). It is expressed in terms of the percent of the total amount of air cargo, including mail and cargo at express consignment courier facilities (ECCF), entering the Nation through the aviation pathway that is scanned using fixed and non-fixed radiation detection equipment. The Domestic Nuclear Detection Office (DNDO) procures and deploys radiation detection equipment and the U.S. Customs and Border Protection (CBP) conducts the cargo scanning using the radiation portal monitors (RPM) to prevent nuclear and other radioactive materials that are out of regulatory control from entering the country via air cargo and mail.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	FOUO	FOUO	FOUO	FOUO	FOUO	FOUO
Result:	FOUO	FOUO	FOUO	FOUO	N/A	N/A

Measure: Percent of planned nuclear and radiation detection equipment acquired to combat nuclear terrorism						
Description: This measure reports the ratio of fixed, mobile, and portable nuclear and radiation detection equipment that DNDO acquires for federal operators to protect against radiological and nuclear threats to the baseline set out in the spend plan for a particular year. The spend plan is updated as requirements are identified by the federal operators and funding is appropriated. All equipment will be acquired in accordance with the DHS Acquisition Directive 102-01 and will meet codified performance and operational requirements.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	95%	95%	95%	95%	95%	95%
Result:	63%	79%	36%	88%	N/A	N/A

Measure: Percent of Research & Development program and project milestones successfully achieved						
Description: This measure will gauge how well Research and Development program and project activities and their progress milestones are executed by DNDO's Transformational and Applied Research Directorate against numerous types of projects that are planned for and budgeted each year. A steady or slightly increasing number of milestones met is an indicator of effective program management.						
Fiscal Year:	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**
Target:	N/A	N/A	N/A	N/A	95%	95%
Result:	N/A	N/A	N/A	N/A	N/A	N/A

Mature and Strengthen Homeland Security

Resources Requested

DNDO resources supporting *Mature and Strengthen Homeland Security* are provided in the table below.

$ in thousands

Program Name	**FY 2016 Revised Enacted**		**FY 2017 Annualized CR**		**FY 2018 President's Budget**	
	$	FTE	$	FTE	$	FTE
Mission Support	24,976	67	23,742	67	26,932	71
Total	24,976	67	23,742	67	26,932	71

Performance Measures

DNDO contributes to this mission, but does not have performance measures in this area.

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Domestic Nuclear Detection Office
Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Operations and Support	137	137	$51,461	137	137	$50,095	158	144	$54,664	21	7	$4,569
Procurement, Construction, and Improvements	-	-	$88,289	-	-	$87,096	-	-	$87,096	-	-	-
Research and Development	-	-	$160,005	-	-	$158,173	-	-	$144,161	-	-	($14,012)
Federal Assistance	-	-	$47,281	-	-	$46,695	-	-	$44,519	-	-	($2,176)
Total	**137**	**137**	**$347,036**	**137**	**137**	**$342,059**	**158**	**144**	**$330,440**	**21**	**7**	**($11,619)**
Subtotal Discretionary - Appropriation	137	137	$347,036	137	137	$342,059	158	144	$330,440	21	7	($11,619)

The Domestic Nuclear Detection Office (DNDO) requests $330.440 million, 158 positions, and 144 FTEs in FY 2018.
DNDO leads the development of the Global Nuclear Detection Architecture (GNDA), implements its domestic portion, and leads the integration of United States Government technical nuclear forensics capabilities. The FY 2018 request funds activities to protect the United States from radiological/nuclear (R/N) terrorism by developing, acquiring, and deploying detection technologies, supporting operational law enforcement and homeland security partners, and by integrating technical nuclear forensic programs and advancing the state-of-the-art in nuclear forensics technologies. To address gaps in the GNDA and dramatically improve the performance of R/N detection and technical nuclear forensics technologies, the request also funds basic, applied, and developmental research to identify, explore, develop, and demonstrate innovative technologies. As part of the effort to foster and maintain expertise in specialized technical fields related to nuclear detection and forensics, the request supports academic programs, scholarships, and fellowships to advance research and encourage students in these fields of study. The request supports DNDO efforts to increase effectiveness of deployed technology through improved operational concepts and work with mission partners to ensure that R/N detection capabilities provide the greatest level of protection possible through multiple layers of defense.
The request for R/N detection equipment programs provides $62.5 million for large scale detection systems to ensure sustainment of the capability to scan virtually all containerized cargo entering the Nation and $24.6 million for the requirements for human portable equipment for DHS operational Components. The request also includes $21.1 million for the Securing the Cities program, which seeks to reduce the risk of a successful deployment of a R/N terrorist weapon against major metropolitan regions in the United States.

Domestic Nuclear Detection Office
Comparison of Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$347,120		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	($84)		
Revised Enacted/Request	**$347,036**	**$342,059**	**$330,440**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$81,814	$51,471	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$428,850**	**$393,530**	**$330,440**
Collections – Reimbursable Resources	$50	-	-
Total Budget Resources	**$428,900**	**$393,530**	**$330,440**
Obligations (Actual/Projections/Estimates)	$374,109	$393,530	$330,440
Personnel: Positons and FTE			
Enacted/Request Positions	137	137	158
Enacted/Request FTE	137	137	144
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	122	137	158
FTE (Actual/Estimates/Projections)	122	137	144

DNDO utilizes a multi-year planning and review process to establish program budgets, execution plans and when making adjustments during execution. Budgets and program plans are informed by risk analysis, Component and mission requirements, and program performance. Historically, DNDO has obligated more than 95% of the funds in the year appropriated, with exceptions occurring lately due to preparations for migration to a new financial management solution, difficulties associated with the implementation and operation of the new system, and delays due to acquisition decisions. Obligation rates for FY 2018 are estimated based on a return to DNDO's historical performance efficiency and completion of several acquisition programs.

Domestic Nuclear Detection Office
Personnel Compensation and Benefits

Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted				FY 2017 Annualized CR				FY 2018 President's Budget				FY 2017 to FY 2018 Total Changes			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Operations and Support	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82
Total	**137**	**137**	**$24,040**	**$175.47**	**137**	**137**	**$23,796**	**$173.69**	**158**	**144**	**$25,129**	**$174.51**	**21**	**7**	**$1,333**	**$0.82**
Discretionary - Appropriation	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82

The FY 2018 budget request reflects an increase to DNDO's FTE count from position conversions and hiring to fill an unexpected growth of vacancies occurring in late FY 2016 and hiring delays in 2017. Conversions focused on staffing to address the most critical vulnerabilities in business areas where "Closely Associated with Inherently Governmental Functions" were performed by contractors. These positions enable DNDO to strengthen oversight of research and development, acquisition, financial management, and information technology

DNDO has used the Balanced Workforce Strategy (specifically, the Balanced Workforce Assessment Tool (BWAT)) to comprehensively evaluate DNDO staffing. Over that time frame (2014 to present), DNDO has assessed positions that should be converted. In applying the results of the BWAT to determine which contractor positions to convert, activities such as providing oversight of government contracts, payment of invoices and access to other proprietary contractual data, and responding to Congressional inquiries were determined to be inherently or closely associated with inherently governmental work and were identified for conversion. Compared to the FY 2017 Annualized CR, the FY 2018 request includes an increase of 21 positions. This increase is a combination of filling positions that have been recently vacated through attrition and contractor slots that have been identified for conversion to federal positions.

The change reflects an increase of $940,000 for the conversion of 7 FTE and 21 positions; a decrease of $65,000 in SES bonuses and performance awards; and $458,000 for pay inflation.

Domestic Nuclear Detection Office
Pay by Object Class

Dollars in Thousands

Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
11.1 Full-time Permanent	$18,191	$18,017	$19,090	$1,073
11.5 Other Personnel Compensation	$275	$315	$250	($65)
12.1 Civilian Personnel Benefits	$5,574	$5,464	$5,789	$325
Total - Personnel Compensation and Benefits	**$24,040**	**$23,796**	**$25,129**	**$1,333**
Positions and FTE				
Positions - Civilian	137	137	158	21
FTE - Civilian	137	137	144	7

The FY 2018 request reflects an increase in personnel compensation reflecting the conversion of 7 FTE and 21 positions, and backfilling unexpected vacancies; as well as accounting for pay inflation.

Domestic Nuclear Detection Office
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Operations and Support	$27,421	$26,299	$29,535	$3,236
Procurement, Construction, and Improvements	$88,289	$87,096	$87,096	-
Research and Development	$160,005	$158,173	$144,161	($14,012)
Federal Assistance	$47,281	$46,695	$44,519	($2,176)
Total	**$322,996**	**$318,263**	**$305,311**	**($12,952)**
Discretionary - Appropriation	$322,996	$318,263	$305,311	($12,952)

DNDO balanced program requirements while supporting the FY 2018 President's Budget. The decrease from FY 2017 to FY 2018 is due to program decreases in Architecture Planning and Analysis, Detection Capability Assessments, Detection Capability Development, Nuclear Forensics, Transformational Research and Development, and Federal, State, Local, Territorial, and Tribal Support.

Domestic Nuclear Detection Office
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$927	$1,115	$1,351	$236
23.1 Rental Payments to GSA	$5,151	$5,151	$5,875	$724
24.0 Printing and Reproduction	$27	$22	$23	$1
25.1 Advisory and Assistance Services	$66,290	$59,194	$66,233	$7,039
25.2 Other Services from Non-Federal Sources	$647	$1,507	$855	($652)
25.3 Other Goods and Services from Federal Sources	$85,824	$90,400	$78,513	($11,887)
25.5 Research and Development Contracts	$56,433	$58,924	$48,389	($10,535)
25.7 Operation and Maintenance of Equipment	$389	$367	$370	$3
26.0 Supplies and Materials	$6,784	$4,505	$157	($4,348)
31.0 Equipment	$67,758	$68,255	$73,755	$5,500
41.0 Grants, Subsidies, and Contributions	$32,766	$28,823	$29,790	$967
Total - Non Pay Object Classes	**$322,996**	**$318,263**	**$305,311**	**($12,952)**

The changes reflect program requirements and a FY 2017 assessment of expenditure types used by DNDO and the definitions in OMB Circular A-11. The reduction to supplies and materials and increase in equipment is associated with a change in how Human Portable R/N Detection Equipment is accounted for in the accounting system as the equipment moves from acquisition, through inventory, and in most cases, transfers to other Components. The increase in rental payments to GSA reflects the delay in moving to the St. Elizabeths campus. The reductions to other goods and services from federal sources and research and development contracts are also associated with the program decreases in Architecture Planning and Analysis, Detection Capability Assessments, Detection Capability Development, Nuclear Forensics, Transformational Research and Development, and Federal, State, Local, Territorial, and Tribal Support.

Domestic Nuclear Detection Office
Supplemental Budget Justification Exhibits

Working Capital Fund

Dollars in Thousands

Appropriation and PPA	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget
Operations and Support	**$13,791**	**$9,904**	**$10,499**
Mission Support	$13,791	$9,904	$10,499
Total Working Capital Fund	**$13,791**	**$9,904**	**$10,499**

The DHS WCF provides for many shared services that the components rely on to execute their missions, such as rent and the DHS-wide IT infrastructure. Funds provided within the Mission Support PPA are used to acquire DHS WCF services, which include: IT support, human resources, and other services. The WCF also provides consolidated subscriptions, government-wide mandated services, and DHS crosscutting activities.

Domestic Nuclear Detection Office
Status of Congressionally Requested Studies, Reports and Evaluations

Fiscal Year	Due Date	Reference/Citation	Requirement	Status
FY 2016	2/1/2016	Public Law 114-113 Joint Explanatory Statement, p. 15	**Component Obligation Plans – Q1** Obligation plans from each DHS component shall be provided to the Committees within 45 days of the date of enactment of this Act, with updates provided not later than 30 days after the end of each quarter.	Submitted
FY 2016	5/2/2016	Public Law 114-113 Joint Explanatory Statement, p. 15	**Component Obligation Plans – Q2** Obligation plans from each DHS component shall be provided to the Committees within 45 days of the date of enactment of this Act, with updates provided not later than 30 days after the end of each quarter.	Submitted
FY 2016	7/30/2016	Public Law 114-113 Joint Explanatory Statement, p. 15	**Component Obligation Plans – Q3** Obligation plans from each DHS component shall be provided to the Committees within 45 days of the date of enactment of this Act, with updates provided not later than 30 days after the end of each quarter.	Submitted
FY 2016	10/30/2016	Public Law 114-113 Joint Explanatory Statement, p. 15	**Component Obligation Plans – Q4** Obligation plans from each DHS component shall be provided to the Committees within 45 days of the date of enactment of this Act, with updates provided not later than 30 days after the end of each quarter.	Submitted
FY 2016	3/31/2016	Section 1907 of the Homeland Security Act of 2002 (6 U.S.C. 101 et seq.) as added by Section 1103 of the Implementing Recommendations of the 9/11 Commission Act of 2007(P.L. 110-53), p. 379	**Global Nuclear Detection Architecture Joint Annual Interagency Review** (a) ANNUAL REVIEW.— (1) IN GENERAL.—The Secretary, the Attorney General, the Secretary of State, the Secretary of Defense, the Secretary of Energy, and the Director of National Intelligence shall jointly ensure interagency coordination on the development and implementation of the global nuclear detection architecture by ensuring that, not less frequently than once each year— (A) each relevant agency, office, or entity— (i) assesses its involvement, support, and participation in the development, revision, and implementation of the global nuclear detection architecture; and (ii) examines and evaluates components of the global nuclear detection architecture (including associated strategies and acquisition plans) relating to the operations of that agency, office, or entity, to determine whether such components incorporate and address current threat assessments, scenarios, or intelligence analyses developed by the Director of National Intelligence or other agencies regarding threats relating to nuclear or radiological weapons of mass destruction; and (B) each agency, office, or entity deploying or operating any nuclear or radiological detection technology under the global nuclear detection architecture—	Submitted

Fiscal Year	Due Date	Reference/Citation	Requirement	Status
			(i) evaluates the deployment and operation of nuclear or radiological detection technologies under the global nuclear detection architecture by that agency, office, or entity; (ii) identifies performance deficiencies and operational or technical deficiencies in nuclear or radiological detection technologies deployed under the global nuclear detection architecture; and (iii) assesses the capacity of that agency, office, or entity to implement the responsibilities of that agency, office, or entity under the global nuclear detection architecture. (2) TECHNOLOGY.—Not less frequently than once each year, the Secretary shall examine and evaluate the development, assessment, and acquisition of radiation detection technologies deployed or implemented in support of the domestic portion of the global nuclear detection architecture. (b) ANNUAL REPORT ON JOINT INTERAGENCY REVIEW.— (1) IN GENERAL.—Not later than March 31 of each year, the Secretary, the Attorney General, the Secretary of State, the Secretary of Defense, the Secretary of Energy, and the Director of National Intelligence, shall jointly submit a report regarding the implementation of this section and the results of the reviews required under subsection (a) to— (A) the President; (B) the Committee on Appropriations, the Committee on Armed Services, the Select Committee on Intelligence, and the Committee on Homeland Security and Governmental Affairs of the Senate; and (C) the Committee on Appropriations, the Committee on Armed Services, the Permanent Select Committee on Intelligence, the Committee on Homeland Security, and the Committee on Science and Technology of the House of Representatives. 2) FORM.—The annual report submitted under paragraph (1) shall be submitted in unclassified form to the maximum extent practicable, but may include a classified annex. (c) DEFINITION.—In this section, the term ‘global nuclear detection architecture’ means the global nuclear detection architecture developed under section 1902.	
FY 2016	3/31/2016	Section 1036 of the National Defense Authorization Act for Fiscal Year 2010 (P.L. 111-84) (Oct. 28, 2009), p. 2450	**Joint Interagency Annual Review of the National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States**	Submitted

Fiscal Year	Due Date	Reference/Citation	Requirement	Status
			NATIONAL STRATEGIC FIVE-YEAR PLAN FOR IMPROVING THE NUCLEAR FORENSIC AND ATTRIBUTION CAPABILITIES OF THE UNITED STATES. (a) IN GENERAL. The President, with the participation of the officials specified in subsection (c), shall develop a national strategic plan for improving over a five-year period the nuclear forensic and attribution capabilities of the United States and the methods, capabilities, and capacity for nuclear materials forensics and attribution. (b) ELEMENTS.—The plan required under subsection (a) shall include the following: (1) An investment plan to support nuclear materials forensics and attribution. (2) Recommendations with respect to— (A) the allocation of roles and responsibilities for predetonation, detonation, and post-detonation activities; and (B) methods for the attribution of nuclear or radiological material to the source when such material is intercepted by the United States, foreign governments, or international bodies or is dispersed in the course of a terrorist attack or other nuclear or radiological explosion. (c) OFFICIALS.—The officials specified in this subsection are the following: (1) The Secretary of Homeland Security. (2) The Secretary of Defense. (3) The Secretary of Energy. (4) The Attorney General. (5) The Secretary of State. (6) The Director of National Intelligence. (7) Such other officials as the President considers appropriate. (d) SUBMITTAL TO CONGRESS.—Not later than 180 days after the date of the enactment of this Act, the President shall submit to Congress the plan required under subsection (a).	

Fiscal Year	Due Date	Reference/Citation	Requirement	Status
FY 2017	3/31/2017	Section 1907 of the Homeland Security Act of 2002 (6 U.S.C. 101 et seq.) as added by Section 1103 of the Implementing Recommendations of the 9/11 Commission Act of 2007(P.L. 110-53), p. 379	Global Nuclear Detection Architecture Joint Annual Interagency Review	Submitted
FY 2017	3/31/2017	Section 1036 of the National Defense Authorization Act for Fiscal Year 2010 (P.L. 111-84) (Oct. 28, 2009)	Joint Interagency Annual Review of the National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States	Submitted

Domestic Nuclear Detection Office
Authorized/Unauthorized Appropriations

Dollars in Thousands

Budget Activity	Last year of Authorization	Authorized Level	Appropriation in Last Year of Authorization	FY 2018 President's Budget
	Fiscal Year	Amount	Amount	Amount
Operations and Support				**$54,664**
Mission Support				$54,664
Procurement, Construction, and Improvements				**$87,096**
Large Scale Detection Systems				$62,524
Human Portable Rad/Nuc Systems				$24,572
Research and Development				**$144,161**
Architecture Planning and Analysis				$15,937
Transformational Research and Development				$60,581
Detection Capability Development				$15,155
Detection Capability Assessments				$34,127
Nuclear Forensics				$18,361
Federal Assistance				**$44,519**
Federal, State, Local, Territorial, and Tribal Support				$23,384
Securing the Cities				$21,135
Total Direct Authorization/Appropriation				**$330,440**

The SAFE Port Act of 2006, (P.L. 109-347) authorizing the creation of DNDO did not specify funding levels for DNDO.

Domestic Nuclear Detection Office
Proposed Legislative Language

Operation and Support

For necessary expenses of the **[**Chemical, Biological, Radiological, Nuclear and Explosives**]***Domestic Nuclear Detection* Office *for operations and support, as authorized by title XIX of the Homeland Security Act of 2002 (6 U.S.C. 591 et seq.),* **[**$180,033,000**]***$54,664,000***[**, of which $41,561,000 is for management and administration, of which $20,552,000, to remain available until September 30, 2019, is for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats, and of which $117,920,000, to remain available until September 30, 2018, is for programs and operations in support of the surveillance, detection, and response to chemical, biological, and emerging infectious disease threats] Provided, That not to exceed $4,500 shall be for official reception and representation expenses.

Language Provision	Explanation
[Chemical, Biological, Radiological, Nuclear and Explosives**]***Domestic Nuclear Detection* Office *for operations and support as authorized by title XIX of the Homeland Security Act of 2002 (6 U.S.C. 591 et seq.)*	Chemical, Biological, Radiological, Nuclear, and Explosives Office not requested in FY 2018. Proposed language is for the Domestic Nuclear Detection Office.
[$180,033,000**]***$54,664,000*	Dollar change only.
[, of which $41,561,000 is for management and administration, of which $20,552,000, to remain available until September 30, 2019, is for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats, and of which $117,920,000, to remain available until September 30, 2018, is for programs and operations in support of the surveillance, detection, and response to chemical, biological, and emerging infectious disease threats**]**	Chemical, Biological, Radiological, Nuclear, and Explosives Office not requested in FY 2018.

Procurement, Construction, and Improvements

For necessary expenses of the **[**Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for procurement, construction, and improvements,* **[**$103,860,000**]***$87,096,000*, to remain available until September 30, **[**2019**]***2020.***[**, for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats.**]**

Language Provision	Explanation
[Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for procurement, construction, and improvements,*	Chemical, Biological, Radiological, Nuclear, and Explosives Office not requested in FY 2018. Proposed language is for the Domestic Nuclear Detection Office.
[$103,860,000**]***$87,096,000*	Dollar change only.
[2019**]***2020*	Updated period of availability.
[, for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats.**]**	Removed unnecessary language for consistency.

Research and Development

For necessary expenses of the **[**Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for research and development,***[**,$151,605,000**]***$144,161,000*, to remain available until September 30, **[**2019**]***2020.* **[**, for research programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats.**]**

Language Provision	Explanation
[Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for research and development*	Chemical, Biological, Radiological, Nuclear, and Explosives Office not requested in FY 2018. Proposed language is for the Domestic Nuclear Detection Office.
[,$151,605,000**]***$144,161,000*	Dollar change only.
[2019**]***2020*	Updated period of availability.
[, for research programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats.**]**	Removed unnecessary language for consistency.

Federal Assistance

For necessary expenses of the **[**Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for Federal assistance through grants, contracts, cooperative agreements, and other activities,* **[**$65,947,000**]***$44,519,000,* **[**of which $51,684,000,**]** to remain available until September 30, **[**2019**]***2020.* **[**, is for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats; and of which $14,263,000 is for programs and operations to prevent, protect against, respond to, and mitigate bombing incidents.**]**

Language Provision	Explanation
[Chemical, Biological, Radiological, Nuclear, and Explosives**]***Domestic Nuclear Detection* Office *for Federal assistance through grants, contracts, cooperative agreements, and other activities*	Chemical, Biological, Radiological, Nuclear, and Explosives Office not requested in FY 2018. Proposed language is for the Domestic Nuclear Detection Office.
[$65,947,000**]***$44,519,000*	Dollar change only.
[of which $51,684,000,**]**	Removed unnecessary language for consistency.
[2019**]***2020*	Updated period of availability.
[, is for programs and operations in support of the detection, forensics, and prevention of radiological and nuclear threats; and of which $14,263,000 is for programs and operations to prevent, protect against, respond to, and mitigate bombing incidents.**]**	Removed unnecessary language for consistency.

Domestic Nuclear Detection Office
Reimbursable Resources

Dollars in Thousands

Collections		FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Change		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Transportation Security Administration	**Source**	-	-	$50	-	-	-	-	-	-	-	-	-
Federal Assistance	Location	-	-	$50	-	-	-	-	-	-	-	-	-
Federal, State, Local, Territorial, and Tribal Support	Location	-	-	$50	-	-	-	-	-	-	-	-	-
Total Collections		-	-	**$50**	-	-	-	-	-	-	-	-	-

Reimbursable resources are used for training TSA Federal teams regarding Preventative Radiological/Nuclear Detection (PRND) Mission. In FY 2016, DNDO provided TSA with two PRND course and received reimbursement for this service.

Department of Homeland Security

Domestic Nuclear Detection Office

Operations and Support

Fiscal Year 2018
Congressional Justification

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Operations and Support

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	137	137	$51,461	137	137	$50,095	158	144	$54,664	21	7	$4,569
Total	**137**	**137**	**$51,461**	**137**	**137**	**$50,095**	**158**	**144**	**$54,664**	**21**	**7**	**$4,569**
Subtotal Discretionary - Appropriation	137	137	$51,461	137	137	$50,095	158	144	$54,664	21	7	$4,569

FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.
Notional FY 2016 Enacted funding for Mission Support was $51.545 million. FY 2016 Revised Enacted reflects an $0.084 million rescission of prior year unobligated balances."

Overview

The Domestic Nuclear Detection Office (DNDO) is the United States Government (USG) lead agency charged with development of the Global Nuclear Detection Architecture (GNDA) and the implementation of its domestic portion, as well as with coordination and stewardship of the USG National Technical Nuclear Forensics (NTNF) enterprise. DNDO works closely with Federal, state, local, tribal, territorial, international, academic, national laboratory, and private sector partners. Functions include integrating interagency efforts to develop and acquire radiological and nuclear (R/N) detection technologies, evaluating detector performance, ensuring effective response to detection alarms, training and helping partners plan their GNDA contributions, integrating and ensuring readiness of U.S. nuclear forensics capabilities, conducting transformational research and development for R/N detection and forensics technologies, and reporting progress to external stakeholders. For both the detection and forensics missions, the likelihood of success is maximized by utilizing and employing appropriate technologies, well-trained law enforcement, and intelligence capabilities.

DNDO works to protect the United States from R/N terrorism by developing, acquiring, and deploying detection technologies, supporting operational law enforcement and homeland security partners, and by integrating technical nuclear forensic programs and advancing the state-of-the-art in nuclear forensics technologies. To address gaps in the GNDA and dramatically improve the performance of R/N detection and technical nuclear forensics technologies, DNDO also invests in basic, applied, and developmental research to identify, explore, develop, and demonstrate innovative technologies. As part of the effort to foster and maintain expertise in specialized technical fields related to nuclear detection and forensics, DNDO supports academic programs, scholarships, and fellowships to advance research and encourage students in these fields of study. DNDO seeks to increase effectiveness of deployed technology through improved operational concepts and works with mission partners to ensure that R/N detection capabilities provide the greatest level of protection possible through multiple layers of defense.

The Operations and Support (O&S) appropriation supports the costs incurred for the day-to-day operation and maintenance of the organization, including, but not limited to, salaries, services, supplies, utilities, travel, training, and transportation, as well as minor procurement, construction, and improvement projects. O&S includes the following Programs, Projects, or Activities (PPAs).

- **Mission Support:** Captures activities that provide enterprise leadership, management and business administration services and includes the capabilities and activities that support the day-to-day management and back office functions that enable the Domestic Nuclear Detection Office to operate efficiently and effectively. Key capabilities include strategic direction, the White House and interagency policy development and liaison, conducting agency planning and performance management, managing finances, managing agency workforce, providing physical and personnel security, acquiring goods and services, managing information technology, managing agency property and assets, managing agency communications, managing legal affairs, and providing general management and administration.

Operations and Support
Budget Authority and Obligations
Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$51,545		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	($84)		
Revised Enacted/Request	**$51,461**	**$50,095**	**$54,664**
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$51,461**	**$50,095**	**$54,664**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$51,461**	**$50,095**	**$54,664**
Obligations (Actual/Projections/Estimates)	$51,522	$50,095	$54,664
Personnel: Positons and FTE			
Enacted/Request Positions	137	137	158
Enacted/Request FTE	137	137	144
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	122	137	158
FTE (Actual/Estimates/Projections)	122	137	144

FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Operations and Support
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**137**	**137**	**$51,545**
FY 2016 Rescission of Prior Year Appropriation	-	-	($84)
Total Rescissions	**-**	**-**	**($84)**
FY 2016 Revised Enacted	**137**	**137**	**$51,461**
FY 2017 Annualized CR	**137**	**137**	**$50,095**
FY 2018 Base Budget	**137**	**137**	**$50,095**
Transfer from Detection Capability Assessments due to CAS Realignment	-	-	$3,474
Transfer to A&O from DNDO due to A&O WCF Activity Costs Removal	-	-	($9)
Transfer to OSEM/OGC from DNDO due to OGC WCF Activity Costs Removal	-	-	($1)
Transfer to USM/CHCO from DNDO due to CHCO WCF Activity Costs Removal	-	-	($35)
Transfer to USM/CIO from DNDO due to CIO WCF Activity Costs Removal	-	-	($426)
Transfer to USM/CPO from DNDO due to CPO WCF Activity Costs Removal	-	-	($20)
Transfer to USM/CRSO from DNDO due to CRSO WCF Activity Costs Removal	-	-	($92)
Transfer to USM/CSO from DNDO due to CSO WCF Activity Costs Removal	-	-	($5)
Total Transfers	**-**	**-**	**$2,886**
DHS Balanced Workforce Strategy	21	7	$940
FY17 Annualized Pay Raise	-	-	$123
FY18 Pay Raise	-	-	$335
GSA Rent	-	-	$724
Total, Pricing Increases	**21**	**7**	**$2,122**
Reduced Contractor Support	-	-	($439)
Total, Pricing Decreases	**-**	**-**	**($439)**
Total Adjustments-to-Base	**21**	**7**	**$4,569**
FY 2018 Current Services	**158**	**144**	**$54,664**
FY 2018 Request	**158**	**144**	**$54,664**
FY 2017 TO FY 2018 Change	**21**	**7**	**$4,569**

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Operations and Support
Justification of Pricing Changes

Dollars in Thousands

Pricing Changes	FY 2018 President's Budget		
	Positions	FTE	Amount
Pricing Change 1 - DHS Balanced Workforce Strategy	**21**	**7**	**$940**
Mission Support	21	7	$940
Pricing Change 2 - FY17 Annualized Pay Raise	**-**	**-**	**$123**
Mission Support	-	-	$123
Pricing Change 3 - FY18 Pay Raise	**-**	**-**	**$335**
Mission Support	-	-	$335
Pricing Change 4 - GSA Rent	**-**	**-**	**$724**
Mission Support	-	-	$724
Pricing Change 5 - Reduced Contractor Support	**-**	**-**	**($439)**
Mission Support	-	-	($439)
Total Pricing Changes	**21**	**7**	**$1,683**

FY17 Annualized Pay Raise: Increase in personnel compensation and benefits for the first quarter of fiscal year 2018 of $123,000.

FY18 Pay Raise: Increase in personnel compensation and benefits for the second through fourth quarters of fiscal year 2018 of $335,000.

DHS Balanced Workforce Strategy: Position conversions to balance workforce composition. These conversions focused on staffing to address the most critical vulnerabilities in business areas where “Nearly Inherent Government Functions” are performed by Federal employees.

GSA Rent: Increase in rent due to delays in moving to the St. Elizabeths campus.

Reduced Contractor Support: Reduction in contractor support due to requested position conversions.

Operations and Support
Personnel Compensation and Benefits
Pay Summary
Dollars in Thousands

Organization	FY 2016 Revised Enacted				FY 2017 Annualized CR				FY 2018 President's Budget				FY 2017 to FY 2018 Total Changes			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82
Total	**137**	**137**	**$24,040**	**$175.47**	**137**	**137**	**$23,796**	**$173.69**	**158**	**144**	**$25,129**	**$174.51**	**21**	**7**	**$1,333**	**$0.82**
Discretionary - Appropriation	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82

Pay by Object Class
Dollars in Thousands

Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
11.1 Full-time Permanent	$18,191	$18,017	$19,090	$1,073
11.5 Other Personnel Compensation	$275	$315	$250	($65)
12.1 Civilian Personnel Benefits	$5,574	$5,464	$5,789	$325
Total - Personnel Compensation and Benefits	**$24,040**	**$23,796**	**$25,129**	**$1,333**
Positions and FTE				
Positions - Civilian	137	137	158	21
FTE - Civilian	137	137	144	7

Operations and Support
Permanent Positions by Grade – Appropriation

Grades and Salary Range	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
Total, SES	8	8	9	1
Total, EX	1	1	1	-
GS-15	61	61	58	-3
GS-14	33	33	47	14
GS-13	21	21	30	9
GS-12	7	7	5	-2
GS-11	3	5	7	2
GS-9	2	-	-	-
GS-3	1	1	1	-
Total Permanent Positions	**137**	**137**	**158**	**21**
Unfilled Positions EOY	15	-	-	-
Total Perm. Employment (Filled Positions) EOY	122	137	158	21
Position Locations				
Headquarters	137	137	158	21
Averages				
Average Personnel Costs, ES Positions	177,000	182,082	188,686	6,604
Average Personnel Costs, GS Positions	124,000	130,145	128,092	-2,053
Average Grade, GS Positions	15	15	14	-1

Operations and Support
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Mission Support	$27,421	$26,299	$29,535	$3,236
Total	**$27,421**	**$26,299**	**$29,535**	**$3,236**
Discretionary - Appropriation	$27,421	$26,299	$29,535	$3,236

* FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$124	$105	$106	$1
23.1 Rental Payments to GSA	$5,151	$5,151	$5,875	$724
24.0 Printing and Reproduction	$27	$22	$23	$1
25.1 Advisory and Assistance Services	$9,034	$8,138	$11,288	$3,150
25.2 Other Services from Non-Federal Sources	$90	$163	$166	$3
25.3 Other Goods and Services from Federal Sources	$12,311	$11,978	$11,328	($650)
25.7 Operation and Maintenance of Equipment	$389	$367	$370	$3
26.0 Supplies and Materials	$146	$145	$147	$2
31.0 Equipment	$149	$230	$232	$2
Total - Non Pay Object Classes	**$27,421**	**$26,299**	**$29,535**	**$3,236**

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Mission Support – PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	137	137	$51,461	137	137	$50,095	158	144	$54,664	21	7	$4,569
Total	**137**	**137**	**$51,461**	**137**	**137**	**$50,095**	**158**	**144**	**$54,664**	**21**	**7**	**$4,569**
Subtotal Discretionary - Appropriation	137	137	$51,461	137	137	$50,095	158	144	$54,664	21	7	$4,569

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Mission Support – PPA
Budget Authority and Obligations
Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$51,545		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	($84)		
Revised Enacted/Request	**$51,461**	**$50,095**	**$54,664**
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$51,461**	**$50,095**	**$54,664**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$51,461**	**$50,095**	**$54,664**
Obligations (Actual/Projections/Estimates)	$51,522	$50,095	$54,664
Personnel: Positons and FTE			
Enacted/Request Positions	137	137	158
Enacted/Request FTE	137	137	144
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	122	137	158
FTE (Actual/Estimates/Projections)	122	137	144

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Mission Support – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**137**	**137**	**$51,545**
FY 2016 Rescission of Prior Year Appropriation	-	-	($84)
Total Rescissions	**-**	**-**	**($84)**
FY 2016 Revised Enacted	**137**	**137**	**$51,461**
FY 2017 Annualized CR	**137**	**137**	**$50,095**
FY 2018 Base Budget	**137**	**137**	**$50,095**
Transfer from Detection Capability Assessments due to CAS Realignment	-	-	$3,474
Transfer to A&O from DNDO due to A&O WCF Activity Costs Removal	-	-	($9)
Transfer to OSEM/OGC from DNDO due to OGC WCF Activity Costs Removal	-	-	($1)
Transfer to USM/CHCO from DNDO due to CHCO WCF Activity Costs Removal	-	-	($35)
Transfer to USM/CIO from DNDO due to CIO WCF Activity Costs Removal	-	-	($426)
Transfer to USM/CPO from DNDO due to CPO WCF Activity Costs Removal	-	-	($20)
Transfer to USM/CRSO from DNDO due to CRSO WCF Activity Costs Removal	-	-	($92)
Transfer to USM/CSO from DNDO due to CSO WCF Activity Costs Removal	-	-	($5)
Total Transfers	**-**	**-**	**$2,886**
DHS Balanced Workforce Strategy	21	7	$940
FY17 Annualized Pay Raise	-	-	$123
FY18 Pay Raise	-	-	$335
GSA Rent	-	-	$724
Total, Pricing Increases	**21**	**7**	**$2,122**
Reduced Contractor Support	-	-	($439)
Total, Pricing Decreases	**-**	**-**	**($439)**
Total Adjustments-to-Base	**21**	**7**	**$4,569**
FY 2018 Current Services	**158**	**144**	**$54,664**
FY 2018 Request	**158**	**144**	**$54,664**
FY 2017 TO FY 2018 Change	**21**	**7**	**$4,569**

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

PPA Description

The Mission Support PPA captures activities that provide enterprise leadership, management, and business administration services and includes the capabilities and activities that support the day-to-day management functions that enable the Domestic Nuclear Detection Office to operate efficiently and effectively. Key capabilities include support to strategic direction and integration across DNDO-related activities, support to White House and interagency policy development and liaison, agency planning and performance management, financial management, workforce management, physical and personnel security, acquisition of goods and services, information technology management, agency property and asset management, communications management, legal affairs, and general management and administration.

The Mission Support PPA funds the administration of DNDO and provides for the execution of salaries, benefits, and expenses for all full-time equivalent/full-time permanent personnel. Funds are also provided to the Working Capital Fund, which provides such services as rent and information technology infrastructure support.

DNDO continues to examine and mature its implementation of the Common Appropriation Structure. As part of a review of program alignment, funds for information technology governance, infrastructure and cybersecurity were transferred from the Research and Development appropriation to the Mission Support PPA. Some information technology infrastructure capabilities have matured beyond development and DNDO considers these activities best aligned to Operations and Support. DNDO relies on the Department and the Working Capital Fund for common information technology support, enterprise and data architecture guidance and direction. The funding transferred supports preparation of agreements to effectively share radiological/nuclear (R/N) detection information among Federal, state, local, tribal, and territorial partners, in order to prevent terrorism and enhance national security; and validates cybersecurity compliance and readiness of DNDO systems and safeguarding of DNDO sensitive information in third-party systems and services. The funding supports the evolution of technical competencies and expertise as well as tools and technologies which comprise DNDO's adaptive mission-support information technology infrastructure.

The Mission Support PPA includes funding for the DNDO Financial, Acquisition, and Asset Management Solution (FAAMS) Program, whose purpose is to operate a business management solution. FAAMS provides DNDO with procurement and asset management capabilities that integrate with the financial system of record. DNDO continues to work with the Department's Financial System Modernization program to implement and strive to achieve full operational capability.

Adjustments to Base Justification

- **FY 2017 Annualized Pay Raise:** Increase in personnel compensation and benefits for the first quarter of fiscal year 2018 of $123,000.

- **FY 2018 Pay Raise:** Increase in personnel compensation and benefits for the second through fourth quarters of fiscal year 2018 of $335,000.
- **DHS Balanced Workforce Strategy:** Position conversions to balance workforce composition. These conversions focused on staffing to address the most critical vulnerabilities in business areas where "Nearly Inherent Government Functions are performed by Federal employees.
- **GSA Rent:** Increase in rent due to delays in moving to the St. Elizabeths campus.
- **Reduced Contractor Support:** Reduction in contractor support due to requested position conversions.

Mission Support – PPA
Personnel Compensation and Benefits

Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted				FY 2017 Annualized CR				FY 2018 President's Budget				FY 2017 to FY 2018 Total Changes			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82
Total	**137**	**137**	**$24,040**	**$175.47**	**137**	**137**	**$23,796**	**$173.69**	**158**	**144**	**$25,129**	**$174.51**	**21**	**7**	**$1,333**	**$0.82**
Discretionary - Appropriation	137	137	$24,040	$175.47	137	137	$23,796	$173.69	158	144	$25,129	$174.51	21	7	$1,333	$0.82

NARRATIVE EXPLANATION OF CHANGES

FTE Change FY 2017-2018: The FY 2018 budget request reflects an increase to DNDO's FTE count from position conversions and attrition of staff. These conversions focused on staffing to address the most critical vulnerabilities in business areas where "Closely Associated with Inherently Governmental Functions" were performed by contractors.

DNDO has used the Balanced Workforce Strategy (specifically, the Balanced Workforce Assessment Tool (BWAT)) to comprehensively evaluate DNDO staffing. Over that time frame (2014 to present), DNDO has assessed positions that should be converted. Compared to the FY 2017 Annualized CR, the FY 2018 request is an increase of 21 positions. In applying the results of the BWAT to determine which contractor positions to convert, activities such as providing oversight of government contracts, payment of invoices and access to other proprietary contractual data, and responding to Congressional inquiries were determined to be inherently or closely associated with inherently governmental work and were identified for conversion. This increase is a combination of filling positions that have been recently vacated through attrition and contractor slots that have been identified for conversion to federal positions.

PCB Change FY 2017-2018: The change reflects an increase of $940,000 for the conversion of 7 FTE; a decrease of $65,000 in SES bonuses and performance awards; and $458,000 for pay inflation.

Average Cost Change FY 2017-2018: The average cost change reflects pay inflation. The average cost change also reflects a projected reduction in average GS salary resulting from the grade structure changes due to position conversions.

Mission Support – PPA
Pay by Object Class
Dollars in Thousands

Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
11.1 Full-time Permanent	$18,191	$18,017	$19,090	$1,073
11.5 Other Personnel Compensation	$275	$315	$250	($65)
12.1 Civilian Personnel Benefits	$5,574	$5,464	$5,789	$325
Total - Personnel Compensation and Benefits	**$24,040**	**$23,796**	**$25,129**	**$1,333**
Positions and FTE				
Positions - Civilian	137	137	158	21
FTE - Civilian	137	137	144	7

Pay Cost Drivers
Dollars in Thousands

Leading Cost-Drivers	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
Federal Employee Compensation and Benefits	137	$24,040	$175.47	137	$23,796	$173.69	144	$25,129	$174.51	7	$1,333	$0.81
Total – Pay Cost Drivers	**137**	**$24,040**	**$175.47**	**137**	**$23,796**	**$173.69**	**144**	**$25,129**	**$174.51**	**7**	**$1,333**	**$0.81**

As DNDO increases staffing to authorized levels in FY 2017, the rate per FTE is reduced as new employees are hired at lower than average grade and step levels. In FY 2018, with the proposed position conversions, DNDO reduced its average grade level from 15 to 14.

Mission Support – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Mission Support	$27,421	$26,299	$29,535	$3,236
Total	**$27,421**	**$26,299**	**$29,535**	**$3,236**
Discretionary - Appropriation	$27,421	$26,299	$29,535	$3,236

* FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$124	$105	$106	$1
23.1 Rental Payments to GSA	$5,151	$5,151	$5,875	$724
24.0 Printing and Reproduction	$27	$22	$23	$1
25.1 Advisory and Assistance Services	$9,034	$8,138	$11,288	$3,150
25.2 Other Services from Non-Federal Sources	$90	$163	$166	$3
25.3 Other Goods and Services from Federal Sources	$12,311	$11,978	$11,328	($650)
25.7 Operation and Maintenance of Equipment	$389	$367	$370	$3
26.0 Supplies and Materials	$146	$145	$147	$2
31.0 Equipment	$149	$230	$232	$2
Total - Non Pay Object Classes	**$27,421**	**$26,299**	**$29,535**	**$3,236**

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.

Mission Support – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Advisory and Assistance Services	$9,034	$8,138	$11,288	$3,150
Working Capital Fund (excl. GSA Rent)	$8,640	$4,753	$4,624	($129)
GSA Rent	$5,151	$5,151	$5,875	$724
Financial, Acquisition, and Asset Management Solution	$3,172	$2,686	$1,963	($723)
Other Costs	$1,424	$5,571	$5,785	$214
Total – Non Pay Cost Drivers	**$27,421**	**$26,299**	**$29,535**	**$3,236**

NARRATIVE EXPLANATION OF CHANGES

Advisory and Assistance Services: The increase of $3.2 million in advisory and assistance contracts are attributed to the transfer of $3.5 million from the Detection Capability Assessments PPA. DNDO's Mission Support advisory and assistance contracts provide financial management, accounting services, workforce management, information technology management, agency property and asset management, and general management and administration support services.

Working Capital Fund (excluding GSA Rent): The DHS Working Capital Fund provides support services across the Department. The decrease is related to the activity cost removals from the Working Capital Fund.

GSA Rent: The increase of $0.7 million is due to delays in moving to the St. Elizabeths campus. This delay will require renegotiation or extension of the lease for DNDO's current location, resulting in an increase in rent.

Financial, Acquisition, and Asset Management Solution: The decrease of $0.7 million is reflective of the approved Life Cycle Cost Estimate for this business management solution.

Department of Homeland Security

Domestic Nuclear Detection Office

Procurement, Construction, and Improvements

Fiscal Year 2018
Congressional Justification

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Procurement, Construction, and Improvements
Budget Comparison and Adjustments
Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Large Scale Detection Systems	$51,269	$53,096	$62,524	$9,428
Human Portable Rad/Nuc Systems	$37,020	$34,000	$24,572	($9,428)
Total	**$88,289**	**$87,096**	**$87,096**	**-**
Discretionary - Appropriation	$88,289	$87,096	$87,096	-

FY 2016 Funding is shown in notional Common Appropriation Structure for comparison purposes

Overview

Procurement, Construction, and Improvements (PC&I) provides funds necessary for the planning, operational development, engineering, and purchase of one or more assets (which hereinafter also refers to end items) prior to sustainment.

Unless otherwise stipulated by regulation or statute, the use of PC&I funding to purchase an end item, asset, or improvement project, is subject to the following funding thresholds:

a. as Personal Property, an end item unit cost of greater than $250,000, or

b. for Real Property, an end item unit cost of greater than $2 million.

In FY 2018, DHS OCFO approved an exception to the personal property threshold for assets procured through the Human Portable Radiological/Nuclear (R/N) Systems PPA to facilitate strategic management of DNDO's detection equipment portfolio.

PC&I funds are necessary to execute operations in support of the DNDO Large Scale Detection Systems and Human Portable Radiological/Nuclear Systems Investments.

DNDO's mission is to prevent nuclear terrorism by continuously improving capabilities to deter, detect, respond to, and attribute attacks, in coordination with domestic and international partners. DNDO supports this mission by funding the U.S. Government's (USG) Global Nuclear Detection Architecture (GNDA) development, its domestic implementation, as well as coordination and stewardship of USG technical nuclear forensics efforts. DNDO integrates interagency efforts to develop nuclear detection technologies, evaluate detector performance, and ensure effective response to detection alarms. Due to the dynamic nature of the

threat, acquisitions pertaining to R/N terrorism prevention are integrated through an agile detection architecture that can readily surge in response to intelligence cues. DNDO uses PC&I funding to acquire R/N detection equipment (RDE) for Department of Homeland Security (DHS) Components, including the U.S. Coast Guard (USCG), U.S. Customs and Border Protection (CBP), and the Transportation Security Administration (TSA). DNDO centrally manages and tracks those assets across their life cycle until a final system dispositioning decision has been made. Additionally, it supports state and local users with acquisition of RDE for the Mobile Detection Deployment Units (MDDU). Through strategic sourcing initiatives, DNDO is able to achieve efficiencies and better buying power for Department resources by centralizing and expanding the volume of RDE purchases as it supports multiple DHS Components.

Commercial First Approach: Recognizing the rapid advancement of technology and innovation, constrained budgets, and market forces, DNDO funding shifted from a focus on government-sponsored development of materiel solutions to one where commercially available off the shelf products are sought first – *Commercial First.* This change allows DNDO to leverage important industry-led innovations and technologies. Additionally, DNDO continues to foster open and transparent communications with industry partners to share publicly releasable aspects of future requirements and projected quantities of planned procurements.

The commercial first approach is based on the principle that all DNDO programs will first engage the private sector to determine whether or not adequate solutions exist to address capability gaps before pursuing time consuming and potentially costly new development initiatives. There are several commercial first pathways a program can follow depending on the defined gap, the technical maturity, and the commercial availability of potential materiel solutions that may be able to address that gap. These pathways include:

- Commercial-off-the-shelf (COTS);
- Customized COTS: COTS modified by the government or industry partner;
- Commercialization (e.g., Commercial Development): Industry-developed solutions using industry internal research and development (R&D) funding; and
- Government-sponsored development.

LARGE SCALE DETECTION SYSTEMS – PPA OVERVIEW

The Large Scale Detection Systems PPA includes resources to acquire and deploy fixed and mobile large scale RDE to support DHS operational end-users and address GNDA requirements. The PPA includes the procurement and/or deployment of RDE systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities and provides the scientific and technical expertise to design, acquire, and deploy these systems. DNDO coordinates with operational partners to refine and prioritize equipment requirements. The following table provides descriptions for the programs within this PPA.

Program	Project	Level of Effort	General Description
Radiation Portal Monitor Program	RPMP	Ongoing	RPMP is a post-Full Operating Capability (FOC) program with the objective to maintain scanning coverage at previously deployed sites. Major activities include: Decommission low-use/no-use RPMs and reconfigure sites as required; deploy new RPMs and redeploy previously decommissioned and refurbished RPMs as necessary to address required level of scanning capability at sites; deploy additional large-scale systems at ports of entry (POEs) or between POEs in the vicinity of the border; deploy improvements to fielded systems; and conduct test and evaluation of improvements.
RPM Replacement Program (RPM RP)	RPM RP	Ongoing	RPM RP is a level 2, post-Acquisition Decision Event (ADE) 2b program with the objective to acquire and deploy enhanced RPMs to begin to recapitalize the current fleet of fixed RPMs.
On Dock Rail (ODR) Program	ODR	Ongoing	ODR is a pre-ADE 3 program to provide more efficient scanning to detect and classify R/N threat sources in intermodal cargo containers transferred directly from ship to rail car.
International Rail (IRAIL) Program	IRAIL	Ongoing	IRAIL is a pre-ADE 2a program to detect and identify nuclear or other radioactive materials out of regulatory control entering the United States via freight rail.

Large Scale Detection Systems PPA Summary

Dollars in Thousands

Investment	Unique Acquisition Identifier	Acquisition Level	Procurement / Construction	IT / Non IT Investment	Major Acquisitions Oversight List	FY 2016 Revised Enacted	FY2017 Annualized CR	FY 2018 Request
Radiation Portal Monitor Program (RPMP)	N/A	Post FOC	Procurement	Non-IT	No	$44,329	$42,187	$33,773
Radiation Portal Monitor Replacement Program (RPM RP)	024-000005961	Level 2	Procurement	Non-IT	Yes	$4,000	$7,509	$26,751
On-Dock Rail (ODR)	N/A	Level 3	Procurement	Non-IT	No	$2,940	$3,400	$1,000
International Rail (IRAIL)	N/A	Level 3	Procurement	Non-IT	No	-	-	$1,000

HUMAN PORTABLE RADIOLOGICAL/NUCLEAR DETECTION SYSTEMS – PPA OVERVIEW

The Human Portable Rad/Nuc Detection Systems PPA includes resources to acquire and deploy human portable RDE that can be carried, worn, or easily moved by a user to support DHS operational end-users and address GNDA requirements. These devices play a critical role in the layered defenses of the United States against radiological or nuclear terrorist attacks. The portfolio consists of personal radiation detectors (PRD), handheld radioisotope identification devices (RIID), human portable tripwire (HPT), linear radiation monitors (LRM), radiation detection backpacks, and handheld radiation monitors (HRM). These systems are used to detect, localize, and/or identify radiological material. Most are relatively lightweight, easy to use, and of sufficiently low cost for widespread deployment.

Legacy handheld RDE, particularly Basic Handheld RIIDs used by CBP, USCG, and TSA have reached or exceeded their expected service life and are in need of immediate replacement. In FY 2018, DNDO will continue recapitalization efforts to maintain current capability. This recapitalization through strategic sourcing will provide Department-wide cost savings by replacing older equipment, which would incur higher Operations and Maintenance (O&M) costs, with modernized equipment with greater capability and lower O&M costs. In FY 2016, technical issues with the new basic handheld devices did not allow DNDO to purchase additional units with FY 2016 funds. These funds were reallocated to other higher priority programs most notably the HPT program to accelerate the deployment of this new capability.

The following table provides descriptions for the programs within the HPRDS PPA.

Project	Level of Effort	General Description
Basic Handheld (BHH) RIID	Ongoing	The BHH RIID program is a post-ADE 3 program acquiring and deploying devices used for search, detection, localization, and identification of R/N materials, primarily in a secondary screening role.
Advanced Handheld (AHH) RIID	No planned 2018 procurements	The AHH RIID program is a post-ADE 3 program acquiring and deploying devices often used as the final arbiter in situations where superior capability for R/N detection and identification is required; they are also used in laboratory settings as reference detectors.
Personal Radiation Detectors (PRD)	Ongoing	The PRD program is a post-ADE 3 program acquiring and deploying pager-size devices used to detect R/N materials. PRDs are continuously worn by operators for detection and personal protection.
Human Portable Tripwire (HPT)	Ongoing	The HPT program is a pre-ADE 3 program acquiring and deploying small/wearable systems that provide next-generation capabilities to detect, identify, communicate, and adjudicate R/N threats.
Backpacks	Ongoing	The Radiation Detection Backpack program is a post-ADE 3 program acquiring and deploying backpack detectors used in situations where a wide-area R/N detection capability is necessary.
Linear Radiation Monitors (LRM) and Handheld Radiation Monitors (HRM)	No planned 2018 procurements	The LRM is designed in a rope configuration to be lowered into small spaces, such as in between large stacks of intermodal shipping containers. The HRM is used by USCG Maritime Security Response Teams during tactical operations to detect and locate a radiation threat. Both programs are post-ADE 3.

Human Portable Rad/Nuc Detection Systems PPA Summary

Dollars in Thousands

Investment	Unique Acquisition Identifier	Acquisition Level	Procurement / Construction	IT / Non IT Investment	Major Acquisitions Oversight List	FY 2016 Revised Enacted*	FY2017 Annualized CR	FY 2018 Request
Human Portable Radiation Detection Systems Portfolio						**$37,020**	**$34,000**	**$24,572**
Basic Handheld RIIDs	024-000005960	Level 3	Procurement	Non-IT	Yes	$1,845	$7,001	$8,877
Advanced Handheld RIIDs	N/A	Level 3	Procurement	Non-IT	No	$1,815	$5,244	-
PRD	024-000005959	Level 3	Procurement	Non-IT	Yes	$7,263	$7,363	$7,404
HPT	024-000005958	Level 3	Procurement	Non-IT	Yes	$19,933	$10,521	$3,685
Backpack Systems	N/A	Level 3	Procurement	Non-IT	No	$4,540	$3,871	$4,606
Other**	N/A	N/A	Procurement	Non-IT	No	$1,624	-	-

* In FY 2016, the PPAs for the Radiation Portal Monitor (RPM) Program and HPRDS Program were combined into a single PPA for RDE equipment; funding was allocated to the PPA level only.
** Other includes equipment such as Linear Radiation Monitors (LRM), Handheld Radiation Monitors (HRM), Source Kits, etc.

Procurement, Construction, and Improvements
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$88,289		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$88,289**	**$87,096**	**$87,096**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$44,631	$19,082	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$132,920**	**$106,178**	**$87,096**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$132,920**	**$106,178**	**$87,096**
Obligations (Actual/Projections/Estimates)	$114,818	$106,178	$87,096
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Procurement, Construction, and Improvements
Summary of Budget Changes
Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$88,289**
FY 2016 Revised Enacted	**-**	**-**	**$88,289**
FY 2017 Annualized CR	**-**	**-**	**$87,096**
FY 2018 Base Budget	**-**	**-**	**-**
Human Portable Radiation Detection Systems Portfolio	-	-	$24,572
International Rail	-	-	$1,000
On Dock Rail	-	-	$1,000
Radiation Portal Monitor Program	-	-	$33,773
Radiation Portal Monitor Replacement Program	-	-	$26,751
Total Investment Elements	**-**	**-**	**$87,096**
FY 2018 Request	**-**	**-**	**$87,096**
FY 2017 TO FY 2018 Change	**-**	**-**	**-**

Procurement, Construction, and Improvements
Non Pay Budget Exhibits

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
25.1 Advisory and Assistance Services	$5,146	$5,600	$6,319	$719
25.3 Other Goods and Services from Federal Sources	$8,929	$9,138	$7,300	($1,838)
26.0 Supplies and Materials	$6,638	$4,360	-	($4,360)
31.0 Equipment	$67,576	$67,998	$73,477	$5,479
Total - Non Pay Object Classes	**$88,289**	**$87,096**	**$87,096**	**-**

Procurement, Construction, and Improvements
Capital Investments Exhibits

Capital Investments

Dollars in Thousands

Investment	Unique Item Identifier	Acquisition Level	Procurement / Construction	IT/Non-IT	MAOL	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget
Large Scale Detection Systems	024-000005961	2	Procurement	Non-IT	Yes	$51,269	$53,096	$62,524
Human Portable Rad/Nuc Systems	-	3	Procurement	Non-IT	No	$37,020	$34,000	$24,572

Large Scale Detection Systems – Investment

Capital Investments Exhibits

Procurement/Acquisition Programs

Investment	Unique Item Identifier	Acquisition Level	Procurement / Construction	IT/Non-IT	MAOL	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget
Large Scale Detection Systems	024-000005961	2	Procurement	Non-IT	Yes	$51,269	$53,096	$62,524

The Large Scale Detection Systems PPA includes resources to acquire and deploy fixed and mobile large scale RDE to support DHS operational end-users and address GNDA requirements. This PPA includes the procurement and/or deployment of RDE systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities and provides the scientific and technical expertise to design, acquire, and deploy these systems. The following table provides a summary of the programs included in this PPA.

Investment	Unique Item Identifier	Acquisition Level	Procurement / Construction	IT / Non IT	MAOL	FY 2016 Revised Enacted	FY2017 Annualized CR	FY 2018 President's Budget
Large Scale Detection Systems			Procurement	Non-IT	Yes	**$51,269**	**$53,096**	**$62,524**
Radiation Portal Monitor Program (RPMP)	N/A	Post FOC	Procurement	Non-IT	No	$44,329	$42,187	$33,773
Radiation Portal Monitor Replacement Program (RPM RP)	024-000005961	Level 2	Procurement	Non-IT	Yes	$4,000	$7,509	$26,751
On-Dock Rail (ODR)	N/A	Level 3	Procurement	Non-IT	No	$2,940	$3,400	$1,000
International Rail (IRAIL)	N/A	Level 3	Procurement	Non-IT	No	-	-	$1,000

Large Scale Equipment	FY 2018 Planned Procurement Units
Radiation Portal Monitor	0 units procured in FY18
RPM RP	9 RPMs procured in FY18
On Dock Rail	0 units procured in FY18
International Rail	1 unit procured in FY18

Radiation Portal Monitor (RPM) Program

Procurement, Construction, and Improvements Funding

Investment Description

The RPM Program is a post-ADE 3*, post FOC program in sustainment that supports CBP's efforts to maintain scanning coverage at previously completed POEs and meet the *Security and Accountability For Every (SAFE) Port Act of 2006*. RPMs are used at U.S. land and sea POEs by CBP to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce. As POEs are reconfigured or expanded, RPMs must be relocated, decommissioned, and/or additional RPM systems must be deployed to maintain current scanning capabilities. In addition, improvements will be deployed to fielded systems to extend the service life of RPMs as well as augment detection efficacy, operational performance, and operational efficiency.

The Program plans to continue managing the deployment of the remaining polyvinyl toluene (PVT)-based systems in its inventory and to deploy selected improvements that have been projected to enhance operational or threat detection performance for fielded systems in FY 2018.

Justification

The *SAFE Port Act of 2006* codifies National Security Presidential Directive (NSPD)-43 as law, formalizing the legislative basis for DNDO. DNDO is responsible for coordinating the domestic portion of the GNDA to include R/N technical detection devices and systems development, testing, and acquisition. FY 2018 funding is required to ensure RPMs are relocated as necessary to support port reconfigurations and expansion and maintain scanning coverage; to ensure necessary improvements are made as the systems continue to age since initial installations began in 2003; and to begin installation of remote operations capability to reduce the manpower burden for CPB RPM operations and allow CBP to apply those resources elsewhere in the ports to perform other law enforcement missions, resulting in an overall risk reduction from weapons of mass destruction and other smuggling threats.

FY 2016 Key Milestone Events (Prior Year)

- Initiated 81 RPM installs and 75 decommissions.
- Completed 22 RPM installs and 26 RPM decommissions.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Initiate 162 RPM installs and 76 decommissions.
- Complete 93 RPM installs and 154 decommissions*.
- Begin operation of Trans Pacific conveyor-based RPM system at Port of Los Angeles/Long Beach.

- Conduct system optimization, testing and analysis of spectroscopic RPMs at the Port of Savannah, GA for future deployment.
- Conduct remote operations single lane and multi-lane pilots at the Port of Savannah, GA.

FY 2018 Planned Key Milestone Events (Budget year)

- Initiate 67 RPM installs and 4 decommissions.
- Begin initial operations of spectroscopic RPMs at the Port of Savannah, GA.
- Initiate deployment of remote operations equipment and software updates at selected POEs.

* Due to the number of variables affecting completion dates of RPM installs and decommissions, in FY18, DNDO will begin reporting RPM installs and decommissions initiated each fiscal year instead of those completed each FY.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$44,329	$42,187	$33,773
Research and Development		-	-	--
Project Funding	$743,622	$44,329	$42,187	$33,773
Obligations	$743,622	$44,329	$42,187	
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA	3/15	3/15	3/20	N/A	$46,287
HSHQDC-16-PA001	General Service Administration	RWA		6/16	9/18	N/A	$2,176
HSHQDC-15-00108	CBP Office of Technology Innovation and Acquisition (OTIA)	IAA		6/15	12/16	N/A	$773
To be assigned at the time of award	General Service Administration	RWA	7/17			N/A	$5,710

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
FY 2016				
Initiated 81 RPM installs and 75 decommissions			1QTR/FY16	
Completed 22 RPM installs and 26 RPM decommissions				4QTR/FY16
FY 2017				
Initiate 162 RPM installs and 76 decommissions			1QTR/FY17	
Complete 93 RPM installs and 154 decommissions				4QTR/FY17
Achieve Trans Pacific system Go-Live				1QTR/FY17
Deploy spectroscopic RPMs at Port of Savannah, GA			1QTR/FY17	4QTR/FY17
Conduct remote operations multi-lane pilot at Savannah, GA			2QTR/FY17	4QTR/FY17
FY 2018				
Initiate 67 RPM installs and 4 decommissions			1QTR/FY18	
Begin initial operations of spectroscopic RPMs at the Port of Savannah, GA			1QTR/FY18	
Initiate deployment of remote operations equipment and software updates at selected POEs			1QTR/FY18	

Radiation Portal Monitor Replacement Program

Procurement, Construction, and Improvement Funding

Investment Description

RPMs are used at U.S. land and sea POEs by CBP to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce.

The RPM RP will support needed enhancements to CBP R/N materials detection and identification capabilities at high-volume POEs by addressing the five key drivers of enhancing mission effectiveness: (1) monitoring the state of health, (2) modernizing, (3) addressing emerging needs, (4) increasing reliability, availability, and (5) maintainability. These drivers were developed jointly by CBP and Pacific Northwest National Laboratory to guide DHS RPM recapitalization and modernization efforts.

The focus of the current RPM RP is the selective deployment of new RPMs to enhance mission effectiveness, gain operational efficiencies, and to address emerging mission needs. Currently, the program plans are to acquire and deploy approximately 200 RPMs between FY 2018 and FY 2022. The program plans to procure nine systems in FY 2018. The RPM RP source selection began in 2Q/FY 2017.

Justification

RPM RP is aligned to the GNDA in the following areas: (1) Deploy detection systems for scanning of cargo and conveyances for R/N materials at U.S. ports of entry; and (2) Ensure steady state operations of deployed radiation detection systems do not unduly disrupt commercial cargo and passenger flow.

FY 2018 funding is required to increase the inventory of RPMs to meet current and expected near-term demand. This funding will also allow the replacement of older units that cannot accommodate new revised operational settings that help mitigate nuisance alarms which is precluding the implementation of remote operations capability.

FY 2016 Key Milestone Events (Prior Year)

- Conducted characterization and environment test planning.
- Completed Acquisition Decision Event (ADE) 1B (R&D-funded).
- Completed planning for System Threat Review (STR) Phase I/II/III (R&D-funded).

FY 2017 Planned Key Milestone Events (Year of Execution)

- Receive ADE-2A and -2B approvals, and proceed into 2C.
- Host an Industry Day for potential bidders on the RPM RP procurement.

- Complete STR Phase I; finalized process and models for future STRs.
- Release the Final RFP to initiate the procurement.
- Complete an initial evaluation of proposals and conduct Downselect 1.
- Commence characterization and environmental test campaigns.

FY 2018 Planned Key Milestone Events (Budget year)

- Complete STR Phase 2.
- Conduct Downselect 2.
- Obtain ADE-2C approval to initiate Low Rate Initial Production (LRIP).
- Award up to 3 contracts for RPM integration and test articles.
- Commence Stream of Commerce and Integration Testing.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$4,000	$7,509	$26,751
Research and Development		$4,105	-	-
Project Funding	$1,917	$8,105	$7,509	$26,751
Obligations	$1,917	$8,105	$7,509	
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDN-16-X-00049	Defense Threat Reduction Agency	IAA	8/16	8/16	8/16		$1,300
HSHQDC-15-X-00092	Los Alamos National Lab	IAA	7/16	7/16	6/17		$300

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00096	Oak Ridge National Lab	IAA	8/15	8/15	6/18		$1,635
HSHQDC-15-X-00136	Sandia National Lab	IAA	8/15	8/15	8/18		$765
HSHQDC-13-C-00005	Johns Hopkins University Applied Physics Laboratory	CPFF	11/12	11/12	11/17		$685
HSHQDC-14-X-00076	Oak Ridge National Lab	IAA	2/14	2/14	6/17		$101
HSHQDN-16-X-00006	Idaho National Lab	IAA	4/16	4/16	4/19		$119
HSHQDC-15-X-00098	Savannah River National Lab	IAA	6/15	7/15	6/18		$250
HSHQDC-15-X-00098	Los Alamos National Lab	IAA	8/16	8/16	3/18		$300
HSHQDN-16-X-00007	Los Alamos National Lab	IAA	8/16	8/16	3/18		$700
To be determined at time of award	PMO Contractor Support/SETA SESP	Commercial Contracts	10/17	10/17	10/20		$3,241
To be determined at time of award	To be determined at time of award	IDIQ	6/18	6/18	6/19		$2,566
To be determined at time of award	To be determined at time of award	IDIQ	6/19	6/19	6/20		$48,415

Significant Changes to Investment since Prior Year Enacted

RPM RP was approved to enter into the DHS "Obtain" stage.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
FY 2016				
Completed Acquisition Decision Event (ADE) 1B				1QTR/FY17
Completed planning for System Threat Review (STR) Phase I/II/III				4QTR/FY16
FY 2017				
Received ADE-2A and -2B approvals			1QTR/FY17	3QTRFY17

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
Hosted an Industry Day for potential bidders on the RPM RP procurement				1QTR/FY17
Completed STR Phase 1				2QTR/FY17
Released Final RFP				2QTR/FY17
Completed initial evaluation of proposals/conducted Downselect 1				3QTR/FY17
Commenced characterization and environmental test campaigns			3QTR/FY17	1QTR/FY18
	FY 2018			
Complete STR Phase 2				1QTR/FY18
Conduct Downselect 2				2QTR/FY18
Obtain ADE-2C approval to initiate Low Rate Initial Production (LRIP)				3QTR/FY18
Award up to 3 contracts for RPM integration and test articles				3QTR/FY18
Commence Stream of Commerce and Integration Testing			4QTR/FY18	

On-Dock Rail (ODR) Program

Procurement, Construction, and Investments Funding

Investment Description

The ODR Program is a pre-ADE 3 program intended to provide increased scanning and detecting efficiencies while screening for R/N material entering the United States at sea ports of entry via cargo containers.

Justification

ODR is aligned to the GNDA in the following areas: (1) Deploy detection systems for scanning of cargo and conveyances at U.S. ports of entry for R/N materials; and (2) Ensure steady state operations of deployed radiation detection systems do not unduly disrupt commercial cargo flow.

ODR solutions are appropriate when a terminal is experiencing stream of commerce limitations based on the operationally-inefficient and cost-ineffective use of mobile RPMs. The program is currently completing deployment of an upgraded prototype system, Straddle Carrier Portal (SCP), at Port of Tacoma (PoT) Pierce County Terminal (PCT). This ODR solution features two fixed R/N scanning systems that can accommodate straddle portal carriers with intermodal cargo containers. FY18 funding is required to complete the construction of a similar system at Maher Terminal in the Port of New York/New Jersey.

FY 2016 Key Milestone Events (Prior Year)

- Finalized ODR Threat Basis Memo.
- Began planning for SCP fabrication, site design and construction of PoT terminal.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Completed DNDO Governance Review Board, 2a/2b.
- Begin Construction at PoT.
- Conduct ODR Performance Testing (PT) Milestone MS-4 and MS-5.
- Begin SCP fabrication, site design and construction at Maher terminal, Port of NY/NJ.

FY 2018 Planned Key Milestone Events (Budget year)

- Complete deployment at PoT.
- Begin the Post-Implementation Review for SCP at PoT.
- Complete SCP fabrication, site design and construction at Maher Terminal.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$2,940	$3,400	$1,000
Research and Development		$5,414	$3,250	-
Project Funding	$31,796	$8,354	$6,650	$1,000
Obligations	$31,796	$8,354	$6,650	
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00131	Pacific Northwest National Lab	IAA		7/15	7/18		$725
HSHQDC-13-C-00005	JHU-Applied Physics Lab	IAA	11/12	11/12	11/17		$1,489
HSHQDC-11-X-00104	Savannah River National Lab	IAA		2/11	12/16		$800
HSHQDC-16-X-00063	Savannah River National Lab	IAA		3/16	9/21		$2,840
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA		3/15	3/20		$1,940
HSHQDC-15-X-00098	Savannah River National Lab	IAA		7/15	8/18		$1,150
HSHQDC-15-X-00098	Savannah River National Lab	IAA	7/15	7/15	8/18		$250
HSHQDC-13-C-00005	JHU-Applied Physics Lab	Existing IAA	11/12	11/12	11/17		$350
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		$750
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		$300
HSHQDC-16-X-00063	Savannah River National Lab	Existing IAA	3/16	3/16	9/21		$1,350

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
To be determined at time of award	Sandia National Lab	New IAA	6/17	6/17	12/22		$400

Significant Changes to Investment since Prior Year Enacted

CBP established a requirement to implement an ODR radiation scanning system at Maher Terminal in the Port of New York/New Jersey.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
FY 2016				
Finalized ODR Threat Basis Memo				1QTR/FY17
FY 2017				
Completed DNDO Governance Review Board, 2a/2b				1QTR/FY17
Begin Construction at PoT			3QTR/FY17	
Conduct ODR Performance Testing (PT) Milestone (MS)-4 and MS-5			1QTR/FY17	1QTR/FY17
Begin SCP fabrication, site design and construction at Maher terminal, Port of NY/NJ			4QTR/FY17	
FY 2018				
Complete deployment at PoT				1QTR/FY18
Begin the Post-Implementation Review for SCP at PoT			3QTR/FY18	
Complete SCP fabrication, site design and construction at Maher terminal				4QTR/FY18

International Rail (IRAIL) Program

Procurement, Construction, and Improvements Funding

Investment Description

The IRAIL program is a pre-ADE 2A program identifying and detecting radiological and nuclear R/N material entering the United States via freight rail. IRAIL supports the CBP-led Integrated Rail Inspection System (IRIS) Program, by leading the RDE sub-system procurement as well as IRIS test and evaluation efforts. The CBP IRIS Program will re-capitalize the current fleet of aging Non-Intrusive Inspection (NII) x-ray imaging equipment employed at international rail crossings.

Justification

DHS has identified the requirement to improving the capability to scanning cargo at international rail crossings as a priority..

FY 2016 Key Milestone Events (Prior Year)

- No PCI funding.

FY 2017 Planned Key Milestone Events (Year of Execution)

- No PCI funding.
- Conduct market research with RFI release (R&D-funded).
- Support development of RFP and test plans (R&D-funded).

FY 2018 Planned Key Milestone Events (Budget year)

- Release RFP.
- Procure first unit for test and evaluation.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		-	-	$1,000
Research and Development		$1,646	$3,850	$3,357
Project Funding	$10,038	$1,646	$3,850	$4,357
Obligations	$10,038	$1,646	$3,850	
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
To be determined at the time of contract award	CBP	IAA	5/18	5/18	12/23		TBD

Significant Changes to Investment since Prior Year Enacted

CBP established a requirement to pursue an integrated NII/RDE capability for IRAIL.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Conduct market research with RFI release			2QTR/FY17	3QTR/FY17
Support development of RFP and test plans			3QTR/FY17	4QTR/FY17
	FY 2018			
Release RFP				1QTR/FY18
Procure first unit(s) for test and evaluation				4QTR/FY18

Human Portable Rad/Nuc Systems – Investment

Capital Investments Exhibits

Procurement/Acquisition Programs

Investment	Unique Item Identifier	Acquisition Level	Procurement / Construction	IT/Non-IT	MAOL	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget
Human Portable Rad/Nuc Systems	-	3	Procurement	Non-IT	No	$37,020	$34,000	$24,572

The Human Portable Rad/Nuc Detection Systems PPA includes resources to acquire and deploy human portable RDE that can be carried, worn, or easily moved by a user to support DHS operational end-users and address GNDA requirements. These devices play a critical role in the layered defenses of the United States against radiological or nuclear terrorist attacks. The portfolio consists of personal radiation detectors (PRD), handheld radioisotope identification devices (RIID), human portable tripwire (HPT), linear radiation monitors (LRM), radiation detection backpacks, and handheld radiation monitors (HRM). These systems are used to detect, localize, and/or identify radiological material. Most are relatively lightweight, easy to use, and of sufficiently low cost for widespread deployment. The following table provides a summary of the programs included in this PPA.

Investment	Unique Item Identifier	Acquisition Level	Procurement / Construction	IT / Non IT	MAOL	FY 2016 Revised Enacted*	FY2017 Annualized CR	FY 2018 President's Budget
Human Portable Radiation Detection Systems Portfolio						**$37,020**	**$34,000**	**$24,572**
Basic Handheld RIIDs	024-000005960	Level 3	Procurement	Non-IT	Yes	$1,845	$7,001	$8,877
Advanced Handheld RIIDs	N/A	Level 3	Procurement	Non-IT	No	$1,815	$5,244	-
PRD	024-000005959	Level 3	Procurement	Non-IT	Yes	$7,263	$7,363	$7,404
HPT	024-000005958	Level 3	Procurement	Non-IT	Yes	$19,933	$10,521	$3,685
Backpack Systems	N/A	Level 3	Procurement	Non-IT	No	$4,540	$3,871	$4,606
Other**	N/A	N/A	Procurement	Non-IT	No	$1,624	-	-

*In FY 2016, the PPAs for the Radiation Portal Monitor (RPM) Program and HPRDS Program were combined into a single PPA for RDE equipment; funding was allocated to the PPA level only.
** Other includes equipment such as Linear Radiation Monitors (LRM), Handheld Radiation Monitors (HRM), Source Kits, etc.

HPRDS Equipment	FY 2018 Planned Procurement Units
Basic Handheld RIIDs	241
Advanced Handheld Germanium RIIDs	0
PRDs	4,641
HPTs	363
Backpacks	101

HPRDS Equipment	FY 2018 Planned Procurement Units
USCG	
Basic Handheld RIIDs	222
HPTs	103
PRDs	321
CBP	
Basic Handheld RIIDs	15
PRDs	4,200
HPTs	117
TSA (VIPR Teams)	
Backpacks	46
MDDP and Other	
Basic Handheld RIIDs	4
Backpacks	55
PRDs	120
HPTs	143

Basic Handheld (BHH) RIID

Procurement, Construction, and Improvements Funding

Investment Description

Basic Handheld (BHH) RIIDs are used for search, detection, localization, and identification of radionuclide composition of R/N materials, and for quick and accurate measurement of dose rate and count rate. These devices are also used to support secondary screening and small-area searches.

Justification

Many legacy handhelds used by CBP, USCG, and TSA have reached or exceeded their expected service life and need immediate replacement. In FY 2016, DNDO began recapitalizing fielded BHH RIIDs using a strategic sourcing contract with an economic order quantity construct. This contract provided Department-wide cost savings by replacing older, less capable equipment with modernized replacement BHH RIIDs with greater capability and lower sustainment costs. In FY 2018, DNDO will continue recapitalizing legacy systems to maintain current capability. FY 2018 PCI funding is required to acquire and deploy BHH RIIDs to support Component FOC requirements. By meeting FOC requirements for USCG and continuing deliveries for CPB, DHS will be able to close and adequately mitigate capability gaps, minimizing the risk of illicit R/N material entering the United States.

FY 2016 Key Milestone Events (Prior Year)

- Completed Operational Assessment for CBP.
- Began to deliver units to DHS components.
- Completed Operational Assessment for USCG.
- Procured upgrade kits for selected legacy systems.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Begin to recapitalize Mobile Detection Deployment Program (MDDP) fleet by beginning device deliveries.
- Begin to recapitalize USCG fleet by beginning device deliveries. .
- Continue device deliveries to CBP.

FY 2018 Planned Key Milestone Events (Budget year)

- Continue device deliveries for CBP and USCG.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$1,845	$7,001	$8,877
Research and Development		-	-	-
Project Funding	$196,452	$1,845	$7,001	$8,877
Obligations	$196,452	$1,845	$7,001	
Expenditures				

*Prior to FY17, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-D-00018	Smiths Detection	IDIQ	9/15	9/15	9/20		$143,000

Significant Changes to Investment since Prior Year Enacted

None

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
FY 2016				
Operational Assessment for CBP			3QTR/FY16	3QTR/FY16
Deliver units to DHS components			1QTR/FY16	4QTR/FY16
Operational Assessment for USCG			3QTR/FY16	3QTR/FY16
Upgrade kits for legacy systems			4QTR/FY16	4QTR /FY17
FY 2017				
Deliveries for MDDP			4QTR/FY17	4QTR /FY18
Deliveries for USCG			4QTR/FY17	4QTR /FY18
Continue deliveries to CBP			1QTR/FY17	4QTR/FY18
FY 2018				
Continue deliveries for CBP and USCG			1QTR/FY18	4QTR/FY18

Advanced Handheld (AHH) RIID

Procurement, Construction, and Improvements Funding

Investment Description

AHH RIIDs are often used as the final arbiter when illicit trafficking is suspected due to their superior capability for R/N detection and identification. They are also used in laboratory settings as reference detectors.

Justification

AHH RIIDs are acquired in small quantities due to their expense and method of employment. DHS Component User requirements for this equipment are dynamic; however, at this time, there is no requirement for FY 2018 funds.

FY 2016 Key Milestone Events (Prior Year)

- Delivered devices for DNDO MDDP.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Continue delivery of devices to CBP and USCG.

FY 2018 Planned Key Milestone Events (Budget year)

- Complete delivery of devices.
- Reach FOC for all components.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$1,815	$5,244	-
Research and Development		-	-	-
Project Funding	$196,452	$1,185	$5,244	-
Obligations	$196,452	$1,185	$5,244	
Expenditures				

*Prior to FY17, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-12-D-00080	AMETEK	IDIQ	9/12	9/12	9/17		$8,800

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2016			
Delivered AHH devices for DNDO MDDP				4QTR/FY16
	FY 2017			
Initiate delivery of AHH devices to CBP and USCG			2QTR/FY17	
	FY 2018			
Complete Delivery of AHH devices				4QTR/FY18
Reach FOC for all Components				4QTR/FY18

Personal Radiation Detector (PRD)

Procurement, Construction, and Improvements Funding

Investment Description

PRDs are pager-size devices used to detect R/N materials. The PRDs are typically clipped to a uniform or belt. PRDs detect both gamma (general purpose) and gamma/neutron (maritime environment) R/N sources. They automatically monitor the environment and alert the user if R/N material is detected.

Justification

PRDs are continuously worn by operators for R/N detection and personal protection. Today, legacy systems by CBP, USCG, and TSA, have reached or exceeded their expected service life and are in need of immediate replacement. In FY 2018, DNDO will award a strategic sourcing contract to recapitalize legacy systems to maintain current capability. This strategic sourcing effort provides a means to provide PRDs to all users and enable Department-wide cost savings by replacing older, less capable equipment with an economic order quantity construct. FY 2018 PCI funding is required to begin deploying PRDs to support Component requirements for detection of illicit R/N materials and for the continuing safety of operators.

FY 2016 Key Milestone Events (Prior Year)

- Continued procurement of legacy PRDs for CBP, USCG, and MDDP.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Release PRD Strategic Sourcing RFP.
- Conduct PRD Strategic Sourcing test and evaluation.

FY 2018 Planned Key Milestone Events (Budget year)

- Award strategic sourcing contract(s) to vendor(s).
- Begin delivering strategically sourced devices to CBP and USCG.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$7,263	$7,363	$7,404
Research and Development		-	-	-
Project Funding	$196,452	$7,263	$7,363	$7,404
Obligations	$196,452	$7,263	$7,363	
Expenditures				

*Prior to FY17, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-13-A-00027	Laurus Systems, Inc	BPA	5/13	5/13	5/18		$1,000
HSHQDC-10-A-00097	Sensor Technology Engineering	BPA	4/11	4/11	4/16		$14,000
HSHQDC-13-A-00043	William F Hawk	BPA	9/13	9/13	9/18		$9,900
HSHQDN-16-F-00007	Sensor Technology Engineering	GSA Schedule	9/16	9/16	3/18		$3,943
To be assigned at time of award	To be determined at time of award	IDIQ	10/17	10/17	10/22		$90,000

Significant Changes to Investment since Prior Year Enacted

The PRD program was approved to enter into the DHS "Obtain" stage to begin recapitalizing fielded PRDs.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2016			
Procure legacy PRDs			2QTR/FY16	1QTR/FY18
	FY 2017			
Release RFP				2QTR/FY17
Conduct test & evaluation			3QTR/FY17	4QTR/FY17
	FY 2018			
Award strategic sourcing contract(s)				TBD/FY18
Deliver PRDs to CBP and USCG			2QTR/FY18	

Human Portable Tripwire (HPT)

Procurement, Construction, and Investments Funding

Investment Description

HPT devices are small/wearable systems that provide next-generation capabilities to detect, identify, communicate, and adjudicate R/N threats. HPTs also function as personal protective equipment to warn operators of potential exposure to harmful levels of radiation. HPTs are able to identify and locate the source of radiation and allow personnel to take appropriate action. The technology includes communication features that allow the user to easily seek additional technical assistance from experts if needed.

Justification

These spectroscopic personal radiation devices are a critical tool for personnel who operate in the maritime environment, at land and sea ports of entry, and within the United States. FY 2018 PCI funding is required to continue to deploy HPTs to support Component FOC requirements to meet their R/N mission requirements. In doing so, DHS will mitigate capability gaps, decreasing the risk of illicit R/N material entering the United States.

FY 2016 Key Milestone Events (Prior Year)

- Deployed Initial Operational Capability (IOC) quantities to TSA, CBP, USBP, USCG, and DNDO MDDU.
- Achieved FOC quantities to TSA.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Continue deliveries of HPT devices.
- Conduct Post-Implementation Review for CBP.

FY 2018 Planned Key Milestone Events (Budget year)

- Continue deliveries of HPT devices.
- Conduct Post-Implementation Review for USBP.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$19,933	$10,521	$3,685
Research and Development		-	-	-
Project Funding	$196,452	$19,933	$10,521	$3,685
Obligations	$196,452	$19,933	$10,521	
Expenditures				

*Prior to FY17, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-D-00019	FLIR Detection	IDIQ	9/15	9/15	9/20		$24,000

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
FY 2016				
IOC for Component Users				4QTR/FY16
FOC for TSA				4QTR/FY16
HPT device deliveries for USBP and USCG			3QTR/FY16	
FY 2017				
HPT device deliveries for USBP and USCG			3Q/FY16	
Post-Implementation Review for TSA			4Q/FY17	4Q/FY17
FY 2018				
HPT device deliveries for USBP and USCG				4QTR/FY18
Post-Implementation Review for USBP			1QTR/FY18	1QTR/FY18

Backpack Program

Procurement, Construction, and Improvements Funding

Investment Description

Backpack radiation detection systems are used when a wide-area detection capability is necessary, potentially in covert operations, and are used to quickly detect and locate a radiation threat in public or maritime environments such as aircraft, medium- to large-sized vessels, open-air events, parking lots, and stadiums. Backpack systems provide the capability to detect both gamma and neutron radiation. A backpack system is also being used for Small Vessel Standoff Detection (SVSD) Increment 1 requirements for boat-to-boat scanning capability. Current backpack systems use Helium-3 (^{3}He) for neutron radiation detection.

Justification

The program will procure wearable R/N detector systems with expansion capability to perform identification that will include ^{3}He-alternative technology.

FY 2016 Key Milestone Events (Prior Year)

- Procure ^{3}He backpack devices for USCG.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Procure ^{3}He backpack devices for MDDP.

FY 2018 Planned Key Milestone Events (Budget year)

- Procure ^{3}He-alternative, wearable R/N detectors for TSA & MDDP.

Overall Investment Funding

	Prior Years	FY 2016	FY 2017	FY 2018
Operations and Support		-	-	-
Procurement, Construction, and Improvements		$4,540	$3,871	$4,606
Research and Development		-	-	-
Project Funding	$196,452	$4,540	$3,871	$4,606
Obligations	$196,452	$4,540	$3,871	
Expenditures				

*Prior to FY17, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-14-D-00007	Sensor Technology Engineering	IDIQ	9/11	9/11	9/16		$7,300

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2016			
Procure legacy backpacks for USCG				3Q/FY16
	FY 2017			
Procure legacy backpacks for MDDP			1Q/FY17	3Q/FY17
	FY 2018			
Procure ^{3}He-alternative, wearable R/N detectors for TSA and MDDP				4Q/FY18

Department of Homeland Security

Domestic Nuclear Detection Office

Research and Development

Fiscal Year 2018
Congressional Justification

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Research and Development

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Architecture Planning and Analysis	-	-	$15,758	-	-	$15,578	-	-	$15,937	-	-	$359
Transformational Research and Development	-	-	$64,684	-	-	$63,943	-	-	$60,581	-	-	($3,362)
Detection Capability Development	-	-	$21,029	-	-	$20,788	-	-	$15,155	-	-	($5,633)
Detection Capability Assessments	-	-	$39,503	-	-	$39,051	-	-	$34,127	-	-	($4,924)
Nuclear Forensics	-	-	$19,031	-	-	$18,813	-	-	$18,361	-	-	($452)
Total	**-**	**-**	**$160,005**	**-**	**-**	**$158,173**	**-**	**-**	**$144,161**	**-**	**-**	**($14,012)**
Subtotal Discretionary - Appropriation	-	-	$160,005	-	-	$158,173	-	-	$144,161	-	-	($14,012)

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes

Overview

The Domestic Nuclear Detection Office (DNDO) leads the U.S. Government (USG) in development of the Global Nuclear Detection Architecture (GNDA) and its implementation, as well as coordination and stewardship of USG technical nuclear forensics efforts. DNDO's Research and Development (R&D) appropriation funds fundamental knowledge discovery, basic and applied research, technology and systems development leading to product acquisition, test and evaluation, and associated costs in support of the following Programs, Projects, or Activities (PPAs):

- **ARCHITECTURE, PLANNING, AND ANALYSIS PPA**

The Architecture, Planning, and Analysis PPA coordinates the development of an enhanced GNDA and implementation of its domestic portion. Its objective is to improve the capability to understand, anticipate, and mitigate the risk of nuclear terrorism. These efforts enable the Department of Homeland Security (DHS) to determine and address gaps and vulnerabilities in existing radiological/nuclear (R/N) detection capabilities. This is accomplished through a continuous process of stakeholder engagement involving the operational Components of the Department; other Federal agencies; and state, local, tribal, and territorial (SLTT) partners to formulate and adjust program plans and investment options, on an annual basis, that addresses the threat of nuclear terrorism across the Nation's homeland security enterprise.

- **TRANSFORMATIONAL RESEARCH AND DEVELOPMENT PPA**

The Transformational R&D PPA seeks to identify, explore, develop, and demonstrate science and technologies that address gaps in the GNDA; improve the performance of R/N detection and nuclear forensics capabilities; and/or significantly reduce the operational burden of radiation detection systems. DNDO works closely with partners to transition technologies from research to the field, including the transfer of technologies to the commercial sector for development and commercialization. Projects in the Transformational Research and Development PPA have achieved technology readiness levels (TRL) one through seven.

- **DETECTION CAPABILITY DEVELOPMENT PPA**

The Detection Capability Development PPA incorporates the user requirements of DHS's operational Components into R/N detection systems. It achieves this by coordinating its systems engineering lifecycle activities with the end-user community and managing the task execution of DNDO's Solution Development Process (SDP).

Recognizing that innovation can originate in a variety of sectors, DNDO has adopted a "commercial first" approach that gives preference for solutions available in the private sector marketplace. Using this approach, DNDO leverages industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

- **DETECTION CAPABILITY ASSESSMENTS PPA**

DNDO's research, development, and acquisition process is anchored by rigorous assessments of mission-related technologies as they are developed and deployed. Through the Detection Capability Assessments PPA, these technologies are supported by test and evaluation (T&E) campaigns to characterize, verify, and validate technical performance and assess the operational effectiveness and suitability of technologies under development, as well as that of commercially available systems prior to deployment. DNDO utilizes test instrumentation and automated data collection systems to enable its test teams to rapidly verify and validate data, thus ensuring that analysts have quality data sets.

Rigorous and scientifically defensible testing requires a team of trained and experienced subject matter experts, including nuclear physicists, statisticians, analysts, and testers. While T&E campaigns evaluate systems under development, the Red Team (RT) Project evaluates deployed systems and operations and their associated tactics, techniques, and procedures, in as-close-to-realistic-environments as possible. The RT Project presents adversary tactics and radiological signature training devices to Federal and SLTT (FSLTT) R/N detection and interdiction operations. These presentations can either be covert or overt in nature. The Program Assessments project performs objective reviews of the effectiveness of GNDA programs and their associated activities by examining

GNDA programs, CONOPS, protocols, policies, procedures, and training.

- **NUCLEAR FORENSICS PPA**

The Nuclear Forensics PPA advances the science of nuclear forensics - the examination of materials recovered from R/N events of an illicit or hostile nature in order to determine their character and origin. Together, the GNDA and nuclear forensics efforts strengthen the detection of nuclear or other radioactive materials that are out of regulatory control;[1] enable the identification and closure of illicit R/N trafficking networks; promote nuclear security; and deter potential adversaries by increasing their perceived and actual risk of failure and the prospect of being held accountable for planned or attempted attacks. This PPA includes the National Technical Nuclear Forensics Center (NTNFC), which through its operational readiness, technology advancement, and expertise development missions, provides centralized planning, integration and advancement of USG nuclear forensics capabilities while leading the interagency implementation of the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States*.

[1] The term "out of regulatory control" refers to materials that are being imported, possessed, stored, transported, developed, or used without authorization of the appropriate regulatory authority, either inadvertently or deliberately.

Research and Development
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$160,005		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$160,005**	**$158,173**	**$144,161**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$27,394	$21,629	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$187,399**	**$179,802**	**$144,161**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$187,399**	**$179,802**	**$144,161**
Obligations (Actual/Projections/Estimates)	$160,683	$179,802	$144,161
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Research and Development
Summary of Budget Changes
Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$160,005**
FY 2016 Revised Enacted	**-**	**-**	**$160,005**
FY 2017 Annualized CR	**-**	**-**	**$158,173**
FY 2018 Base Budget	**-**	**-**	**$158,173**
Transfer from FA FSLTTS due to Common Appropriation Structure Realignment	-	-	$1,118
Transfer to O&S Mission Support due to CAS Realignment	-	-	($3,474)
Total Transfers	**-**	**-**	**($2,356)**
Total Adjustments-to-Base	**-**	**-**	**($2,356)**
FY 2018 Current Services	**-**	**-**	**$155,817**
Architecture Planning and Analysis	-	-	($759)
Detection Capability Assessments	-	-	($1,450)
Detection Capability Development	-	-	($5,633)
Nuclear Forensics	-	-	($452)
Transformational Research and Development	-	-	($3,362)
Total, Program Decreases	**-**	**-**	**($11,656)**
FY 2018 Request	**-**	**-**	**$144,161**
FY 2017 TO FY 2018 Change	**-**	**-**	**($14,012)**

DNDO continues to examine and mature its implementation of the Common Appropriation Structure. As part of a review of program alignment, adversary analysis and capability integration activities and funding from the Federal, State, Local, Territorial, and Tribal Support PPA in Federal Assistance were identified as being more effectively integrated into the Architecture Planning and Analysis PPA in Research and Development. This $1.118 million transfer would consolidate adversary analysis and capability-based planning functions with architecture, risk, and other similar functions already in the Architecture Planning and Analysis PPA. This will result in more holistic analysis products that better advance DNDO's ability to understand, anticipate, and reduce the threat of radiological and nuclear terrorism.

Also identified as part of the review of program alignment, funds for information technology governance, infrastructure and cybersecurity were transferred from the Detection Capability Assessment PPA in Research and Development to the Mission Support PPA in Operations and Support. Some information technology infrastructure capabilities have matured beyond development and DNDO considers these activities best aligned to Operations and Support. The funding transferred supports preparation of agreements to effectively share radiological/nuclear (R/N) detection information among FSLTT partners, in order to prevent terrorism and enhance national security; and validates cybersecurity compliance and readiness of DNDO systems and safeguarding of DNDO sensitive information in third-party systems and services. The funding supports the evolution of technical competencies and expertise as well as tools and technologies which comprise DNDO's adaptive mission-support information technology infrastructure.

Research and Development
Justification of Program Changes

Dollars in Thousands

Program Changes	FY 2018 President's Budget		
	Positions	FTE	Amount
Program Change 1 - Architecture Planning and Analysis	**-**	**-**	**($759)**
Architecture Planning and Analysis	-	-	($759)
Program Change 2 - Detection Capability Assessments	**-**	**-**	**($1,450)**
Detection Capability Assessments	-	-	($1,450)
Program Change 3 - Detection Capability Development	**-**	**-**	**($5,633)**
Detection Capability Development	-	-	($5,633)
Program Change 4 - Nuclear Forensics	**-**	**-**	**($452)**
Nuclear Forensics	-	-	($452)
Program Change 5 - Transformational Research and Development	**-**	**-**	**($3,362)**
Transformational Research and Development	-	-	($3,362)
Total Program Changes	**-**	**-**	**($11,656)**

Program Change 1

Architecture Planning and Analysis

Description

The DNDO Architecture, Planning, and Analysis Program coordinates the development of an enhanced Global Nuclear Detection Architecture (GNDA) and implementation of its domestic portion. These efforts enable DHS to determine and address gaps and vulnerabilities in existing radiological/nuclear (R/N) detection capabilities. This is accomplished through a continuous process of stakeholder engagement with other Federal agencies; operational components of the department; and state, local, tribal, and territorial partners to formulate and adjust plans and investment options, on a regular basis, that address the threat of nuclear terrorism across the nation's homeland security enterprise.

Architecture, Planning, and Analysis projects advance the capability to understand, anticipate, and reduce the threat of nuclear terrorism. Each project contributes to the development of strategies and plans for implementing the GNDA and preventing R/N terrorism.

Justification

The reduction in funding will result in reductions to capability and delayed development activity in the Architecture, Planning, and Analysis Program.

Performance

DNDO's capability to address gaps and vulnerabilities in existing R/N detection capabilities will be reduced. The impact to the GNDA Analysis Sub-Project includes a reduction to Threat Elicitations and the Radiological/Nuclear Risk Analysis Model (RNRAM). The reduction in this account will allow DNDO to better focus its efforts towards Administration and DHS priorities. The impact to the GNDA Solutions Management Sub-Project affects Aviation Solutions Management. DNDO has been leading efforts to analyze international general aviation and air cargo operations and identify potential risk reduction enhancements. The products and tools developed through these efforts will be transferred to interagency partners with appropriate operational authorities and responsibilities to continue pursuit of these initiatives. DNDO will continue to participate in interagency working group efforts.

Program Change 2

Detection Capability Assessments: Operational Readiness Assessment

Description

The Operational Readiness Assessment Program is DNDO's primary means to objectively assess the operational effectiveness and performance of DNDO programs and deployed R/N detection capabilities at the FSLTT levels in support of the GNDA. The decrease will come from the Program Assessments project, which performs objective reviews of the effectiveness of GNDA programs and their associated activities.

Justification

The $1.4 million would have augmented existing in-house capabilities to support the assessment mission of evaluating GNDA programs, systems and operations. However, an internal review showed the project could sustain its current level of effort and meet requirements.

Performance

DNDO will continue to assess, at their present state, current and future GNDA programs and their ability to enhance R/N detection and improve the overall GNDA.

Program Change 3

Detection Capability Development: On Dock Rail and Aerial Detection

Description

The Detection Capability Development Program incorporates the user requirements of DHS's operational components into R/N detection systems. Ports with "on-dock rail," in which maritime cargo containers are transferred from ships to railways, have required R/N scanning solutions that are different from the standard practice of scanning truck-borne containers as they depart from seaports. Aerial Detection is a planned program to identify, acquire and deploy a detection capability via an aircraft-borne system to intercept illicit radiological threats at much greater distances from major population centers and critical infrastructure with fast response times.

Justification

Funding for On Dock Rail (ODR) in FY 2018 would have been used for System Threat Review for capabilities at Maher Terminal in New Jersey, and Analysis of Alternatives and Capabilities Based Assessment for additional ports that may seek an on-dock rail solution. The reduced funding will delay installation of on-dock rail capability at any additional ports.

In FY 2018, there is no funding allocated to Aerial Detection pending the completion of operational requirements. This reduction in funding will delay the development and technology transition of the Aerial Detection program.

Performance

This program change will not impact the current R/N detection scanning rates at seaports for containerized cargo from FY 2018 – 2022. The elimination of FY 2018 funding allocated to the Aerial Detection Program will delay the start of the program until at least FY 2019.

Program Change 4

Nuclear Forensics: Technology Advancement and Operational Readiness

Description

The Nuclear Forensics Technology Advancement program addresses the pre-detonation materials forensics capability development mission. This program improves our national ability to analyze, characterize, and ultimately trace nuclear materials back to their

source. The Nuclear Forensics Operational Readiness Program provides centralized planning, evaluation, and stewardship of nuclear forensics capabilities through interagency coordination and integration; international collaboration; and leading joint exercises, assessments, and corrective actions.

Justification

To better focus efforts towards Administration and DHS priorities, DNDO will defer development of a new methodology, Resonance Ionization Mass Spectrometry, which is designed to improve the speed of nuclear forensics material characterizations. In addition, the characterization of nuclear materials in the U.S. inventory will be reduced.

DNDO will also reduce interagency coordination and support of nuclear forensics exercises by decreasing the number of subject matter experts from laboratories and DNDO who support planning, analysis, and evaluation of interagency exercises.

Performance

The reduction to Technology Advancement and Operational Readiness will limit the number of operational laboratories involved in the continual evaluation and analysis of special nuclear materials to enable DNDO to focus efforts towards Administration and DHS priorities. DNDO relies on a comprehensive complex of laboratories to perform analyses so they are continually exercised, certified, and validated for the Nuclear Forensics mission. This reduction will have a ripple effect on the U.S. government's operational readiness by reducing the responsiveness should there be a need. Additionally, the reduction takes away opportunities to develop the necessary personnel expertise, from undergraduate to post-doctorate levels, at the affected labs.

Program Change 5

Transformational Research and Development: Advanced Technology Demonstration

Description

The Advanced Technology Demonstration (ATD) Program transitions promising laboratory technology into performance test units that can be characterized in simulated and controlled operational environments. This program decrease will come from the High-throughput Integrated Rail Scanner (HIRS) project, which aims to develop technology to scan rail cargo at high-throughput rates using advanced non-intrusive inspection technology.

Justification

To better focus efforts towards Administration and DHS priorities, DNDO will focus efforts on basic and applied research as well as longer standing technology development projects.

Performance

The HIRS project planned to investigate both hardware and software (i.e., automated threat recognition algorithms) approaches to enhance the ability of non-intrusive inspection (NII) systems to detect nuclear threats in rail cargo. This funding reduction will require the HIRS project to focus solely on software approaches. This will limit the overall potential capability of future systems, but the HIRS project will still be able to provide an improvement in capability of commercially available systems within the planned timeline.

Research and Development
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Architecture Planning and Analysis	$15,758	$15,578	$15,937	$359
Transformational Research and Development	$64,684	$63,943	$60,581	($3,362)
Detection Capability Development	$21,029	$20,788	$15,155	($5,633)
Detection Capability Assessments	$39,503	$39,051	$34,127	($4,924)
Nuclear Forensics	$19,031	$18,813	$18,361	($452)
Total	**$160,005**	**$158,173**	**$144,161**	**($14,012)**
Discretionary - Appropriation	$160,005	$158,173	$144,161	($14,012)

Research and Development
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$664	$771	$1,003	$232
25.1 Advisory and Assistance Services	$34,501	$32,859	$38,192	$5,333
25.2 Other Services from Non-Federal Sources	$557	$796	$116	($680)
25.3 Other Goods and Services from Federal Sources	$52,551	$53,673	$44,265	($9,408)
25.5 Research and Development Contracts	$56,433	$58,924	$48,389	($10,535)
26.0 Supplies and Materials	-	-	$10	$10
31.0 Equipment	$33	$27	$46	$19
41.0 Grants, Subsidies, and Contributions	$15,266	$11,123	$12,140	$1,017
Total - Non Pay Object Classes	**$160,005**	**$158,173**	**$144,161**	**($14,012)**

Architecture Planning and Analysis – PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Architecture Planning and Analysis	-	-	$15,758	-	-	$15,578	-	-	$15,937	-	-	$359
Total	**-**	**-**	**$15,758**	**-**	**-**	**$15,578**	**-**	**-**	**$15,937**	**-**	**-**	**$359**
Subtotal Discretionary - Appropriation	-	-	$15,758	-	-	$15,578	-	-	$15,937	-	-	$359

Architecture Planning and Analysis PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$15,758		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$15,758**	**$15,578**	**$15,937**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$1,119	$2,142	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$16,877**	**$17,720**	**$15,937**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$16,877**	**$17,720**	**$15,937**
Obligations (Actual/Projections/Estimates)	$14,906	$17,720	$15,937
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Architecture Planning and Analysis – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$15,758**
FY 2016 Revised Enacted	**-**	**-**	**$15,758**
FY 2017 Annualized CR	**-**	**-**	**$15,578**
FY 2018 Base Budget	**-**	**-**	**$15,578**
Transfer from FA FSLTTS due to Common Appropriation Structure Realignment	-	-	$1,118
Total Transfers	**-**	**-**	**$1,118**
Total Adjustments-to-Base	**-**	**-**	**$1,118**
FY 2018 Current Services	**-**	**-**	**$16,696**
Architecture Planning and Analysis	-	-	($759)
Total, Program Decreases	**-**	**-**	**($759)**
FY 2018 Request	**-**	**-**	**$15,937**
FY 2017 TO FY 2018 Change	**-**	**-**	**$359**

PPA Description

The Architecture, Planning, and Analysis PPA coordinates the development of an enhanced GNDA and implementation of its domestic portion. Its objective is to improve the capability to understand, anticipate, and mitigate the risk of nuclear terrorism. These efforts enable the Department of Homeland Security (DHS) to determine and address gaps and vulnerabilities in existing R/N detection capabilities. This is accomplished through a continuous process of stakeholder engagement involving the operational Components of the Department; other Federal agencies; and state, local, tribal, and territorial (SLTT) partners to formulate and adjust program plans and investment options, on an annual basis, that addresses the threat of nuclear terrorism across the Nation's homeland security enterprise.

Adjustments to Base Justification

DNDO continues to examine and mature its implementation of the Common Appropriation Structure. As part of a review of program alignment, adversary analysis and capability integration activities and funding from the Federal, State, Local, Territorial, and Tribal Support PPA in Federal Assistance were identified as being more effectively integrated into the Architecture Planning and Analysis

PPA in Research and Development. This $1.118 million transfer would consolidate adversary analysis and capability-based planning functions with architecture, risk, and other similar functions already in the Architecture Planning and Analysis PPA. This will result in more holistic analysis products that better advance DNDO's ability to understand, anticipate, and reduce the threat of radiological and nuclear terrorism.

Architecture Planning and Analysis – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Architecture Planning and Analysis	$15,758	$15,578	$15,937	$359
Total	**$15,758**	**$15,578**	**$15,937**	**$359**
Discretionary - Appropriation	$15,758	$15,578	$15,937	$359

Architecture Planning and Analysis – PPA
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$327	$340	$340	-
25.1 Advisory and Assistance Services	$10,861	$10,798	$11,956	$1,158
25.2 Other Services from Non-Federal Sources	$557	$579	$116	($463)
25.3 Other Goods and Services from Federal Sources	$3,980	$3,834	$3,469	($365)
26.0 Supplies and Materials	-	-	$10	$10
31.0 Equipment	$33	$27	$46	$19
Total - Non Pay Object Classes	**$15,758**	**$15,578**	**$15,937**	**$359**

Architecture Planning and Analysis – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
GNDA Analysis	$5,799	$7,272	$8,479	$1,207
GNDA Solutions Management Program	$5,502	$3,666	$2,924	($742)
GNDA Planning and Reporting	$1,765	$2,433	$2,318	($115)
International Program	$2,692	$2,207	$2,216	$9
Total – Non Pay Cost Drivers	**$15,758**	**$15,578**	**$15,937**	**$359**

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. The changes in the previous table reflect the $1.118 million transfer from the Federal, State, Local, Territorial, and Tribal Support PPA and the $0.759 million program reduction in the Architecture Planning and Analysis PPA. The funding transfer is made to align with DNDO's mission to prevent nuclear terrorism by continuously improving capabilities to deter, detect, respond to, and attribute attacks, in coordination with domestic and international partners. The transfer consolidates adversary analysis and capability-based planning functions with architecture, risk, and other similar functions already in the Architecture Planning and Analysis PPA. This will result in more holistic analysis products that better advance DNDO's ability to understand, anticipate, and reduce the threat of radiological and nuclear terrorism. The remaining adjustments align program funding with objectives for FY 2018 and reflect prioritization between program areas.

Architecture Planning and Analysis – PPA
Research and Development
Technology Readiness Level Exhibit

Project Description:
The DNDO Architecture, Planning, and Analysis Program coordinates the development of an enhanced GNDA and implementation of its domestic portion. These efforts enable DHS to determine and address gaps and vulnerabilities in existing R/N detection capabilities. This is accomplished through a continuous process of stakeholder engagement with other Federal agencies; operational Components of the Department; and SLTT partners to formulate and adjust plans and investment options, on a regular basis, that address the threat of nuclear terrorism across the Nation's homeland security enterprise.

Architecture, Planning, and Analysis projects advance the capability to understand, anticipate, and reduce the threat of nuclear terrorism. Each of the following contributes to the development of strategies and plans for implementing the GNDA and preventing R/N terrorism.

Sub-Projects

- **Planning and Reporting:** The GNDA Planning and Reporting Project coordinates engagement with DNDO's DHS and interagency partners for strategic and implementation planning of the GNDA, summarizing the accomplishments through reporting, and promoting interagency dialogue and engagement. This project supports fulfillment of DNDO's mandate to coordinate an enhanced GNDA by facilitating the development of strategic, implementation, and operational concepts and plans for nuclear detection programs, activities, and capabilities. Through this project, DNDO coordinates and integrates the roles, responsibilities, and collective goals and objectives of the interagency GNDA community and ensures that GNDA and other DHS R/N prevention activities are integrated into DHS policies, strategies, and plans. This project also coordinates and manages performance measure development and reporting, collaborates with DHS Components to create and deliver congressionally mandated reports such as the *GNDA Joint Interagency Review* and the DHS GNDA Strategic Plan of Investments.
- **GNDA Analysis:** The Department is responsible for conducting periodic, in-depth analysis of the GNDA to inform strategic, budgetary, and operational decisions across the Federal Government. Strategic planning and risk assessments provide the status of current detection capabilities while assessing and prioritizing proposed architectural enhancements. Deliberate planning, modeling, and analysis of the GNDA directly contribute to effective programming and budgeting decisions which contribute to making nuclear terrorism prohibitively difficult for our adversaries.
    - *Architecture Development:* The Architecture Development Project produces and maintains a model supporting DNDO's ability to analyze current GNDA capabilities, identify vulnerabilities and gaps, make prioritization decisions, and inform planning for future GNDA capabilities. It ensures the use of common terminology, capability sets,

assumptions, and constraints supporting risk and capability assessments, capabilities-based assessments (CBA), and cost-benefit analyses of proposed GNDA portfolios. The portions of the Enterprise Architectural Framework, consisting of mission architecture and related operational models that have already been developed, and are being used to determine vulnerabilities in the GNDA, identify and quantify gaps, and support the evaluation of proposed solutions. The results of the analyses have contributed to improvement of the risk model's ability to assess systemic risk, both to the U.S. from R/N attacks and in prioritization of solutions development. The Framework also ensures the use of common terminology, capability sets, assumptions, and constraints supporting risk and capability assessments, CBAs, and cost-benefit analyses of the proposed GNDA project portfolio.

- *Adversary Threat:* DNDO elicits input from the intelligence community regarding a wide range of adversary characteristics informing the risk analysis of the GNDA and developing an adversary model. In addition, DNDO facilitates interagency discussions about weapon types and yield characteristics for input into the weapons model. Updates to the weapons model incorporate an expanded threat definition of weapons and adversary methods, and higher fidelity handling of threat signatures. Intelligence from across the USG which pertains to R/N terrorism is gathered in one place, made available to other analytic efforts, and informs senior DHS leadership regarding individual events or the historical and strategic context surrounding R/N terrorism. DNDO leads the USG in its approach to assessing the technical capabilities of the adversary and the resulting weapon designs that our defensive architecture may be confronted with. Using this information, DNDO applies the threat definition to relevant programs to support risk assessments and conduct cost trade studies for individual enhancements to the GNDA or implementation of capabilities. The result is a defensive architecture that is more closely oriented towards realistic adversaries and realistic R/N weapons.
- *Risk:* To analyze and enhance the effectiveness of GNDA implementation, DNDO uses risk assessments to measure the combined effect of the threat of, vulnerability to, and consequences of radiological and nuclear terrorism. DNDO continues to develop a suite of modeling, simulation, and assessment tools to estimate the risk from particular pathways, transport modes, threat objects, and adversaries. DNDO and DHS are able to rigorously prioritize capability gaps and potential solutions and inform the department and government-wide conversations about prioritization amongst the many threats and hazards facing our Nation. The transparency of DNDO's risk model and associated analysis contributes to risk-informed decision making processes by making the assumptions and underlying analysis clear to the end users.
- *Capabilities-Based Planning:* In order to enhance the GNDA, one must first determine current capability gaps and potential vulnerabilities and then formulate recommendations and plans to mitigate them. To accomplish these analytical tasks, DNDO organizes and facilitates collaborative activities with domestic and international partners and stakeholders in the GNDA. The CBA process has been instrumental in developing recommendations for planning, coordination, and implementing of needed capabilities, operations, and information sharing to improve the detection of

nuclear or other radioactive materials out of regulatory control. Capability needs are the basis of the development of mission needs statements (MNS) and material and non-material change request documents that serve as the foundational documents for the solutions development phase. These assessments feed strategic and operational planning and help ensure cost-effective use of limited resources to address priority detection shortfalls.

- **GNDA Solutions Management:** The GNDA Solutions Management Program works with stakeholders to develop materiel and non-materiel solutions to reduce the risk from R/N threats faced by the GNDA. As a first step in the SDP, the program leverages the outputs of CBAs and other analyses to identify GNDA capability gaps and engages stakeholders, end-users, technology developers, and systems developers to capture requirements and develop actionable programmatic documents, such as MNS and concept of operations (CONOPS). These efforts focus on specific pathways, operating environments, modes of transportation, and/or specific threats.
    - *Aviation Solutions Management:* The Aviation Solutions Management Project examines ways to reduce risks from adversarial use of commercial and general aviation to conduct an R/N attack against the United States. The Aviation Solutions Management Project includes efforts to address risk within international general aviation (IGA), international commercial air cargo (ICAC), and domestic general aviation (DGA) pathways. The Aviation Solutions Management Project provides risk reduction and deterrence within IGA, ICAC, and DGA pathways against adversaries considering aviation pathways for transport of R/N weapons or materials.
    - *Interior Solutions Management:* The Interior Solutions Management Project examines the GNDA interior layer's FSLTT detection capabilities and program development. Overarching efforts focus on characterization, gathering interior layer requirements, and improving stakeholder planning and coordination. The Interior Solutions Management Project provides risk reduction and deterrence against adversaries considering interior pathways for transport of R/N weapons or materials within the United States.
    - *Land Border Solutions Management:* The Land Border Solutions Management Project gathers requirements and develops solutions to address R/N detection deficiencies and vulnerabilities at and between land border ports of entry (POE). The Land Border Solutions Management Project includes efforts to address risk within international rail and on-dock rail pathways and at border crossing and checkpoints. The Land Border Solutions Management Project seeks solutions to provide risk reduction and deterrence against adversaries considering land border pathways at and between POEs to transport R/N weapons or materials into the United States.
    - *Maritime Solutions Management:* The Maritime Solutions Management Project addresses ways to reduce the risk of an adversary using navigable waterways to conduct an R/N attack against the United States. It also provides information to facilitate and support opportunities to advocate for the enhancement of Maritime Domain Awareness with FSLTT stakeholders and partners. The Maritime Solutions Management Project seeks solutions to provide risk reduction and deterrence against adversaries considering maritime pathways for transport of R/N weapons or materials into and within the United States.

- *Cross Cutting:* The Cross Cutting Project aims to address operational gaps and vulnerabilities common to multiple mission areas and pathways. The Cross Cutting Project includes airborne radiation detection and human portable detectors. The Cross Cutting Project seeks solutions to provide risk reduction and deterrence against adversaries considering one or more of multiple pathways for transport of R/N weapons or materials into and within the United States.

- **International Project:** The GNDA is multi-layered in nature and the enhancement of the exterior layer plays a crucial role in the USG nuclear security risk mitigation strategy. Development of the GNDA requires a comprehensive understanding of existing international partner R/N detection capabilities to better inform capacity-building efforts to fill gaps in the architecture. DNDO's International Program leads USG efforts in assisting international partners in developing their own national-level R/N detection architectures, resulting in a coordinated and cost-effective approach to enhancing the exterior layer of the GNDA. DNDO coordinates the development of the exterior layer of the GNDA, centered on both characterization and prioritization of R/N detection capabilities worldwide. These efforts include targeted bilateral and multilateral outreach to foreign counterparts to raise situational awareness and enhance broader national-level R/N detection capacity building efforts.
  - *GNDA Exterior Layer Capabilities:* DNDO supports USG efforts to characterize the international GNDA – accounting for USG, international partner, and indigenous capabilities and efforts – to better guide future USG outreach and resources. This holistic characterization allows decision makers to target critical gaps while reducing unnecessary efforts or overlaps. DNDO efforts focus on conducting regional architecture analyses (to date, analyses have been completed to span the globe) in partnership with USG and multilateral partners to better understand the detection architectures in place around the world. DNDO efforts in this project area continue to make these analyses more readily available to partners to inform implementation and outreach. DNDO has led or taken a lead role in architecture analyses on every region across the globe. As a result of DNDO's efforts in this project area, USG senior leaders and foreign partners have a better understanding of global nuclear detection capabilities and are more informed to make decisions on where to receive maximum return on the limited resources committed to this mission area.
  - *International Development & Outreach:* A significant portion of the development of the external layer of the GNDA is dependent on the sovereign decisions of foreign partners to enhance their own national and regional-level detection architectures and capabilities. Through both bilateral and multilateral (e.g., Global Initiative to Combat Nuclear Terrorism (GICNT) and International Atomic Energy Agency (IAEA)) planning and engagement efforts, DNDO works with foreign counterparts to further develop the exterior layer of the GNDA by providing them the awareness and tools necessary to develop indigenous capabilities that work towards enhancing the GNDA. DNDO participates in workshops and conducts training courses to facilitate the continued development and application of nuclear detection architecture best practices and planning and implementation tools within bilateral or multilateral constructs. In FY 2018, DNDO will continue to work with international counterparts on developing and implementing detection strategies and guidelines, focusing on promoting national-level capacity building and sustainment while leveraging

lessons learned and best practices from domestic application. DNDO led the development of the four-volume *Developing a Nuclear Detection Architecture Series* through the GICNT and assisted in the development of numerous other IAEA publications related to nuclear security. These publications are a cost-effective mechanism to provide international partners the framework necessary for planning and implementation of their own national-level architectures. Through its international development and outreach project, DNDO has reached 93 countries to provide the foundational training and awareness necessary to develop and enhance global nuclear security capabilities.

FY 2016 Key Milestone Events (Prior Year)

- Planning and Reporting: Led and published the interagency GNDA Domestic Implementation Plan.
- Planning and Reporting: Led, published, and delivered to Congress on time the GNDA Joint Annual Interagency Review.
- GNDA Analysis: Developed pathway decomposition for Maritime Non-Containerized Cargo (MNCC) CBA.
- GNDA Solutions Management Program: Refined operational alternatives to reduce identified IGA vulnerabilities and prioritized options for further analysis and implementation.
- GNDA Solutions Management Program: Developed, with Federal partners, an initial prototype ICAC insider threat tool for end users, such as policy makers and operational planners, to assess insider risk within their systems, with a focus on foreign last points of departure.
- GNDA Solutions Management Program: Deployed beta-version of web-enabled Capabilities Development Framework (CDF) geographic information system GIS mapping tool for state and local assessments of R/N detection capability needs.
- GNDA Solutions Management: Completed technical analysis related to providing USBP's Border Patrol Search, Trauma, and Rescue (BORSTAR) teams and Border Patrol Tactical (BORTAC) units with R/N detection capabilities.
- International: Completed International Nuclear Detection Architecture Reports for Bulgaria, Georgia, Kazakhstan, Mongolia, Turkey, and Ukraine: Illicit Trafficking Scenarios.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Planning and Reporting: Lead the revision of the DHS GNDA Implementation Plan.
- Planning and Reporting: Lead, publish, and deliver to Congress on time the GNDA Joint Annual Interagency Review.
- GNDA Solutions Management Program: Complete a systems threat review to analyze existing detection systems in air cargo pathways at international LPODs and APOEs to identify how those systems could be leveraged during surge operations to detect R/N threats.
- GNDA Solutions Management Program: Deliver at least 15 Threat and Hazard Identification Assessment (THIRA) R/N technical assistance workshops to assist state and local stakeholders in evaluation of current R/N detection capability gaps.
- GNDA Solutions Management Program: Fully deploy the Capabilities Development Framework (CDF) mapping tool for state and local strategic planning use, including supporting THIRA and State Preparedness Report (SPR) processes.

- GNDA Solutions Management: Complete international rail commerce stream pathway analysis and prepare risk reduction solution(s) recommendation. Recommendations may include: new technologies; maturation and testing new and/or improved systems; supporting system procurement; and/or developing new techniques, procedures, and protocols which further mitigate R/N risk without disrupting the commerce stream.

FY 2018 Planned Key Milestone Events (Budget year)

- Planning and Reporting: Lead, publish, and deliver to Congress as required the GNDA Joint Annual Interagency Review.
- GNDA Solutions Management: Develop customized versions of the ICAC Insider Threat tool for specific end-users and support initial implementation of those tools.
- GNDA Solutions Management: Develop DNDO implementation strategy and plan for R/N detection baseline capability metrics.
- GNDA Solutions Management: Deliver at least 15 THIRA/SPR R/N technical assistance workshops to assist the national network of fusion analysts in evaluating and sharing R/N threat information.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$21,000	$17,000	$15,758	$15,578	$15,937
Obligations	$17,877	$16,010	$15,378	$15,578	$15,937

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
GNDA Analysis: Completed development of the Urban Area Nuclear Detection Architecture Template for the GNDA	1st QTR	2nd QTR
GNDA Analysis: Developed a high-level architecture description of the impact of the U.S. Third Coast on the GNDA	2nd QTR	3rd QTR
GNDA Analysis: Conducted capability gap (Stage 0) outreach with the USCG, as part of a biennial review of current and future capability needs analysis	1st QTR	4th QTR

Research & Development Description	Planned Start Date	Planned Completion
GNDA Solutions Management: Conducted analysis of operational alternatives to reduce identified IGA vulnerabilities	1st QTR	4th QTR
GNDA Solutions Management: Characterized the interior layer by improving the CDF assessment flexibility and placing the CDF on a web-enabled platform to improve nationwide stakeholder access to the tool	1st QTR	4th QTR
International: Co-chaired the IAEA's International Coordination Meeting to discuss good practices and challenges in developing a nuclear security detection architecture (NSDA).	1st QTR	4th QTR
FY 2017		
Planning and Reporting: Publish the DHS GNDA Implementation Plan	1st QTR	4th QTR
Planning and Reporting: Coordinate the development and approval of the DNDO Deterrence Strategy	1st QTR	4th QTR
GNDA Analysis: Conduct capabilities-based analysis on the International Commercial Air Cargo (ICAC) threat vector	1st QTR	3rd QTR
GNDA Solutions Management: Finalize detailed international rail commerce stream analysis to identify unaccounted risk mitigation activities and support potential improvements in the pathway	1st QTR	4th QTR
GNDA Solutions Management: Develop U.S. Border Patrol Checkpoint JRC and systems engineering milestone requirements related to solutions analysis.	1st QTR	4th QTR
International: Conduct one iteration of the R/N Smuggling and Detection Awareness Course for Law Enforcement in Bangkok, Thailand and one in Budapest, Hungary	1st QTR	4th QTR
FY 2018		
Planning and Reporting: Consolidate and harmonize the GNDA International and Domestic Implementation Plans	1st QTR	4th QTR
GNDA Solutions Management: Develop R/N detection baseline capability metrics to measure the development of capabilities within the GNDA interior domestic layer	1st QTR	4th QTR
GNDA Solutions Management: Continue ODR systems engineering process and detailed analysis and	1st QTR	4th QTR

Research & Development Description	Planned Start Date	Planned Completion
solution(s) selection to meet all stakeholder requirements		
GNDA Solutions Management: Conduct an AoA to assess materiel and non-materiel solutions to reduce R/N smuggling risk in the MNCC pathway	4th QTR	4th QTR
International: Conduct one iteration of the R/N Smuggling and Detection Awareness Course for Law Enforcement in Bangkok, Thailand; Budapest, Hungary; and Gaborone, Botswana.	1st QTR	4th QTR

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

Transformational Research and Development - PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Transformational Research and Development	-	-	$64,684	-	-	$63,943	-	-	$60,581	-	-	($3,362)
Total	**-**	**-**	**$64,684**	**-**	**-**	**$63,943**	**-**	**-**	**$60,581**	**-**	**-**	**($3,362)**
Subtotal Discretionary - Appropriation	-	-	$64,684	-	-	$63,943	-	-	$60,581	-	-	($3,362)

Transformational Research and Development – PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$64,684		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$64,684**	**$63,943**	**$60,581**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$5,327	$6,335	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$70,011**	**$70,278**	**$60,581**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$70,011**	**$70,278**	**$60,581**
Obligations (Actual/Projections/Estimates)	$62,844	$70,278	$60,581
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Transformational Research and Development – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$64,684**
FY 2016 Revised Enacted	**-**	**-**	**$64,684**
FY 2017 Annualized CR	**-**	**-**	**$63,943**
FY 2018 Base Budget	**-**	**-**	**$63,943**
FY 2018 Current Services	**-**	**-**	**$63,943**
Transformational Research and Development	-	-	($3,362)
Total, Program Decreases	**-**	**-**	**($3,362)**
FY 2018 Request	**-**	**-**	**$60,581**
FY 2017 TO FY 2018 Change	**-**	**-**	**($3,362)**

PPA Description

DNDO's Transformational R&D seeks to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the GNDA; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies. DNDO works closely with partners to transition technologies from research to the field, including transfer of technologies to the commercial sector for development and commercialization.

R&D investments aligned with goals and priorities outlined in the *DNDO Transformational and Applied Research Roadmap and Implementation Strategy, Fiscal Years 2016 – 2021*, are issued as competitive awards open to researchers from all sectors: government laboratories, academia, and private industry. The transformational research efforts leverage the qualities and advantages of all three sectors to develop capability. Teaming is encouraged across the sectors. Transformational R&D is carried out within four major programs: Advanced Technology Demonstration (ATD); Exploratory Research (ER); Academic Research Initiative (ARI); and the Small Business Innovation Research (SBIR) program. Each program is described in detail below along with the corresponding projects and research areas. Many research areas remain consistent from year-to-year, with ongoing work for multiple projects.

Transformational Research and Development – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Transformational Research and Development	$64,684	$63,943	$60,581	($3,362)
Total	**$64,684**	**$63,943**	**$60,581**	**($3,362)**
Discretionary - Appropriation	$64,684	$63,943	$60,581	($3,362)

Transformational Research and Development – PPA
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$106	$147	$150	$3
25.1 Advisory and Assistance Services	$4,788	$2,577	$2,371	($206)
25.5 Research and Development Contracts	$46,467	$50,716	$46,570	($4,146)
41.0 Grants, Subsidies, and Contributions	$13,323	$10,503	$11,490	$987
Total - Non Pay Object Classes	**$64,684**	**$63,943**	**$60,581**	**($3,362)**

Transformational Research and Development – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Academic Research Initiative	$11,496	$11,343	$12,403	$1,060
Exploratory Research	$21,977	$24,581	$25,045	$464
Advanced Technology Demonstration	$27,254	$24,723	$23,133	($1,590)
Small Business Innovation Research*	$3,957	$3,296	-	($3,296)
Total – Non Pay Cost Drivers	**$64,684**	**$63,943**	**$60,581**	**($3,362)**

*Small Business Innovation Research (SBIR) will be funded in FY 2018 to meet legislative requirement. SBIR Funding shown in FY 2016 and FY 2017 only reflects Transformational Research and Development funding. Actual amount of R&D set aside for small business is determined in the year of execution after assessing the appropriations, and comparison of responses to DNDO's annual announcement for proposals to DNDO mission requirements.

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. For explanation of program changes, see Justification of Program Changes.

Through the Transformational and Applied Research (TAR) Directorate DNDO manages three types of R&D: basic research, applied research, and technology development. The R&D types correspond to the Academic Research Initiative (ARI), Exploratory Research (ER), and Advanced Technology Demonstration (ATD) programs, respectively; with a portion of the total R&D set aside for small businesses. DNDO strives to maintain a balanced funding profile across the different types of R&D to ensure a robust technology pipeline that can support continual technology transition. Although not mandated, a funding profile of 20% basic research, 40% applied research, and 40% technology development has historically been effective. Within the planning cycle, this portfolio is maintained within a few percent per program. Slightly greater deviations are seen in the execution year for multiple reasons including:

- The actual cost of new proposed work (e.g., through a Broad Agency Announcement) was different than originally anticipated;
- Work was terminated because the R&D results were not as impactful as originally expected;
- An increase in current year spending could provide beneficial results such as an accelerated technology transition; or

- The logistics of contracting and the uncertainty in the budget cycle can result in certain projects being funded over different fiscal year boundaries.

Transformational Research and Development – PPA
Research and Development
Technology Readiness Level Exhibit

Project Description:

The Advanced Technology Demonstration (ATD) program performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection capabilities.

- **Problem:** There is a need to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the GNDA; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies. Following Proof of Concept demonstrations under the Exploratory Research Project, there is a need to further advance the promising technologies into the next stage of development and system-level integration.
- **Solution:** The ATD program performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection capabilities. It builds on technology concepts previously demonstrated under the ER program, research conducted by our interagency partners, or privately funded research. Through the ATD program, technology concepts are developed into prototype systems called Performance Test Units (PTU), which provide reliable and scalable performance measurements in a challenging and realistic simulated or controlled operational environment. Through this characterization process, sufficient understanding of the technology is obtained to recommend a technology transition path for the PTU to a government acquisition program, commercial system development, or additional basic and applied research.

  New ATD projects are initiated approximately yearly based on: 1) prioritized gaps in the GNDA; and 2) technological successes from the ER program, the ARI, or other private or public research programs that support the prioritized gaps. Multiple research projects are being monitored for potential transition to an ATD. The ongoing and planned ATD projects for each fiscal year are summarized in the table below followed by a brief description of each project:
- **Impact:** Through this program, technology is matured and integrated. Robust data sets are collected which define the performance envelope of the existing technology and is available to support requirements development efforts for future acquisition programs. The culminating Technology Demonstration and Characterization phase is important in that these define the tangible technological benefits that can be achieved with real-world, integrated systems. Demonstration units are an essential tool in transitioning promising technologies because they are generally the first time operational end users get to interact with a new technology.

Sub Projects

- *Shielded Nuclear Alarm Resolution (SNAR):* The SNAR sub-project develops and characterizes advanced technologies required to resolve alarms and to detect Special Nuclear Material (SNM), even when heavily shielded or masked. The project has two principal applications: 1) dramatic performance enhancement to commercially or near-commercially available x-ray nonintrusive inspection screening systems by integrating solutions directly into hardware and software to substantially reduce the number of manual inspections while increasing probability of SNM detection; and 2) targeted and chokepoint screening in multiple venues, including vehicle border crossings, checkpoints, rail, air cargo, and general aviation with rapidly relocatable inspection systems. Technologies of interest include induced fission, high energy backscatter, advanced radiography, and nuclear resonance fluorescence. By the end of the project, three separate PTUs will be built and characterized. The final report for the first PTU was completed in FY 2013 and the technology has transitioned to the Nuclear and Radiological Imaging Platform (NRIP) project (see below). The final report for the second PTU was completed in early FY 2016. In collaboration with the United Kingdom Home Office, the final report for the third PTU was completed in FY 2016.
- *Airborne Radiological Enhanced-sensor System (ARES) Project:* The ARES sub-project develops and characterizes standoff radiation measurement technology for the detection of radiological material from an airborne platform. The test bed system will demonstrate the technology to locate point-like sources in a complex and dynamic background. This technology could be used in urban, maritime, and coastal environments with a CONOPS more in line with law enforcement practices rather than past radiological mapping operations. The prototype system will be deployable on rotary winged aircraft. The system will record data that will be resampled and replayed in a computer simulation environment to characterize advanced algorithms. The algorithms will determine the presence, location, and identification of radioactive isotopes. The technology is enabled by the fusion of radiation detection with other sensing modalities (e.g., multispectral imaging, GPS, altimetry, etc.). Utilizing scintillating materials, innovative packaging, and algorithm improvements, the ARES systems will offer greater detection sensitivity, lower nuisance alarms, and simultaneously provide a greater range of operation. A technology demonstration and characterization will be completed in FY 2017 with a final report to assess technology transition potential.
- *Nuclear and Radiological Imaging Platform (NRIP):* The NRIP sub-project leverages recent advancements in the commercial sector as well as prior Transformational R&D work. By combining the merits of passive and active technologies, new systems are being developed so that a single system is able to detect radiological and nuclear threats, regardless of the amount of shielding or the complexity of cargo, in primary mode with minimal impact to the flow of commerce. The technologies being investigated include muon tomography, which use muons to image cargo without requiring a man-made radiation source; radiation detectors integrated into commercially available radiographic imaging systems; and radiation detectors integrated into a previously demonstrated SNAR PTU that utilizes high energy backscatter and photo fission. By looking at unique data signatures and methodologies for fusing active interrogation signatures with the passive detection capabilities, the

holistic system has advanced detection capabilities to potentially solve the shielded SNM problem at chokepoints. In addition to the regular ATD characterization in a simulated operational environment, these systems will also undergo testing in a controlled, but realistic, operational environment. This will provide a unique data set to better estimate nuisance alarm rates and additionally provide data on operational utility. The demonstration and characterization of the commercial PTU was completed in FY 2014; the muon tomography-based PTU evaluation was completed in 2015. The characterization of the SNAR-inspired PTU will be completed in FY 2017. The characterization of the Passport NRIP system at Conley Terminal will be completed in FY 2017 and an operational pilot with CBP at Conley Terminal is planned for FY 2018.

- *Radiation Awareness and Interdiction Network (RAIN):* The RAIN sub-project, an initiative closely tied to the Securing the Cities program, is intended to develop and characterize technologies for monitoring free-flowing traffic on highways and on-ramps for nuclear or other radioactive threat materials. RAIN technologies will couple networked radiation sensors with vehicle detection and identification systems to allow monitoring and tracking of vehicles passing by the systems at highway speeds. Multiple technical approaches are being explored and integrated during the effort, ranging from sophisticated networked radiation detection arrays combined with machine vision to the integration of radiation detectors into all-electronic highway tolling systems. In FY 2013 and early FY 2014, the technical support team consisting of government and national laboratory scientists worked with the New York Police Department to gather the operational requirements, conditions and constraints in monitoring traffic and vehicles approaching a protected city via highways, bridges, and tunnels. Analysis of these vignettes helped generate the required performance and suitability requirements for the ATD systems. Early in FY 2014, a solicitation was issued for proposed research and development of these technologies. Three technologies were subsequently selected, with three awards made in FY 2014. The system developers recently completed critical design reviews of their approaches, and are now developing their PTUs that will be used in government characterization in FY 2017. The effort will culminate in an operational demonstration of one or more of the technologies at a location(s) as determined by the user group, potentially extending into FY 2018.
- *Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE):* The ERNIE system is a computer-based analysis system that uses advanced signal processing, statistical analysis, multi-regression, and statistical machine learning (ML) algorithms to analyze RPM scans. Scan data is ingested in either real-time from an RPM or batch processed from historical records, and key features are extracted. These features are supplied to the ML algorithms which are trained through repeated exposure to sample incidents and are subsequently able to return an assessment (classification) of whether the conveyance should be released or inspected. A preliminary operational assessment of the ERNIE prototype was conducted in FY 2014 at the Port of Tacoma with impressive results in reduced nuisance alarm rates. ERNIE development was transferred to an ATD program in FY 2015. A formal operational assessment was completed in FY 2016, with the final report provided in January 2017. The outcome of the assessment supported a technology transition of ERNIE from DNDO's Transformational and Applied Research Directorate to its Product Acquisition and Deployment Directorate.

- *Wearable Intelligent Nuclear Detection (WIND) Project:* The ability to interdict a moving threat or localize an emplaced threat during wide area search missions is a major technical challenge. The WIND sub-project will develop and characterize a highly-modular, multi-purpose, and human-portable (e.g., backpack or vest) system that greatly advances the ability to detect and interdict threats during wide area search missions. The technical approach will merge two major sources of information to develop the design specifications. The first approach will utilize threat analysis to compare several critical design options, including the enhanced sensitivity of state-of-the-art radiation anomaly detection algorithms. The second approach will survey end users to gather initial requirements and then will proceed to spiral development getting end user input along the way to develop a balanced and flexible system. To achieve the objective, a number of advanced capabilities will be fully characterized, to include spectral anomaly detection, spatial mapping/tracking, sophisticated background subtraction, and sensor fusion. In FY 2016, a solicitation was issued for the proposed research and development and four awardees selected across two topic areas. In FY 2017, each proposed device design will undergo review according to the performance assessment methods described above. In FY 2018, each of the four awardees will assemble a performance test unit to undergo a Characterization Readiness Review in preparation for demonstration and characterization for technology transition potential in FY 2019.
- *Mobile Urban Radiation Search (MURS):* The goal of the MURS sub-project is to efficiently migrate the knowledge and technology of previous Transformational R&D stand-off and long range detection projects into a production-ready, compact, and modular radiation imager for a van-based platform coupled to an advanced contextual sensor package. The program will emphasize the required operational performance and suitability assessment of technology rather than traditional technology characterization. As an interested end user, the Federal Bureau of Investigation is partnered with DNDO to regularly exercise the MURS system to provide realistic operational constraints and feedback during the spiral development. The MURS Project also leverages the Defense Advanced Research Projects Agency SIGMA Program to facilitate spiral development and system integration within a network of detectors. This will enable planning for future developmental programs in support of DNDO missions such as the Mobile Detection Deployment Units (MDDU) and other inter-agency surge capabilities. Technology development began in FY 2015 with demonstration of the first spiral prototype in FY 2017. The project will continue in FY 2018 with the development of an optimized prototype by a commercial vendor. It will conclude in FY 2019 with the demonstration and operational assessment of the optimized prototype.
- *High-Throughput Integrated Rail Scanner (HIRS):* The planned HIRS sub-project will investigate the technologies required to enable high throughput non-intrusive inspection of rail cargo with improved performance over currently deployed systems. These technologies will enable higher penetration of cargo while minimizing radiation dose without hindering rail operating environments. Automated algorithms with material discrimination for detection of SNM in this scanning environment will also be developed and evaluated. It is anticipated that the results from this program will be leveraged by CBP for future rail

scanning operations. This project will initiate in FY 2017. Prototypes will be characterized in FY 2020 leading to a technology transition in FY 2021.

- *SIGMA:* The SIGMA sub-project is a multi-pronged approach to the wide area monitoring and search problem for R/N threats. The central tenets are (1) foster commercial availability of inexpensive, wearable detectors far superior to available spectroscopic "pagers" (SPRDs); (2) incorporate cutting edge, USG-funded detection algorithms; and (3) link the detectors via smartphone to a cloud network and provide system-level monitoring in addition to local read-out. The project was initiated by Defense Advanced Research Project Agency (DARPA). In FY 2018, SIGMA will begin the transition to DNDO, while being jointly administered by DARPA and DNDO.

FY 2016 Key Milestone Events (Prior Year)

- SNAR Sub-Project: Completed the final report of the second SNAR system.
- NRIP Sub-Project: Completed the final characterization report on the Multi-Mode Passive Detection System.
- RAIN Sub-Project: Completed vendor development and test phase and conducted characterization readiness review for the three developed technologies. Selected and prepared a site for government characterization activities. Coordinated with New York Police Department stakeholders on the operational demonstrations of the systems.
- MURS Sub-Project: Completed integration of first MURS prototype. Deployed MURS prototype with Federal Bureau of Investigation (FBI) and Department of Energy (DOE) partners at the Nuclear Security Summit.
- WIND Sub-Project: Executed kick-off with selected vendor(s) and begin work towards concept preliminary design. Conducted first spiral development phase with vendors to facilitate early incorporation of end-user feedback.
- ERNIE Sub-Project: Completed operational pilot at Virginia International Gateway.
- ARES Sub-Project: Completed vendor reports on aerial detection hardware and algorithms.

FY 2017 Planned Key Milestone Events (Year of Execution)

- SNAR Sub-Project: Complete SNAR program final report that will present a full compilation of results from technologies characterized by the program.
- NRIP Sub-Project: Conduct Technology Demonstration and Characterization of Passport NRIP system at Conley Terminal.
- HIRS Sub-Project: Initiate project planning and the derivation of the R&D requirements for next generation rail cargo scanning non-intrusive inspection (NII) technologies enabling increased penetration and high throughput without impeding rail operations.
- RAIN Sub-Project: Conduct government characterization of RAIN performance test units that successfully complete a characterization readiness review. Work with stakeholders to plan and execute an operational demonstration of the systems around New York City.

- MURS Sub-Project: Integrate MURS system into an FBI vehicle to further operational development. Participate in FBI deployments for the Presidential Inauguration, State of the Union Address, and other events to refine the operational usability of the developmental technologies.
- WIND Sub-Project: Complete Spiral development event to provide end-user feedback on initial vendor designs; and complete supporting STR to evaluate effectiveness of proposed vendor designs in detecting threats. Finalize analysis and characterization plans to evaluate prototype performance during Technical Demonstration and Characterization in FY 2019.
- ARES Sub-Project: Complete Government characterization of ARES system algorithms, and generate the final characterization report.
- ERNIE Sub-Project: Complete Operational Assessment report.

FY 2018 Planned Key Milestone Events (Budget year)

- NRIP Sub-Project: Operational pilot with CBP at Conley Terminal; complete the NRIP program final report.
- HIRS Sub-Project: Release Broad Agency Announcement.
- RAIN Sub-Project: Operational demonstration of RAIN system at Lincoln Tunnel, New York.
- MURS Sub-Project: License MURS developments to a commercial vendor and include the technology in product acquisition analysis of alternatives for federal acquisition.
- WIND Sub-Project: Complete critical design reviews with WIND vendors. Perform Characterization Readiness Review in preparation for Technical Demonstration and Characterization in FY 2019.
- ERNIE Sub-Project: Initial phased deployment in conjunction with CBP.
- SIGMA Sub-Project: Complete deployment of SIGMA to New York/New Jersey (NY/NJ) Port Authority.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$27,117	$23,672	$27,254	$24,723	$23,133
Obligations	$27,117	$23,572	$21,489	$24,723	$23,133

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Shielded Nuclear Alarm Resolution (SNAR)	2008	2017
Airborne Radiological Enhanced-Sensor System (ARES)	2012	4th QTR
Nuclear and Radiological Imaging Platform (NRIP)	2012	2018
Radiation Awareness and Interdiction Network (RAIN)	2014	2017
Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)	2014	2017
Wearable Interdiction Nuclear Detection (WIND) Mobile Urban Radiation Search (MURS)	2015 2015	2018 2019
FY 2017		
Shielded Nuclear Alarm Resolution (SNAR)	2008	2017
Nuclear and Radiological Imaging Platform (NRIP)	2012	2018
Radiation Awareness and Interdiction Network (RAIN)	2014	2017
Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)	2014	2017
Wearable Interdiction Nuclear Detection (WIND)	2015	2018
Mobile Urban Radiation Search (MURS)	2015	2019
High-Throughput Integrated Rail Scanner (HIRS)	2017	2021
FY 2018		
Nuclear and Radiological Imaging Platform (NRIP)	2012	2018
Wearable Interdiction Nuclear Detection (WIND)	2015	2018
Mobile Urban Radiation Search (MURS)	2015	2019
SIGMA	2018	2019
High-Throughput Integrated Rail Scanner (HIRS)	2017	2021

Type of Research

Applied

Technology Readiness Level

The Advanced Technology Demonstration program generally matures technology from TRL 5 to 7.

Transition Plans

The ATD project develops demonstration units that may result in several transition outcomes. They lead to the possibility of direct commercialization. They provide the basis for forming Technical Transition Agreements with DNDO for federal acquisition. They also identify component technologies that require further maturation under the Exploratory Research project.

Project Description:

The Exploratory Research (ER) program explores innovative, high-risk technologies that address gaps in the GNDA, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities.

- **Problem:** There is a need to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the GNDA; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies.
- **Solution:** The ER program explores innovative, high-risk, early to later-stage technologies. Specifically, the ER program researches technologies and techniques that:
  - Address capability gaps and weaknesses in the GNDA;
  - Provide substantial performance improvement and/or cost reduction of R/N detection capabilities; and
  - Improve nuclear forensics capabilities.
- **Impact:** Capabilities developed under the ER program can provide enabling technologies in support of the ATD program or directly spur commercial development.

Sub Projects

- *Materials Research and Support Technology (Materials):* The Materials Sub-Project has the technical objective of discovering new gamma-ray and neutron sensing materials, significantly improving existing materials and improving or developing new signal readout methods for these materials.
- *Radiation Detection Technology (Radiation):* The Radiation Sub-Project emphasizes investigating novel approaches to greatly improve the ability to detect, identify, and locate threat materials based on their intrinsic radiological signatures.
- *Shielded SNM (Shielding):* The Shielding Sub-Project addresses the critical challenge of being able to detect SNM and other threats even when heavily shielded or masked.
- *Advanced Analytics (Analytics):* The Analytics Sub-Project utilizes advanced signal processing and cutting-edge analyses to greatly enhance the ability to detect, locate, track, and identify potential threat materials and devices across a broad range of environments.
- *Nuclear Forensics (Forensics):* The Forensics Sub-Project directly coordinates with DNDO's NTNFC mission to execute research and development to discover new forensics signatures of R/N material and to also develop the tools enabling comprehensive and timely analytical results.

FY 2016 Key Milestone Events (Prior Year)

- Initiated six new R&D activities under the ER program addressing the challenging gaps in the GNDA and TNF.

- Completed 19 Feasibility Evaluations and nine Proof of Concept Demonstrations for technologies addressing the challenging gaps in the GNDA and TNF.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Initiate up to 17 new R&D activities under the ER program addressing the challenging gaps in the GNDA and TNF.
- Transition technologies to Advanced Technology Demonstrations or commercial development as needed.

FY 2018 Planned Key Milestone Events (Budget year)

- Initiate up to 20 new R&D activities under the ER program addressing the challenging gaps in the GNDA and TNF.
- Transition technologies to Advanced Technology Demonstrations or commercial development as needed.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$25,337	$24,126	$21,977	$24,581	$25,045
Obligations	$25,337	$23,847	$21,331	$24,581	$25,045

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Discrete Depth Reconstruction Algorithm for Radiography	4th QTR	2nd QTR FY17
Wafer-Level Processing of thallium bromide (TlBr)	4th QTR	3rd QTR FY19
DFM for Low-Cost Processing and Packaging of Scintillators	4th QTR	4th QTR FY19
Pre-Processing Module for Gamma-ray Spectra	4th QTR	4th QTR FY19
Modular High-Fidelity Calibration of Gamma-ray Spectra	3rd QTR	3rd QTR FY19
PreCalc Simulation of Pu Processing	4th QTR	4th QTR FY21
FY 2017		
GADTR Algorithm for Radiography	1st QTR	4th QTR FY18
Automated Fabrication Chain for TlBr	1st QTR	1st QTR FY20
New Starts: Future Solicitation Topics	4th QTR	4th QTR FY20
FY 2018		
New Starts: Future Solicitation Topics	4th QTR	4th QTR FY21

Type of Research

Applied

Technology Readiness Level

Levels 2-5

Transition Plans

Successful ER technologies and concepts may transition to support subsequent ATD projects or directly spur commercial development.

Project Description:

The Academic Research Initiative (ARI) program has two primary objectives: 1) Advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) Develop the next generation workforce in the nuclear sciences, engineering, and related fields.

- **Problem:** Radiological and nuclear detection and nuclear forensics is multi-disciplinary. Areas traditionally associated with R/N expertise have aging subject matter experts and shrinking funding. Areas not traditionally associated with R/N expertise can provide new perspectives but are not necessarily aware of their potential impact.
- **Solution:** Provide continued investment in fundamental science, engineering, and related fields to build capability at the university level. Students supported by the project are provided funding to help them in their work toward undergraduate and graduate degrees. The ARI program is also reaching out to non-traditional areas to solicit their ideas to solving R/N detection and forensics challenges.
- **Impact:** Since the ARI program was started in 2007, it has awarded over 100 grants to more than 55 academic institutions and sponsored over 160 students. These grants have resulted in over 580 journal publications which have increased the fundamental knowledge in areas such as nuclear engineering, physics, and chemistry, as well as other disciplines not traditionally associated with R/N detection like social sciences, deterrence theory, and applied mathematics.

The ARI Program follows established academic practices of peer review and competitive research awards. These practices include conducting an annual program review that enables faculty and student researchers funded by these competitively awarded DHS grants to present their latest finding to both DHS program managers as well as their peers. Presentations follow accepted practices used at scientific conferences: professors, post-doctoral research associates and students give scheduled talks in topic area sessions; students present posters at forums designed to foster face-to-face interactions with researchers.

Sub Project

- *Materials* – Research in this area focuses on high-risk, long-term research aimed at developing greatly improved radiation detector materials for gammas and neutrons that are highly sensitive, selective, low-cost, and rugged. This research aims to understand the fundamental properties of radiation sensing materials, such as mechanisms of light production in scintillator materials and charge mobility and lifetimes in semiconductor materials.
- *Advanced Analytics* – This sub-project investigates innovative data processing and analysis techniques that will lead to major performance improvements through state-of-the-art computational methodologies. Current and prior research in this area has included algorithm development for real-time gamma-ray imaging and radionuclide identification and application of machine learning to facilitate mobile search/detection performance. The research also includes advances in simulation and modeling

techniques to provide early understanding of the operational benefits of new threat detection approaches or background suppression.

- *Nuclear Forensics* – This sub-project investigates advanced analytical techniques used to determine the processing history and transit route of pre-detonation nuclear materials. Research emphasis includes identifying ways to improve analytical techniques and methodologies (e.g., speed, accuracy, and precision) for determining the physical, chemical, radiological, or morphological properties of nuclear or other radioactive materials. Objectives include determining the specific processing the material underwent, geographic origins, transport pathways, and intended use.
- *Radiation Techniques* – Research in this area explores radically new approaches to threat detection, eventually leading to sensor or detection system concepts that are highly sensitive to R/N signatures and selective in their ability to distinguish and locate these materials from naturally occurring background radiation. This includes fundamental research into new detection system concepts that provide new insights in how threat materials can be detected even in challenging pathways.
- *Shielded SNM Detection* – This research area includes investigations to overcome the challenge of detecting shielded SNM, principally through advanced or enhanced nonintrusive inspection or active interrogation approaches for cargo scanning, vehicle scanning, and human-portable scanning applications. Fundamental research in this area addresses a range of studies to augment conventional nonintrusive inspection approaches including: 1) transformational low-power, low-weight, high-yield neutron and gamma-ray producing sources; 2) high-efficiency, fast-recovery, low-cost detectors for active detection; 3) novel active interrogation inspection concepts; and 4) investigations into unique signatures and fundamental data associated with active detection methods such as nuclear resonance fluorescence.

FY 2016 Key Milestone Events (Prior Year)

- Funded 46 research efforts at 31 universities to advance fundamental knowledge to address long-term, high-risk challenges in R/N Detection and Forensics.
- Issued a Notice Of Funding Opportunity (NOFO) with four topic areas and awarded 10 new research grants.
- Held annual ARI Program Review which hosted 46 grants to present their research to DNDO and interagency audiences.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Hold annual ARI Program Review which will host 45 grantees to present their research to DNDO and interagency audiences.
- Fund 45 research efforts at 29 universities to address long-term, high-risk challenges in R/N Detection and Forensics.

FY 2018 Planned Key Milestone Events (Budget year)

- Release a NOFO announcement to solicit new proposals for research, and award up to 15 new grants.
- Hold annual ARI Program Review to host over 40 grants to present their research to DNDO and interagency audiences.
- Fund over 40 research efforts at over 30 universities to address long-term, high-risk challenges in R/N Detection and Forensics.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$9,834	$10,612	$11,496	$11,343	$12,403
Obligations	$9,831	$10,612	$9,849	$11,343	$12,403

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Synthesis and Evaluation of Novel Plastic Scintillator Materials	4th QTR	4th QTR FY21
Methylammonium Lead Halide Semiconductor for Dual Gamma/Neutron Sensing	4th QTR	4th QTR FY21
Investigation of Detectors, Algorithms, and Systems for SNM Detection	4th QTR	4th QTR FY21
Portable, kHz Laser Driven Accelerator	4th QTR	4th QTR FY21
Compact High Repetition Rate Laser Driver for Detection of SNM	4th QTR	4th QTR FY21
Fast Neutron Detection for Active Interrogation	4th QTR	4th QTR FY21
Active Interrogation with Superheated Emulsions	4th QTR	4th QTR FY21
Comprehensive Modeling of Detector Performance to Support Threat Detection at Checkpoints	4th QTR	4th QTR FY21
Enhancing Search Capabilities by Fusing Radiological and Non-Radiological Signatures	4th QTR	4th QTR FY21
Machine Learning of Nuclear Forensic Data	4th QTR	4th QTR FY21
FY 2017		
No New Starts in FY 2017		

Research & Development Description	Planned Start Date	Planned Completion
FY 2018		
Notice of Funding Opportunity for up to 15 new grants		

Type of Research

Basic

Technology Readiness Level

Level 1

Transition Plans

The ARI program funds grants that are low TRL (1-3). These grants often are investigating fundamental concepts and only start to develop applications for the technology. Research executed in ARI grants helps determine the feasibility of the technology to help the mission. Those concepts and technologies that show feasibility can transition to Exploratory Research for further development, either from additional development in academia or the commercial sector.

Project Description:

The Small Business Innovation Research (SBIR) program enables technological innovation by strengthening the role of small business concerns in federally funded R&D. The DNDO SBIR program is specifically focused on meeting Federal research and development needs for R/N detection.

- **Problem:** There is a need to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the GNDA; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies.
- **Solution:** The SBIR program stimulates the technological innovation by strengthening the role of innovative small business concerns in federally funded R&D. The goals of the program include:
  - Stimulate technological innovation.
  - Meet Federal research and development needs.
  - Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons.
  - Increase private-sector commercialization of innovations derived from Federal research and development funding.
- **Impact:** The DNDO SBIR program transitions near-term solutions, supporting the gaps in the GNDA, into a commercial product or service.

Under the SBIR Program, Phase I efforts are six months long and result in a feasibility evaluation. Phase II efforts are two years long and result in a Proof of Concept Demonstration. The final phase, Phase III, transitions the new technology to a commercial product.

Sub Projects

- *Embedding of Advanced Search Technique for Detect, Locate, and Track for Pedestrian-based Search*: Advancement of search techniques to improve the ability to localize and track a radiation source anomaly.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:* Aims to shrink the footprint for support infrastructure necessary to run high energy x-ray sources.
- *Stable Semiconductor Modules as Core Component in Pager Radiation Detectors*: Development of an advanced core detector module for the next generation of radiation pager detectors.
- *Mass/Shielding Anomaly Passive Detector Module*: Develop an innovative system to detect anomalous dense masses in conveyances without the use of irradiation technologies.
- *Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization*: Development and demonstration of a user-friendly and straightforward smartphone/smart device toolkit for radiation detection, identification, and localization based on the presence of a simulated or virtual radiological source.

- *Plastic Composite Based Scintillators for MultiSignature Radiation Detectors*: Demonstration of a simple-to-fabricate-and-integrate detector technology that combines gamma and neutron sensitivity with good efficiency at a reduced cost compared to the current commercial-off-the-shelf (COTS) scintillators.
- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement*: Development and commercialization of a portable accelerator for detection of shielded SNM and replacement of radiological gamma isotope sources currently used for commercial non-medical applications.
- *Accelerated Crystal-Size Scale-Up of Thallium-based Scintillator*: Aims to develop a new gamma- and neutron-detecting scintillator material with high energy resolution and detection efficiency, and the "scaled-up" processes necessary to produce material crystals of a marketable size.
- *Unattended Radiation Detection Systems*: Aims to develop a system capable of radiation detection and analysis, capturing relevant contextual information (e.g., video or pictures) from the surrounding environment, and transmitting the all relevant information, but have low-energy requirements to facilitate long periods of operation without direct operator interface.

FY 2016 Key Milestone Events (Prior Year)

- Initiated seven SBIR Phase I, five SBIR Phase II, and one SBIR Phase III projects of research capable of meeting GNDA end-user needs.
- Completed seven Feasibility Evaluations and six Proof of Concept Demonstrations.
- Transitioned new technologies to the open market or GNDA end-users.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Initiate up to six SBIR Phase I, four SBIR Phase II, and one SBIR Phase III projects of research capable of meeting GNDA end-user needs.
- Conclude SBIR Phase I projects initiated in FY 2016.
- Conclude SBIR Phase II projects initiated in FY 2015.
- Transition new technologies to the open market or GNDA end-users.

FY 2018 Planned Key Milestone Events (Budget year)

- Initiate up to six SBIR Phase I, four SBIR Phase II, and one SBIR Phase III projects of research capable of meeting GNDA end-user needs.
- Conclude SBIR Phase I projects initiated in FY 2017.
- Conclude SBIR Phase II projects initiated in FY 2016.
- Transition new technologies to the open market or GNDA end-users.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$1,991	$2,046	$3,957	$3,296	
Obligations	$1,991	$2,045	$3,957	$3,296	

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system. Small Business Innovation Research (SBIR) will be funded in FY 2018 to meet legislative requirement. Actual amount of R&D set-aside for small business is determined in the year of execution after assessing the appropriations, and comparison of responses to DNDO's annual announcement for proposals to DNDO mission requirements.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Phase I: Smartphone-based Radiation Analysis and Personnel Training Toolkit for Operators	4th QTR	2nd QTR FY17
Phase I: Radiation and Nuclear Detection Smart-device User Interface and Training Suite	4th QTR	2nd QTR FY17
Phase I: Multi-Signature Composite Detector	4th QTR	2nd QTR FY17
Phase I: Large Volume Composite Scintillators	4th QTR	2nd QTR FY17
Phase I: Plastic-Crystal Composite Scintillator for Multi-Signature	4th QTR	2nd QTR FY17
Phase I: Portable Linear Accelerator for Replacement of Radioactive Sources	4th QTR	2nd QTR FY17
Phase I: The Accelerator in a Suitcase for Isotope Replacement	4th QTR	2nd QTR FY17
Phase II: Shielded SNM Detection with Gravity Gradiometry	3rd QTR	3rd QTR FY18
Phase II: Personal Neutron Detector Based on Cadmium Telluride	3rd QTR	3rd QTR FY18
Phase II: Personal Semiconductor Neutron Detector Based on Lithium Indium Diselenide	3rd QTR	3rd QTR FY18
Phase II: Stable Tl-Based Semiconductor Modules for Radiation Detection	3rd QTR	3rd QTR FY18

Research & Development Description	Planned Start Date	Planned Completion
Phase II: Thallium Bromide Detectors for Radiation Pagers	3rd QTR	3rd QTR FY18
Phase III: Embedded Algorithms for Localization and Tracking	4th QTR	3rd QTR FY18
FY 2017		
Phase III: Portable High-Intensity X-Ray Source Based on a 10 MeV Superconducting Electron Linac	3rd QTR	1st QTR FY19
Phase I New Start: Accelerated Crystal-Size Scale-Up of Thallium-based Scintillator	3rd QTR	1st QTR FY18
Phase I New Start: Unattended Radiation Detection Systems	3rd QTR	1st QTR FY18
Phase II: Phase II Contracts Resulting from FY 2016 Phase I Activities	3rd QTR	3rd QTR FY19
FY 2018		
Phase I New Starts: Future Solicitation Topics	3rd QTR	1st QTR FY19
Phase II: Phase II Contracts Resulting from FY 2017 Phase I New Starts	2nd QTR	2nd QTR FY20

Type of Research

Developmental

Technology Readiness Level

Levels 4-7

Transition Plans

The primary objective of the SBIR program, at the whole-of-government level, is for new innovative products to reach the consumer market towards one or more identified end users – i.e., "commercialization." The DNDO SBIR program also seeks projects which can meet R&D needs identified by end-users and analysts, as well as the development of components which can be integrated into larger projects like Advanced Technology Demonstrations. Aspects of the technologies developed under SBIR will support and can further augment technologies of the Exploratory Research Program and Advanced Technology Demonstration program.

Detection Capability Development - PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Detection Capability Development	-	-	$21,029	-	-	$20,788	-	-	$15,155	-	-	($5,633)
Total	**-**	**-**	**$21,029**	**-**	**-**	**$20,788**	**-**	**-**	**$15,155**	**-**	**-**	**($5,633)**
Subtotal Discretionary - Appropriation	-	-	$21,029	-	-	$20,788	-	-	$15,155	-	-	($5,633)

Detection Capability Development-PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$21,029		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$21,029**	**$20,788**	**$15,155**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$9,837	$3,878	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$30,866**	**$24,666**	**$15,155**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$30,866**	**$24,666**	**$15,155**
Obligations (Actual/Projections/Estimates)	$26,360	$24,666	$15,155
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Detection Capability Development – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$21,029**
FY 2016 Revised Enacted	**-**	**-**	**$21,029**
FY 2017 Annualized CR	**-**	**-**	**$20,788**
FY 2018 Base Budget	**-**	**-**	**$20,788**
FY 2018 Current Services	**-**	**-**	**$20,788**
Detection Capability Development	-	-	($5,633)
Total, Program Decreases	**-**	**-**	**($5,633)**
FY 2018 Request	**-**	**-**	**$15,155**
FY 2017 TO FY 2018 Change	**-**	**-**	**($5,633)**

PPA Description

The Detection Capability Development Program incorporates the user requirements of DHS's operational components into R/N detection systems. It achieves this by coordinating its integrated lifecycle management and systems engineering lifecycle activities with the end-user community and managing the task execution of DNDO's SDP.

Recognizing that innovation can originate in a variety of sectors, DNDO has adopted a "commercial first" approach that gives preference for solutions available in the private sector marketplace. Using this approach, DNDO can leverage industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

Adjustments to Base Justification

Not Applicable

Detection Capability Development – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Detection Capability Development	$21,029	$20,788	$15,155	($5,633)
Total	**$21,029**	**$20,788**	**$15,155**	**($5,633)**
Discretionary - Appropriation	$21,029	$20,788	$15,155	($5,633)

Detection Capability Development – PPA
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$17	$22	$21	($1)
25.1 Advisory and Assistance Services	$8,812	$9,682	$7,129	($2,553)
25.2 Other Services from Non-Federal Sources	-	$217	-	($217)
25.3 Other Goods and Services from Federal Sources	$10,043	$10,867	$8,005	($2,862)
25.5 Research and Development Contracts	$2,157	-	-	-
Total - Non Pay Object Classes	**$21,029**	**$20,788**	**$15,155**	**($5,633)**

Detection Capability Development – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
RPM Replacement	$4,105	$4,875	$6,292	$1,417
On Dock Rail	$5,414	$3,250	$0	($3,250)
International Rail	$1,646	$3,850	$3,357	($493)
Maritime Non-Containerized Cargo	$0	$5,094	$2,790	($2,304)
Small Vessel Standoff Detection	$0	$3,719	$2,216	($1,503)
Other Costs	$9,864	$0	$500	$500
Total Non Pay Cost Drivers	**$21,029**	**$20,788**	**$15,155**	**($5,633)**

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. For explanation of program changes, see Justification of Program Changes.

Detection Capability Development – PPA
Research and Development
Technology Readiness Level Exhibit

Project Description:

The Detection Capability Development Program incorporates the user requirements of DHS's operational components into R/N detection systems. It achieves this by coordinating its integrated lifecycle management and systems engineering lifecycle activities with the end-user community and managing the task execution of DNDO's SDP.

Recognizing that innovation can originate in a variety of sectors, DNDO has adopted a "commercial first" approach that gives preference for solutions available in the private sector marketplace. Using this approach, DNDO can leverage industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

Sub Project:

- *3He Alternative Implementation Backpack (HAIBP):* The ^{3}He Alternative Implementation Backpack (HAIBP) program is a pre-ADE 2A program using test and evaluation results to integrate ^{3}He alternative neutron detection technologies into deployable detection systems. The National shortage of ^{3}He requires DNDO to procure an alternative backpack solution for radiological and nuclear (R/N) detection. *DHS Special Notice Regarding Future Use of Helium-3 (^{3}He) Gas for Neutron Detection*, May 2014, dictates that R/N Detection manufacturers pursue alternative He^{3} solutions. ^{3}He is integral to neutron detection in R/N detection backpacks. This project will identify and facilitate the development of ^{3}He alternative R/N detection technology that transitions DHS away from ^{3}He -dependent systems. The ^{3}He alternative solution will result in the fielding of a wearable R/N detector system with expansion capability to perform identification.
- *Radiation Portal Monitor Replacement Program (RPM RP):* The Radiation Portal Monitor Replacement Program (RPM RP) is a pre-ADE 3 program to identify solutions that mitigate GNDA risks resulting in a partial replacement of fixed RPM capabilities, as well as identify improved technology solutions for currently deployed fixed RPMs. A follow-on program under the RPMRP, identified as Program 1, will investigate using open systems architecture to recapitalize additional portions of the legacy RMP fleet in the future. The current RPM fleet does not support remote operations at high volume sea POEs and requires additional resources to adjudicate alarms. Additionally, there is current shortage of systems to support port expansions and reconfigurations. This project will provide 200 upgraded RPMs at CBP identified high-priority sites. The upgrades will provide reduced alarm rates, set the conditions for remote operations, improve operational efficiencies, and improve flow of commerce.

- *On Dock Rail (ODR) Program:* On Dock Rail (ODR) is a pre-ADE 3 program intended to provide increased scanning and detecting efficiencies while screening for R/N material entering the United Sates at sea ports of entry via cargo containers. Current ship to rail container offloading procedures at the Port of Los Angeles/Long Beach (TraPac), Port of Tacoma (PoT) Pierce County Terminal (PCT) (and potentially other terminals, including NY/NJ Maher Terminal Port) include placing single containers on the ground prior to transfer to rail. The containers are then scanned for R/N material by CBP officers using the mobile Radiation Portal Monitors (mRPM). This procedure unnecessarily consumes time, valuable port real estate, and CBP manpower resources, and reduces the port's flow of commerce. This project will provide stationary straddle carrier portals (SCP) that scan cargo as it is transferred directly from ship to rail.
- *International Rail (IRAIL) Program:* The International Rail (IRAIL) Program is a pre-ADE 2A program identifying and detecting R/N material entering the United States via freight rail. IRAIL supports the CBP-led Integrated Rail Inspection System (IRIS) Program by leading the radiation detection equipment (RDE) sub-system procurement as well as IRIS test and evaluation efforts. The CBP IRIS Program will re-capitalize the current fleet of aging Nonintrusive Inspection (NII) x-ray imaging equipment employed at international rail crossings. Currently, limited R/N scanning of freight rail cargo exists at rail crossings at U.S. international POEs. Existing NII technology to address these threats is approaching the end of its useful service life and is not fully capable of detecting R/N threats without the addition of passive radiation detection equipment
- *Long-Range Radiation Detection (LRRD) Program:* In FY 2016 and FY 2017, funding planned for the Long-Range Radiation Detection (LRRD) Program was reallocated to higher GNDA priorities. In FY 2018, there is no funding allocated to this program pending the completion of the development of operational requirements.
- *U.S. Border Patrol (USBP) Checkpoint Program:* In FY 2016 and FY 2017, funding planned for the U.S. Border Patrol (USBP) Checkpoint Program was reallocated to higher GNDA priorities. In FY 2018, there is no funding allocated to this program.
- *Maritime Non-Containerized Cargo (MNCC) Program*: The Maritime Non-Containerized Cargo (MNCC) Program is a pre-ADE 2A program with the objective to provide efficient and effective scanning of the most diverse cargo types -- break bulk cargo and roll-on, roll-off (vehicles, bags, bundles, crates, loose materiel, and containerized liquid) -- for R/N material entering the United States at sea POEs. When break bulk cargo is off loaded from ships, CBP officers scan it for R/N material, often using hand held devices. This capability is not suitable for the high volume of cargo being offloaded at U.S. ports and has been identified as an area for risk reduction. The MNCC program will conduct analysis to identify materiel, non-materiel, or combined, solutions that will reduce the risk of R/N material being offloaded at U.S. ports inside break bulk cargo. If not funded, the risk of off-loading R/N material will remain and resources that could be applied elsewhere will continue to remain focused on this type of threat. Combined, these possibly cause an increased risk of not detecting R/N entering at U.S. seaports.
- *Aerial Detection Program*: In FY 2016 and FY 2017, funding planned for the Aerial Detection Program was reallocated to higher priority programs due to a lack of maturity of operational requirements. In FY 2018, there is no funding allocated to this program pending the completion of operational requirements.

- *Small Vessel Standoff Detection (SVSD) Program:* The Small Vessel Standoff Detection (SVSD) Program is a pre-ADE 2A program developing and fielding for the USCG and CBP a greater capability to conduct boat-to-boat R/N detection. This program is also referred to as SVSD Increment 2. For SVSD Increment 1, a radiation detection backpack-based solution, the USCG and CBP vessel's R/N detection stand-off distance and detection frequency is limited. Furthermore, SVSD increment 1 is man packed and not integrated with the vessel structure. This physically limits USCG and CBP personnel conducting routine operations, especially during high seas, inclement weather, and when operating in a hostile environment. SVSD Increment 2 will provide the USCG and CBP increased R/N detection capability, including increased stand-off distance, detection frequency, and integration with the vessel's structure and components.
- *SIGMA:* SIGMA is a cost-effective, operationally practical, continuous city/region-scale, radiological WMD detection capability. Current Gamma and Neutron human portable WMD detectors do not feed into an automated detector network that demonstrate wide-area monitoring suitable for cities or regions. SIGMA provides low cost radiation detectors with spectroscopic gamma and neutron sensing capability, packaged as automated and networked threat detection and identification with web-based command and control at the city/region scale. SIGMA will achieve a continuous city-scale and regional WMD monitoring system with the potential to increase and refine the concept of operations previously prohibited by cost and technical capability.

FY 2016 Key Milestone Events (Prior Year)

- RPM RP: Conducted COTS systems performance evaluation and systems operational analysis based on request from industry RFI responses.
- RPM RP: Completed a cooperative research and development agreement for a vendor developed Replay Tool.
- Program 1: Constructed a table-top prototype to validate the concept of an open systems architecture replacement solution and began planning for construction of a full-scale prototype to test key features and refine technical documentation.
- ODR: Completed testing and evaluation of fixed RPMs integrated with a conveyor solution at TraPac terminal in the Port of Los Angeles/Long Beach.
- ODR: Completed Straddle Portal Prototype (SPP) upgrades and modifications, Straddle Carrier Portal (SCP) site design, and City of Tacoma permitting processes for deployment at PoT PCT.
- IRAIL: Supported CBP in the drafting of an Integrated Product Team Charter, RFI, and requirements for the IRIS, which will integrate NII imaging technology with passive radiation detection.
- SVSD Increment 1: Reached Full Operational Capability with USCG and CBP-Air and Marine Operations (AMO).

FY 2017 Planned Key Milestone Events (Year of Execution)

- HAIBP: Complete the System Threat Review (STR) and Qualitative Risk Analysis.

- Program 1: Complete construction of, test and evaluate a full-scale prototype to test key features and refine technical documentation.
- ODR: Complete SCP deployment activities, conduct SCP performance testing at Savannah River National Laboratory and operational assessment at PoT PCT.
- IRAIL: Conduct and Complete IRAIL Pathway Decomposition Study.
- MNCC: Begin initial acquisition program documentation.
- SVSD Increment 2: Complete the STR and characterization test to help inform project initiation decision.

FY 2018 Planned Key Milestone Events (Budget year)

- HAIBP: No R&D funding in FY 2018 (program will be fully funded out of Procurement, Construction, and Improvements (PCI) appropriation).
- Program 1: Prepare to release Request for Proposal.
- ODR: Develop requirements-related and program documentation for additional ODR POEs, as required.
- IRAIL: Support CBP in the completion and release of a RFP and source selection decision (to include a Capabilities Demonstration) for IRIS.
- MNCC: Conduct an STR, and AoA.
- SVSD Increment 2: If project initiated, prepare RFP, and plan to conduct test and evaluation.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$21,000	$21,400	$21,029	$20,788	$15,155
Obligations	$15,952	$12,217	$17,615	$20,788	$15,155

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
3He Alternative Implementation Backpack (HAIBP) Program	Ongoing	Ongoing
Radiation Portal Monitor Replacement Program (RPM RP)	Ongoing	Ongoing
On Dock Rail (ODR) Program	Ongoing	Ongoing
International Rail (IRAIL) Program	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC) Program	Not Started	Not Started
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
FY 2017		
3He Alternative Implementation Backpack (HAIBP) Program	Ongoing	4TH QTR
Radiation Portal Monitor Replacement Program (RPM RP)	Ongoing	Ongoing
On Dock Rail (ODR) Program	Ongoing	Ongoing
International Rail (IRAIL) Program	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC) Program	1ST QTR	Ongoing
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
FY 2018		
Radiation Portal Monitor Replacement Program (RPM RP)	Ongoing	Ongoing
On Dock Rail (ODR) Program	Ongoing	Ongoing
International Rail (IRAIL) Program	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC) Program	Ongoing	Ongoing
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
SIGMA	1ST QTR	Ongoing

Type of Research

Developmental

Technology Readiness Level

5-7

Transition Plans

The detection capabilities under these programs will be transitioned to DHS operational component(s) (CBP, USCG, TSA, etc.) after test and evaluation to ensure they meet operational requirements, and an operational readiness review is conducted with the DHS operational component(s) deploying the capability. Post-implementation Review activities are conducted after the initial deployed units have been in operational use for 12 to 18 months to provide the necessary information to determine the degree to which a materiel investment operating in its intended environment has met the needed capability. Throughout the life of the capability, DNDO works collaboratively with the DHS operational components to manage the equipment configuration to ensure it continues to meets its operational requirements; as well as collect and analyze operational performance and maintenance data to maximize performance per maintenance dollar, and inform future procurement requirements.

Detection Capability Assessments –PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Detection Capability Assessments	-	-	$39,503	-	-	$39,051	-	-	$34,127	-	-	($4,924)
Total	**-**	**-**	**$39,503**	**-**	**-**	**$39,051**	**-**	**-**	**$34,127**	**-**	**-**	**($4,924)**
Subtotal Discretionary - Appropriation	-	-	$39,503	-	-	$39,051	-	-	$34,127	-	-	($4,924)

Detection Capability Assessment – PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$39,503		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$39,503**	**$39,051**	**$34,127**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$9,565	$7,508	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$49,068**	**$46,559**	**$34,127**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$49,068**	**$46,559**	**$34,127**
Obligations (Actual/Projections/Estimates)	$37,561	$46,559	$34,127
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Detection Capability Assessment – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$39,503**
FY 2016 Revised Enacted	**-**	**-**	**$39,503**
FY 2017 Annualized CR	**-**	**-**	**$39,051**
FY 2018 Base Budget	**-**	**-**	**$39,051**
Transfer to O&S Mission Support due to CAS Realignment	-	-	($3,474)
Total Transfers	**-**	**-**	**($3,474)**
Total Adjustments-to-Base	**-**	**-**	**($3,474)**
FY 2018 Current Services	**-**	**-**	**$35,577**
Detection Capability Assessments	-	-	($1,450)
Total, Program Decreases	**-**	**-**	**($1,450)**
FY 2018 Request	**-**	**-**	**$34,127**
FY 2017 TO FY 2018 Change	**-**	**-**	**($4,924)**

PPA Description

The Detection Capability Assessment PPA, supports the development and acquisition process for mission-related technologies. DNDO continually assesses the GNDA and implemented capabilities through a variety of means, including test and evaluation (T&E) campaigns to characterize and collect performance data on commercially available and emerging technologies and systems.

Red team assessments to deepen the understanding of deployed capabilities by presenting overt and covert adversarial-based scenarios to FSLTT stakeholders. Program assessments to identify the effectiveness of planned and deployed programs and operations. Development of national consensus standards and interagency technical capability standards (TCS) for R/N detection systems.

Adjustments to Base Justification

DNDO continues to examine and mature its implementation of the Common Appropriation Structure. As part of a review of program

alignment, funds for information technology governance, infrastructure and cybersecurity were transferred from the Detection Capability Assessment PPA in Research and Development to the Mission Support PPA in Operations and Support. Some information technology infrastructure capabilities have matured beyond development and DNDO considers these activities best aligned to Operations and Support. The funding transferred supports preparation of agreements to effectively share radiological/nuclear (R/N) detection information among FSLTT partners, in order to prevent terrorism and enhance national security; and validates cybersecurity compliance and readiness of DNDO systems and safeguarding of DNDO sensitive information in third-party systems and services. The funding supports the evolution of technical competencies and expertise as well as tools and technologies which comprise DNDO's adaptive mission-support information technology infrastructure.

Detection Capability Assessment – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Detection Capability Assessments	$39,503	$39,051	$34,127	($4,924)
Total	**$39,503**	**$39,051**	**$34,127**	**($4,924)**
Discretionary - Appropriation	$39,503	$39,051	$34,127	($4,924)

Detection Capability Assessment – PPA
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$154	$152	$382	$230
25.1 Advisory and Assistance Services	$7,256	$7,173	$14,173	$7,000
25.3 Other Goods and Services from Federal Sources	$26,259	$25,959	$19,572	($6,387)
25.5 Research and Development Contracts	$5,834	$5,767	-	($5,767)
Total - Non Pay Object Classes	**$39,503**	**$39,051**	**$34,127**	**($4,924)**

Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Operational Readiness Assessment	$8,386	$8,724	$9,868	$1,144
Studies & Infrastructure	$10,009	$8,977	$0	($8,977)
Test & Evaluation Program	$17,749	$17,876	$24,259	$6,383
Information Sharing	$3,359	$3,474	$0	($3,474)
Total – Non Pay Cost Drivers	**$39,503**	**$39,051**	**$34,127**	**($4,924)**

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. For explanation of program changes, see Justification of Program Changes. Funding for the Information Sharing program transferred to the Mission Support PPA in the Operations and Support appropriation.

Detection Capability Assessment – PPA
Research and Development
Technology Readiness Level Exhibit

Project Description:
The DNDO research, development, and acquisition process is anchored by rigorous assessments of mission-related technologies as they are developed, deployed, and implemented. These programs are supported by the Test, Evaluation, and Analysis Program (T&E) campaigns to characterize, verify, and validate technical performance and assess the operational effectiveness and suitability of technologies under development, as well as that of commercially available systems prior to deployment (full operational capability). DNDO utilizes a suite of test instrumentation and automated data collection systems to enable testing teams to rapidly verify and validate data. The Standards project follows a cycle of development, use, and revision of consensus and technical capability standards to ensure that each standard remains effective for the assessment of R/N detection technology.

- **Problem:** Support DNDO's focus on preventing nuclear terrorism by assuring that detection equipment and systems meet specific requirements and standards.
- **Solution:** Plan and execute tests and evaluations to provide critical information on the technical and operational capabilities and limitations of our detection technologies, acquisition decisions, and facilitate the development of standards and requirements.
- **Impact:** These tests and evaluations provide critical information on detection technologies used to prevent nuclear terrorism.

Sub Projects
- *T&E Operations:* The Sub-Project funds the staff resources necessary to independently plan test activities, ensure scientific defensibility and rigor, oversee test execution, and report results.
- *Operational Analysis and Technical Assessments (OATA):* The OATA Sub-Project provides the subject matter experts that conduct technical assessments. The activities and products produced from this effort will transform data collected during assessments into actionable knowledge of R/N detectors under acquisition consideration. The OATA Project has four main elements: Tools for Test Data Management; Spectral Data and Algorithm Analysis Tools; Test Modeling and Simulation; and Technical Assessment. (Data Mining Analysis and Modeling and Simulation Cell).
- *Directed Test:* Through the Directed Test Sub-Project, DNDO conducts test campaigns using mature, commercially available R/N detection systems in operational scenarios faced by FSLTT end-users. These Directed Tests produce independent assessments of equipment to confirm vendor performance claims and can help with development and/or refinement of the end-users' CONOPS and can help identify training needs.

- *Standards and Conformity Testing:* The Sub-Project includes work on national and international consensus standards, development of technical capability standards, and standards validation. Conformity assessments are a systematic examination of the extent to which an R/N detection system conforms to specified standards. Such conformity assessments require testing facilities that can reliably test equipment against the standards
- *Sources and Infrastructure:* The Sub-Project provides oversight for the R/N Countermeasures Test and Evaluation Center (RNCTEC) test venue and the design, fabrication and management of radiation signature training devices (RSTD) and radioactive sources to support the Test and Evaluation Program.

FY 2016 Key Milestone Events (Prior Year)

- Supported national and international consensus standards and technical capability standards
  - Commenced interagency coordination of two technical capability standards (TCS).
  - Supported publication of a revision to the voluntary consensus standard ANSI N42.35.
  - Conducted a conformity test campaign for mobile radiation detection systems against the *Vehicle Mounted Mobile Systems TCS*.
- Delivered five RSTDs; began fabrication and defined requirements for additional RSTDs.
- Began the IT upgrades and established additional source shipment and handling capability at RNCTEC.
- Provided T&E staff resources and expertise to support the planning of nine developmental and/or operationally relevant test campaigns addressing next-generation Radiation Portal Monitors, systems development testing, and commercial systems testing;
  - Executed and provided reports for five of the nine test events planned in FY 2016.
  - Commenced planning for five FY 2017 developmental and/or operationally relevant test campaigns.
- Completed the systems requirements document for a central repository platform for housing T&E data and related information for the Radiological and Nuclear Data Repository (RNDR).
- Fully upgraded the Report Analysis and Archive System (RAAS) to a new architecture that will facilitate complex searches, improved document retrieval, analysis, and interconnections with other DNDO funded repositories, and added an additional 131 documents this year, increasing the total documents in RAAS to 1,139.
- Expanded the data catalog system to 154 users representing 19 organizations; expanded the Instrument Library to 36 fielded instruments; expanded the Modeling Catalog (ModCat) to 37 models and analysis packages; expanded the Background Catalog to over 60 verified radiation backgrounds submitted from multiple organizations.
- Completed development of the Data Mining, Analysis and Modeling Cell (DMAMC) to full deployment and sustainment. Responded to 51 major technical and scientific requests for information and analysis from a variety of internal and external stakeholders. Developed and exercised a crisis response capability within the DMAMC to respond to emergency requests for information during the National Level Exercise Capstone. Finalized and standardized normalization procedures to ensure re-

usability of data.
- Created domestic and international partnerships to expand the Replicative Assessment of Spectrometric Equipment (RASE) database and enhance the capability for dynamic systems such as portals.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Publish *Aerial Radiation Detection Systems TCS*, conduct interagency coordination on two TCSs, and support publication of a revision *ANSI N42.37*.
- Conduct a conformity test campaign against the *Aerial Radiation Detection Systems TCS*.
- Complete IT upgrades at RNCTEC.
- Begin RSTD fabrication; deliver additional RSTDs.
- Plan, execute, and/or provide reports for at least nine developmental or operational test campaigns.
- Plan the Robotics R/N Detection Directed Test.
- Continue building interconnections between RAAS and the DMAMC Lexicon, Modeling Catalog, and Instruments Catalog and add ability to search and filter uploaded documents and improve aggregate views of data.
- Include DHS Science and Technology consequence management instrument database into the Instrument Library, and expand the number of models incorporated into the ModCat and Background Catalogs.
- Continue domestic and international partnership to further expand the RASE database and enhance the capability for dynamic systems such as portals.
- Sustain DMAMC capability and continue to dynamically populate the compendium of data. Respond to 100 major technical and scientific requests for information and analysis.
- Build two radiological source kits to support normalization testing.
- Begin development of summary reports for all RDE technology categories currently deployed in MDDUs.
- Develop a framework to establish and maintain the DMAMC SME network. Continue integration of Design of Experiment in DNDO T&E campaigns.

FY 2018 Planned Key Milestone Events (Budget year)

- Publish the *Active Interrogation TCS*, complete the interagency coordination on two TCSs, and support the revision of the *ANSI N42.48*.
- Conduct a conformity test campaign for a class of R/N detection equipment against the applicable TCS.
- Deliver two RSTDs.
- Begin excessing of obsolete testing equipment at RNCTEC.
- Plan, execute, and/or provide reports for at least nine developmental or operational test campaigns.
- Plan and execute the Robotics R/N Detection Directed Test.

- Continue building interconnections between RAAS and the DMAMC Lexicon, Modeling Catalog and Instruments Catalog and add ability to search and filter uploaded documents and improve aggregate views of data.
    - Continue development of the RNDR in FY 2018 to illuminate areas that yield opportunities for T&E process improvements and efficiencies.
    - Sustain DMAMC capability and deploy initial crisis response capability. Respond to 100 major technical and scientific requests for information and analysis. Complete development of summary reports for all RDE technology categories currently deployed in the MDDU. Deploy the DMAMC SME network management system.
    - Begin Central Data Repository integration with RAAS and other DMAMC catalogs.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$18,546	$16,254	$26,828	$26,330	$24,259
Obligations	$18,546	$16,254	$21,435	$26,330	$24,259

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Delivered five RSTDs; began fabrication and defined requirements for additional RSTDs.	1st QTR	4th QTR
Began the IT upgrades and establish additional source shipment and handling capability at RNCTEC.	4th QTR	4th QTR
Planned the COTS Vehicle-Mounted Mobile Systems "Honey Badger" Directed Test (Phase 1) in support of Federal, state, local and tribal partners	1st QTR	4th QTR
Performed On-Dock Rail (ODR) Data Collection	2nd QTR	2nd QTR
Conducted a conformity test campaign for mobile radiation detection systems against the Vehicle Mounted Mobile Systems TCS	2nd QTR	3rd QTR

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Complete IT upgrades at RNCTEC.	1st QTR	4th QTR
Begin RSTD fabrication; deliver additional RSTDs.	1st QTR	4th QTR
Execute the COTS Vehicle-Mounted Mobile Systems "Honey Badger" Directed Test (Phase 1) in support of Federal, state, local and tribal partners	1st QTR	1st QTR
Plan the Robotics R/N Detection Directed Test	3rd QTR	4th QTR
Perform ODR SCP Performance Test	1st QTR	1st QTR
Publish Aerial Radiation Detection Systems TCS	1st QTR	4th QTR
FY 2018		
Deliver two RSTDs.	1st QTR	4th QTR
Excess obsolete testing infrastructure at RNCTEC	1st QTR	4th QTR
Plan and execute the Robotics R/N Detection Directed Test	1st QTR	2nd QTR
Publish the Active Interrogation TCS	1st QTR	4th QTR
Plan, execute, and/or provide reports for at least nine developmental or operational test campaigns	1st QTR	4th QTR

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

Project Description:

The Operational Readiness Assessment (ORA) Program is DNDO's primary means to objectively assess the operational effectiveness and performance of the DNDO programs and deployed R/N detection capabilities at the FSLTT levels in support of the GNDA. ORA program also assesses the effectiveness of planned and deployed elements of the GNDA and supporting programs.

- **Problem:** Objectively assess the operational effectiveness and performance of the DNDO programs and deployed R/N detection capabilities at the FSLTT levels in order to improve the GNDA.
- **Solution:** Evaluate deployed systems and operations and their associated tactics, techniques and procedures, in as-close-to-realistic environments as possible and perform objective reviews of the effectiveness of GNDA programs and their associated activities.
- **Impact:** These assessments are conducted to provide objective findings and recommendations to improve the GNDA.

Sub Projects

- *Program Assessments (PA):* Performs objective reviews of the effectiveness of GNDA programs and their associated activities by examining GNDA programs, CONOPS, protocols, policies, procedures, and training. PA conducts assessments that provide insights on what is successfully being accomplished and identifies areas for improvement. These assessments are conducted to provide objective findings and recommendations and establish a documented baseline to provide a historic perspective for future endeavors.
- *Red Team (RT):* Fulfills a mission need to evaluate deployed systems and operations and their associated tactics, techniques and procedures, in as-close-to-realistic environments as possible. The RT Project presents adversary tactics and radiological signature training devices to FSLTT R/N detection and interdiction operations. These presentations can either be covert or overt in nature.

FY 2016 Key Milestone Events (Prior Year)

- Conducted 36 overt and covert operations and adversarial-based assessments of the GNDA.
- Conducted an assessment of DNDO's Radiological and Nuclear Situational Awareness Efforts and their Analytic Processes and initiated two others: GNDA Performance Measures Assessment and DNDO State and Local Detection Capability Sustainment.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Conduct at least 20 overt and covert operations and adversarial-based assessments of the GNDA.
- Initiate/complete at least three program assessments and perform other assessments as required.

FY 2018 Planned Key Milestone Events (Budget year)

- Conduct at least 20 overt and covert operations and adversarial-based assessments of the GNDA.
- Initiate/complete at least three program assessments and perform other assessments as required.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$9,681	$10,110	$12,675	$12,721	$9,868
Obligations	$9,681	$10,110	$10,256	$12,721	$9,868

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Program Assessments	1st QTR	4th QTR
Red Team	1st QTR	4th QTR
FY 2017		
Program Assessments	1st QTR	4th QTR
Red Team	1st QTR	4th QTR
FY 2018		
Program Assessments	1st QTR	4th QTR
Red Team	1st QTR	4th QTR

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

Nuclear Forensics –PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Nuclear Forensics	-	-	$19,031	-	-	$18,813	-	-	$18,361	-	-	($452)
Total	**-**	**-**	**$19,031**	**-**	**-**	**$18,813**	**-**	**-**	**$18,361**	**-**	**-**	**($452)**
Subtotal Discretionary - Appropriation	-	-	$19,031	-	-	$18,813	-	-	$18,361	-	-	($452)

Nuclear Forensics – PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$19,031		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$19,031**	**$18,813**	**$18,361**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$1,546	$1,766	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$20,577**	**$20,579**	**$18,361**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$20,577**	**$20,579**	**$18,361**
Obligations (Actual/Projections/Estimates)	$19,012	$20,579	$18,361
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Nuclear Forensics – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$19,031**
FY 2016 Revised Enacted	**-**	**-**	**$19,031**
FY 2017 Annualized CR	**-**	**-**	**$18,813**
FY 2018 Base Budget	**-**	**-**	**$18,813**
FY 2018 Current Services	**-**	**-**	**$18,813**
Nuclear Forensics	-	-	($452)
Total, Program Decreases	**-**	**-**	**($452)**
FY 2018 Request	**-**	**-**	**$18,361**
FY 2017 TO FY 2018 Change	**-**	**-**	**($452)**

PPA Description

The Nuclear Forensics PPA advances the science of nuclear forensics - the examination of materials recovered from R/N events of an illicit or hostile nature in order to determine their character and origin. Together, the GNDA and nuclear forensics efforts strengthen the detection of nuclear or other radioactive materials that are out of regulatory control;[2] enable the identification and closure of illicit R/N trafficking networks; promote nuclear security; and deter potential adversaries by increasing their perceived and actual risk of failure and the prospect of being held accountable for planned or attempted attacks. This PPA includes the National Technical Nuclear Forensics Center (NTNFC), which through its operational readiness, technology advancement, and expertise development missions, provides centralized planning, integration and advancement of USG nuclear forensics capabilities while leading the interagency implementation of the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States*.

The Nuclear Forensics Program is organized into three mission areas: Operational Readiness, Technology Advancement, and Expertise Development.

[2] The term "out of regulatory control" refers to materials that are being imported, possessed, stored, transported, developed, or used without authorization of the appropriate regulatory authority, either inadvertently or deliberately.

DNDO programs and activities focused on nuclear forensics are also aligned with the goals and investment priorities delineated in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States*.

Adjustments to Base Justification

Not Applicable

Nuclear Forensics – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Nuclear Forensics	$19,031	$18,813	$18,361	($452)
Total	**$19,031**	**$18,813**	**$18,361**	**($452)**
Discretionary - Appropriation	$19,031	$18,813	$18,361	($452)

Nuclear Forensics – PPA
Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$60	$110	$110	-
25.1 Advisory and Assistance Services	$2,784	$2,629	$2,563	($66)
25.3 Other Goods and Services from Federal Sources	$12,269	$13,013	$13,219	$206
25.5 Research and Development Contracts	$1,975	$2,441	$1,819	($622)
41.0 Grants, Subsidies, and Contributions	$1,943	$620	$650	$30
Total - Non Pay Object Classes	**$19,031**	**$18,813**	**$18,361**	**($452)**

Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Operational Readiness	$4,317	$3,727	$3,970	$243
Technology Advancement	$9,851	$9,858	$9,152	($706)
Expertise Development	$4,863	$5,228	$5,239	$11
Total – Non Pay Cost Drivers	**$19,031**	**$18,813**	**$18,361**	**($452)**

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. For explanation of program changes, see Justification of Program Changes.

Nuclear Forensics – PPA
Research and Development
Technology Readiness Level Exhibit

Project Description:
Through the Operational Readiness Project, DNDO, as the USG National Technical Nuclear Forensics (NTNF) program integrator, provides centralized planning, evaluation, and stewardship of nuclear forensics capabilities through interagency coordination and integration; international collaboration; and leading joint exercises, assessments, and corrective actions. DNDO leads the development of foundational planning documents that establish interagency strategic goals, objectives, requirements, processes, plans, and operational procedures for the NTNF mission. DNDO sponsors and leads assessments to evaluate these efforts and improve the Nuclear Forensics capability across the mission spectrum from pre- to post-detonation, both within the United States and abroad. DNDO also coordinates partner agency programs to facilitate alignment and eliminate duplication. Another key component of ensuring operational readiness, as emphasized by the National Academy of Sciences in a 2010 report on the state of the nuclear forensics enterprise, is the conduct of regular, rigorous nuclear forensics exercises. Such exercises assess multiagency integration, readiness, field sampling techniques, laboratory analysis, data evaluation and reporting, and communication flow. The major exercises alternate between pre- and post-detonation scenarios involving nuclear materials. These exercises focus on the continuous improvement of operations across the NTNF community. Exploring the technical and operational shortcomings and gaps enable DNDO and its partners to identify corrective actions based on after-action reports and lessons learned.

- **Problem:** The need to maintain and advance the operational readiness of the USG technical nuclear forensics capabilities.
- **Solution:** Coordination and integration of nuclear forensics activities for the USG, including interagency program planning from the strategic to tactical level, continual evaluation of the technical nuclear forensics capability through assessments and analyses, increasingly rigorous and realistic exercises, and promoting international collaboration to advance global nuclear forensics capabilities.
- **Impact:** A ready, robust, and enduring technical nuclear forensics capability.

Sub Projects
- *Assessments and Analysis:* The Assessments and Analysis Sub Project strengthens nuclear forensics capability through regular evaluations and assesses processes and capabilities to ensure readiness and to identify lessons learned, best practices, strengths, and areas needing improvement. An important aspect of the Assessments and Analysis Project is the Nuclear Forensics Science Panel (NFSP). The NFSP comprises experts in technical fields with relevance to nuclear forensics, such as nuclear weapons design and testing, analytical and radiochemistry, statistics, nuclear production processes, and modeling and simulation of nuclear processes. At the request of the DNDO and interagency partners, the NFSP assesses various aspects of

NTNF and answers technical questions that may guide future operational or R&D activities.

- *Centralized Planning:* The Centralized Planning Sub Project conducts efficient interagency program planning and integration of respective agency nuclear forensics capabilities and resources. This involves working closely with partners across six departments and agencies—as well as the White House—to effectively coordinate and align USG technical capabilities and operational activities while leveraging interagency investment in R&D in order to address priority needs and ensure unity of effort. DNDO accomplishes this integration through its leadership of the Nuclear Forensics Executive Council, NTNF Steering Committee, and issue-specific working groups.
- *Exercises:* The Exercises Sub Project strengthens nuclear forensics capability through jointly planned and executed exercises across the entire nuclear forensics mission space and that are inclusive of all partner agencies. Well-documented lessons learned and a robust corrective actions program play a significant role in improving the collective nuclear forensics capabilities and future exercise planning and execution. This includes the conduct of rigorous full-scale interagency exercises to rehearse, evaluate, identify gaps, and improve the nuclear forensics capabilities.
- *International Engagements*: The International Engagements Sub Project facilitates multilateral and bilateral collaborations in a strategic, cost-effective manner that supports the USG national objective to advance international nuclear forensics capabilities and build foreign partner capacity. DNDO activity in this area involves subject-matter expert contributions to multilateral initiatives and organizations, such as the Nuclear Security Summits, GICNT, IAEA, and the Nuclear Forensics International Technical Working Group (ITWG), to develop key technical and policy-oriented guidance documents. Bilateral work features direct collaboration between DNDO and foreign governments on pre-detonation nuclear forensics and related technical projects. These activities are prioritized based on the DNDO's R&D interests and the concurrent benefits of building relationships and strengthening partner nations' capabilities.

FY 2016 Key Milestone Events (Prior Year)

- Enhanced interagency coordination through leadership of the NTNF Steering Committee, Executive Council, and issue-specific working group, and led the development of the *Joint Interagency Annual Review of the National Strategic Five-Year Plan* and the annual update of the NTNF Budget Crosscut.
- Led agencies from across the CBRN mission space to consensus on an interagency framework for conducting weapons of mass destruction (WMD) attribution. The WMD Attribution Framework (WAF) outlines the USG process for providing timely, authoritative assessments to appropriate U.S. officials regarding the nature, source, perpetrator, and pathway of an attempted or actual WMD attack.
- Provided subject-matter expertise to major multilateral nuclear forensics forums, to include the IAEA, GICNT, Nuclear Forensics ITWG, and the 2016 NSS.
- Advanced nuclear forensics bilateral engagements with Sweden, the United Kingdom, and Canada, to include: advancing ongoing joint R&D work through a U.S.-Sweden Technical Annex under the "Project Arrangement on Cooperation and

Information Exchange in Radiological and Nuclear Forensics" (2013); discussing current and future cooperation with the United Kingdom (UK) Ministry of Defense and Atomic Weapons Establishment during the annual Joint Working Group 29 Nuclear Forensics User Group meeting; and collaborating with Canadian colleagues on certified reference material development and characterization.
- Coordinated the planning and execution of one pre-detonation materials exercise, one pre-detonation device exercise, and two post-detonation collections exercises.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Lead the development of the *Joint Interagency Annual Review* of the *National Strategic Five-Year Plan* and the annual update of the *NTNF Budget Crosscut*. Continue to enhance interagency coordination through leadership of the NTNF Steering Committee, Executive Council, and issue-specific working groups.
- Continue to advance international nuclear forensics efforts through participating in and contributing to activities of the key multilateral nuclear forensics initiatives, including the GICNT, IAEA, and ITWG, as well as bilateral work with the UK, Sweden, and Canada.
- Coordinate the planning and execution of one pre-detonation materials exercise, one pre-detonation device exercise and two post-detonation collections exercises.
- Assist in the development of an interagency WAF Implementation Plan, in close coordination with interagency partners.

FY 2018 Planned Key Milestone Events (Budget year)

- Lead the development of the Joint Interagency Annual Review of the National Strategic Five-Year Plan and the annual update of the NTNF Budget Crosscut. Continue to enhance interagency coordination through leadership of the NTNF Steering Committee, Executive Council, and issue-specific working groups.
- Continue to advance international nuclear forensics efforts through participating in and contributing to activities of the key multilateral nuclear forensics initiatives, to include the GICNT, IAEA, and ITWG, and bilateral collaborations with partner nations.
- Support the development and execution of an interagency tabletop exercise (or series of exercises), in close coordination with NTNF partners, to test the newly codified WAF, WAF Implementation Plan, and associated processes.
- Coordinate the planning and execution of one pre-detonation materials exercise, one pre-detonation device exercise and two post-detonation collections exercises.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$3,187	$2,830	$4,317	$3,727	$3,970
Obligations	$3,187	$2,505	$4,015	$3,727	$3,970

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Interagency coordination	1st QTR	Ongoing
International Engagements (bilateral and multilateral initiatives)	1st QTR	Ongoing
Coordinate/plan pre/post-detonation exercise	1st QTR	4th QTR
FY 2017		
Interagency coordination	1st QTR	Ongoing
International Engagements (bilateral and multilateral initiatives)	1st QTR	Ongoing
Coordinate/plan pre/post-detonation exercise	1st QTR	4th QTR
FY 2018		
Interagency coordination	1st QTR	Ongoing
International Engagements (bilateral and multilateral initiatives)	1st QTR	Ongoing
Coordinate/plan pre/post-detonation exercise	1st QTR	4th QTR

Type of Research

Operational readiness supports technology development by exercising operational capabilities and assists in identifying gaps for future development efforts. Operational readiness also supports operational testing of technologies under development to ensure technologies can perform under operational conditions.

Technology Readiness Level

Levels 5-7

Transition Plans

Technologies developed will be operationally tested under realistic conditions resulting in stakeholder buy-in and adoption by operational community.

DNDO's Nuclear Forensics R&D efforts are informed by high level policy guidance, legislation, and pre-eminent scientific expertise, included in National Security/Homeland Security Policy Directives, the *Joint Interagency Annual Review* of the President's *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the U.S.*, the 2010 *Nuclear Forensics and Attribution Act*, and the 2010 National Academy of Sciences Report, *Nuclear Forensics: A Capability at Risk*. Our R&D efforts support our operational partners' needs and capabilities, help maintain a viable workforce, and focus the efforts of our students and universities, all of which is connected to a strong exercise program.

Project Description:

DNDO, through the Technology Advancement Project, leads activities that advance the USG capability to rapidly, accurately, and credibly characterize and identify the nature, origin, and history of nuclear materials interdicted before a detonation. These techniques allow experts to reach technical conclusions about interdicted material based on known signatures, comparative samples of materials, and modeling of manufacturing processes. The Technology Advancement program benchmarks and advances forensics methodologies to provide results with well-understood uncertainties and develops signatures and data evaluation tools to support attribution assessments. In addressing the pre-detonation materials forensics capability development mission, the Technology Advancement Project provides advanced operational capability to the Bulk Special Nuclear Material Analysis Program (BSAP). BSAP is an interagency program coordinated by the National Nuclear Security Administration Office of Technical Nuclear Forensics (Department of Energy (DOE) NA-83). It is the program that operates the Nuclear Forensics analytical capability for interdicted nuclear materials. The Federal Bureau of Investigation (FBI), the DOE Office of Intelligence and Counterintelligence (DOE-IN), and DHS are participants in the program. The methods and signatures are provided to operators in the FBI, Department of Defense (DoD), DOE, and intelligence community.

- **Problem:** There is a need to assess, identify, develop, demonstrate, and operationalize scientific and technological approaches that address gaps in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 - 2019* and to continuously improve the speed, quality, and confidence of pre-detonation bulk material nuclear forensics methodologies.
- **Solution:** The Technology Advancement program explores innovative, low-risk, later-stage technologies and methodologies. Specifically, the Technology Advancement program develops technologies and methodologies that:
  - Address capability gaps and weaknesses found in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 - 2019*;
  - Assesses current forensics laboratory performance, identifies improvement areas, develops methodologies, and fields solutions to enhance operational nuclear forensics capabilities; and
  - Develops pre-detonation material nuclear forensics signatures to determine material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics.
- **Impact:** Capabilities developed under the Technology Advancement program continuously improve the USG pre-detonation materials nuclear forensics operational capability. In addition, Technology Advancement efforts support development of the next generation of nuclear forensic scientific expertise.

Sub Projects

- *Reference Material Development:* Reference materials serve as the "gold standard" for assessing forensic analysis methods.

The Reference Material Development Project prepares certified reference materials and other well-characterized materials to support the Methodology Benchmarking Project, exercises, and operational quality assurance activities, such as validating measurement methods and operational laboratory proficiency testing, performed by the interagency Bulk Special Nuclear Materials Analysis Program. A schedule for production of nuclear forensics certified reference materials extends for the next 20 years, given national laboratory capacity to perform the requisite certification.

- *Plutonium Processing Signatures:* The Plutonium Processing Signatures Project is developing a capability to simulate industrial production-scale plutonium materials processing on a much smaller, laboratory scale. The produced materials are analyzed for discriminating signatures and are also used for creating well-characterized reference materials for methodology validation.
- *Uranium Processing Signatures:* The Uranium Processing Signatures Project continues to operate and improve a capability to simulate industrial production-scale uranium materials processing on a much smaller, laboratory scale. The materials are analyzed for discriminating signatures and are also used for creating well-characterized reference materials for methodology validation.
- *Material Characterization:* The Material Characterization Project allows for operational use of validated analytical methods to inform and support signature development and to provide information to the Nuclear Materials Information Program. As new signatures are developed, materials are characterized to support development and validation of those signatures. This is a continuing effort, coordinated with DOE and the New Methodology Development, New Signature Development, and Data Evaluation Tools Projects.
- *Methodology Benchmarking:* The Methodology Benchmarking Project evaluates and benchmarks laboratory capabilities to perform specific analytical methods. This project identifies (1) the most accurate, precise, and timely methods available and appropriate for operational use, and (2) gaps for which improved methods are needed and that will be developed under the New Methodology Development Project. Improved methods are then transitioned to the operational laboratories through a technology transfer workshop.
- *Data Evaluation Tools:* The Data Evaluation Tools Project develops and demonstrates the next generation of tools for data pattern analysis and methods to assess whether or not measurements from samples can be linked and included or excluded from specific families of signatures.
- *New Methodology Development:* The New Methodology Development Project advances the accuracy, precision, and timeliness of measurement techniques. This project focuses on activities at TRLs 5-8, while Transformational and Applied R&D in the Exploratory Research Program addresses efforts at TRLs 2-5.
- *New Signature Development:* The New Signature Development Project determines material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics. This project focuses on activities at TRLs 5-8, while Transformational and Applied R&D in the Exploratory Research Program addresses efforts at TRLs 2-5.

FY 2016 Key Milestone Events (Prior Year)

- Produced two certified reference materials for forensic method improvement and quality assurance purposes.
- Fully characterized four nuclear forensic relevant samples to assist in populating the U.S. National Nuclear Forensics Library and to maintain a sharp operational nuclear forensics workforce.
- Operated the laboratory-scale uranium processing capability to produce uranium materials for signature development.
- Completed development of the laboratory-scale plutonium processing capability to produce plutonium materials for signature development.
- Continued transition to operational use an improved methodology for characterization of trace elements in uranium.
- Completed benchmarking study for improving measurements of trace actinides in plutonium and began transition to operational use.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Produce two certified reference materials for forensic method improvement and quality assurance purposes.
- Operate the laboratory-scale uranium and plutonium processing capabilities to produce uranium and plutonium materials for signature development.
- Continue transition to operational use an improved methodology for characterization of trace elements in uranium.
- Commence transition to operational use an improved methodology for characterization of trace elements in plutonium.
- Commence benchmarking study for improving measurements of trace elements in uranium.

FY 2018 Planned Key Milestone Events (Budget year)

- Produce two certified reference materials for forensic method improvement and quality assurance purposes.
- Operate the laboratory-scale uranium and plutonium processing capabilities to produce uranium and plutonium materials for signature development.
- Complete transition to operational use an improved methodology for characterization of trace elements in plutonium and uranium.
- Continue benchmarking study for improving measurements of trace elements in uranium.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$11,174	$9,968	$9,851	$9,858	$9,152
Obligations	$11,174	$9,934	$9,673	$9,858	$9,152

FY2014 and FY2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing
FY 2017		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing

Research & Development Description	Planned Start Date	Planned Completion
FY 2018		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing

Type of Research

Developmental:

Reference Material Development, Material Characterization, Methodology Benchmarking, Plutonium Processing Signatures, Uranium Processing Signatures

Applied:

New Signature Development, New Methodology Development, Data Evaluation Tools

Technology Readiness Level

Levels 5-7

Transition Plans

Successful Technology Advancement methodologies and concepts transition to operational customers through the Bulk Special Nuclear Material (SNM) Analysis Program.

Project Description:

As mandated by the *Nuclear Forensics and Attribution Act, 2010 (P.L. 111-140)*, the National Nuclear Forensics Expertise Development Program (NNFEDP), as well as the Federal Expertise Development Program (FEDP) which resides within, are the comprehensive USG effort to address the enduring challenge of sustaining a preeminent workforce of scientists and policymakers educated and trained in nuclear forensics-related specialties. NNFEDP initiatives aim to maintain the technical expertise required to execute the Nation's nuclear forensics mission through interdisciplinary R&D collaboration among students, academic departments, universities, and national laboratories. FEDP enhances the education of the federal workforce in areas critical to technical nuclear forensics, facilitates technical and professional development, and promotes understanding of partner department and agency missions. These programs are led by DNDO in close collaboration with the Departments of Defense, Energy, and Justice (Federal Bureau of Investigation), through a biannual Expertise Development Committee.

- **Problem:** Current TNF activities leverage significantly off the shrinking nuclear weapons complex which has been in decline since the end of the Cold War with nuclear scientists leaving the field for other pursuits. The majority of nuclear scientists remaining are retired or nearing retirement. Additionally, compounding the issue, the number of students entering into the academic pipeline in nuclear forensics-related degree programs has declined significantly since the 1970s.
- **Solution:** Provide long-term and continued investment to promote education and training within academia, the national and defense laboratories that perform nuclear forensics research, and the federal workforce. Bolster the existing workforce through providing technical and policy training and education opportunities for senior and junior scientists as well as federal personnel.
- **Impact**: An enduring nuclear forensics workforce which is able to meet technical and policy mission requirements.

Sub Projects

- *Academics:* The Academics Sub Project supports a current DHS management performance measure for DNDO. National Strategic Five-Year Plan activities and investment areas under this goal include the implementation of academic and workforce programs designed to ensure a robust and enduring nuclear forensics workforce. Initiatives included in this project are an undergraduate summer school, graduate fellowships and internships, and collaborative national laboratory and university R&D support.
- *Assessments Project:* The Assessments Sub Project evaluates the state of the workforce within the national and defense laboratory system, relative to USG NTNF mission requirements, in order to appropriately scale and scope the NNFEDP into future years.
- *Laboratories Project:* The Laboratories Sub Project supports post-doctorate fellowships and early-career awards at the national laboratories as well as planned outreach and recruitment activities to potential university and student participants. Additionally, the Laboratories Project supports development and presentation of curricula related to nuclear forensics training for the Federal workforce.

FY 2016 Key Milestone Events (Prior Year)

- Supported 10 Seaborg Institute nuclear science summer interns, five undergraduate scholars, one undergraduate summer school, 16 graduate fellows, 17 post-doctorate fellowship positions, one university education award, four junior faculty awards, one minority serving institution award, and dedicated one-on-one senior scientist/student mentoring at the national laboratories.
- Enhanced university and student engagement in nuclear forensics-related R&D through a dedicated outreach strategy.
- Sponsored two nuclear forensics courses as part of the "Overview of Nuclear Forensics for the Federal Workforce" at Oak Ridge National Laboratory, and "Nuclear Testing, Diagnostics, Forensics, and Stockpile Stewardship" at Lawrence Livermore National Laboratory and the Nevada National Security Site.
- Evaluated the state of the nuclear forensics workforce within the DOE national laboratories to inform and guide expertise development program efforts.

FY 2017 Planned Key Milestone Events (Year of Execution)

- Implement three new initiatives supporting universities and students, as well as scientific staff at the DOE national laboratories, focused on strengthening and sustaining the nuclear forensics workforce.
- Support 10 Seaborg Institute nuclear science summer interns; one undergraduate summer school; two research awards; 12 graduate fellowships; 14 post-doctorate fellowship positions; one early career award; and dedicated one-on-one senior scientist/student mentoring at the national laboratories.
- Continue to enhance university and student engagement in nuclear forensics-related R&D through a dedicated outreach strategy.
- Sponsor one nuclear forensics course for the Federal workforce: "Nuclear Testing, Diagnostics, Forensics, and Stockpile Stewardship."

FY 2018 Planned Key Milestone Events (Budget year)

- Support 7 Seaborg Institute nuclear science summer interns; one undergraduate summer school; three research awards; four graduate fellowships; 14 post-doctorate fellowship positions; and one early-career award.
- Evaluate the state of the nuclear forensics workforce within the national and defense laboratories to inform and guide expertise development program efforts.
- Continue to enhance university and student engagement in nuclear forensics-related R&D through a dedicated outreach strategy.
- Sponsor two nuclear forensics courses for the Federal workforce: "Overview of Nuclear Forensics for the Federal Workforce" and "Nuclear Testing, Diagnostics, Forensics, and Stockpile Stewardship."

Delayed Milestones

- N/A

Overall Project Funding

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Project Funding	$5,477	$5,383	$4,863	$5,228	$5,239
Obligations	$5,477	$5,383	$4,563	$5,228	$5,239

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2016		
Glen T. Seaborg Nuclear Science Summer Internship	1st QTR	Ongoing
Post-Doctoral Fellowships	1st QTR	Ongoing
Nuclear Forensics Junior Faculty Award Program	1st QTR	4th QTR
Nuclear Forensics Education Award Program	1st QTR	4th QTR
Nuclear Forensics Undergraduate Scholarship and Internship Program	1st QTR	4th QTR
Federal Expertise Development Courses	1st QTR	Ongoing
FY 2017		
Glen T. Seaborg Nuclear Science Summer Internship	1st QTR	Ongoing
Nuclear Forensics Undergraduate Summer School	1st QTR	Ongoing
Post-Doctoral Fellowships	1st QTR	Ongoing
Early Career Award	1st QTR	Ongoing
Nuclear Forensics Research Awards	1st QTR	Ongoing
Federal Expertise Development Courses	1st QTR	Ongoing
FY 2018		
Glen T. Seaborg Nuclear Science Summer Internship	1st QTR	Ongoing

Research & Development Description	Planned Start Date	Planned Completion
Nuclear Forensics Undergraduate Summer School	1st QTR	Ongoing
Post-Doctoral Fellowships	1st QTR	Ongoing
Early Career Award	1st QTR	Ongoing
Nuclear Forensics Research Awards	1st QTR	Ongoing
Federal Expertise Development Courses	1st QTR	Ongoing

Type of Research

Basic, Applied, Developmental

Technology Readiness Level

TRL 1-7

Transition Plans

NNFEDP transition plans revolve around on the ability to transition people, from academia to the national laboratories or federal agencies, and knowledge, from senior scientists and policymakers to junior workforce staff. Any research performed within the NNFEDP is at the direction of other federal research programs which are responsible for transitioning the research from TRL 1-3 into an operational method or tool.

Department of Homeland Security

Domestic Nuclear Detection Office

Federal Assistance

Fiscal Year 2018
Congressional Justification

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Federal Assistance

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Federal, State, Local, Territorial, and Tribal Support	-	-	$26,168	-	-	$25,560	-	-	$23,384	-	-	($2,176)
Securing the Cities	-	-	$21,113	-	-	$21,135	-	-	$21,135	-	-	-
Total	**-**	**-**	**$47,281**	**-**	**-**	**$46,695**	**-**	**-**	**$44,519**	**-**	**-**	**($2,176)**
Subtotal Discretionary - Appropriation	-	-	$47,281	-	-	$46,695	-	-	$44,519	-	-	($2,176)

*FY2016 Funding is shown in notional Common Appropriation Structure for comparison purposes.
** In accordance with common usage, DNDO proposes changing the name of the Federal, State, Local, Territorial, and Tribal Support PPA to the Federal, State, Local, Tribal, and Territorial Support PPA.

Overview

The Domestic Nuclear Detection Office (DNDO) plays a pivotal role in implementing the domestic portion of the Global Nuclear Detection Architecture (GNDA) by ensuring that the training, exercises, and cross-jurisdictional protocols integral to radiological/nuclear (R/N) detection, forensics, and prevention capability elements are adopted and sustained. DNDO's Federal Assistance (FA) budget covers integration and outreach efforts necessary to ensure that GNDA Federal, State, local, tribal, and territorial, (FSLTT) partners have access to and the knowledge of how to leverage available resources to support the R/N detection mission. DNDO structures and resources the FA portfolio of programs to help ensure that R/N detection equipment deployed by FSLTT partners are accompanied by the appropriate concepts of operations (CONOPS), training, exercises, and R/N alarm response protocols. These programs include Securing the Cities (STC); Training, Exercises, and Assistance; and the Joint Analysis Center (JAC).

Federal, State, Local, Territorial, and Tribal (FSLTT) Support: The FSLTT Support PPA provides advisory and assistance services to FSLTT stakeholders who are developing or enhancing R/N detection capabilities. This support includes assistance in developing and integrating local or regional programs into the GNDA, guiding the development of CONOPS and standard operating procedures, and developing training and exercise products to ingrain those procedures into day-to-day activities. In addition, FSLTT Support includes integration and outreach efforts like state and local working groups and leadership advisory committees necessary to ensure that GNDA partners are aware of, have proper contact information for, and have the knowledge needed to properly leverage available resources to support the R/N detection mission.

Securing the Cities: The Securing the Cities PPA seeks to reduce the risk of a successful deployment of a R/N terrorist weapon

against major metropolitan regions in the United States by establishing sustainable capability within the GNDA partner agencies to detect, analyze, and report nuclear and other radioactive materials out of regulatory control.

STC is a multi-year R/N detection capability development project. FA funds are disbursed under the STC Program through competitively awarded cooperative agreements to a lead agency. The lead agency then uses local procurement procedures to acquire equipment and services in support of STC goals and objectives and also establishes a regional governance structure among the major law enforcement, first response, emergency management, and public health agencies to implement a regional R/N detection program.

Federal Assistance
Budget Authority and Obligations
Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$47,281		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$47,281**	**$46,695**	**$44,519**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$9,789	$10,760	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$57,070**	**$57,455**	**$44,519**
Collections – Reimbursable Resources	$50	-	-
Total Budget Resources	**$57,120**	**$57,455**	**$44,519**
Obligations (Actual/Projections/Estimates)	$47,086	$57,455	$44,519
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Federal Assistance
Collections – Reimbursable Resources
Dollars in Thousands

Collections		FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Transportation Security Administration	Source	-	-	$50	-	-	-	-	-	-
Total Collections		-	-	**$50**	-	-	-	-	-	-

Federal Assistance
Summary of Budget Changes
Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$47,281**
FY 2016 Revised Enacted	**-**	**-**	**$47,281**
FY 2017 Annualized CR	**-**	**-**	**$46,695**
FY 2018 Base Budget	**-**	**-**	**$46,695**
Transfer to R&D Architecture Planning and Analysis due to CAS Realignment	-	-	($1,118)
Total Transfers	**-**	**-**	**($1,118)**
Total Adjustments-to-Base	**-**	**-**	**($1,118)**
FY 2018 Current Services	**-**	**-**	**$45,577**
Federal, State, Local, Territorial, and Tribal Support	-	-	($1,058)
Total, Program Decreases	**-**	**-**	**($1,058)**
FY 2018 Request	**-**	**-**	**$44,519**
FY 2017 TO FY 2018 Change	**-**	**-**	**($2,176)**

Federal Assistance
Justification of Program Changes
Dollars in Thousands

Program Changes	FY 2018 President's Budget		
	Positions	FTE	Amount
Program Change 1 - Federal, State, Local, Territorial, and Tribal Support	**-**	**-**	**($1,058)**
Federal, State, Local, Territorial, and Tribal Support	-	-	($1,058)
Total Program Changes	**-**	**-**	**($1,058)**

Program Change
Federal, State, Local, Territorial, and Tribal Support

Description
DNDO develops a national framework for implementing R/N detection training for Federal, State and local law enforcement and public safety professionals to enhance national operational capabilities. In FY 2018, DNDO will decrease FSLTT support by $1.058 million overall to include reductions to the Joint Analysis Center (JAC) ($0.708 million), the Assistance program ($0.159 million), the Training program ($0.108 million), the Exercises program ($0.083 million).

DNDO's JAC enhances situational awareness and provides technical support and informational products to Federal, State, and local partners. The JAC maintains and provides awareness to mission partners through visibility into deployed detection capabilities, monitoring ongoing events or threats, and maintaining historical data.

The Assistance Program supports FSLTT partners in developing and implementing R/N detection programs and capabilities. In addition, it provides Mobile Detection Deployment Units (MDDU) to surge assets in support of enhanced steady state deployment postures or special events.

The Training Program, in coordination with FEMA, defines national R/N detection training and qualification standards in addition to developing training courses delivered to GNDA stakeholders.

The Exercises Program evaluates and improves planning and operational capabilities by leading and assisting FSLTT partners in the preparation and execution of exercises, including associated guidance and after-action reporting.

Justification
The $0.708 million reduction in the JAC program is principally achieved as a result of efficiencies in the approach to intelligence collection and analysis, and the completion of the bulk of work to develop "state books" that catalog the capabilities at the state and

local level. The reduction will not affect the delivery of capability and support to state and local partners.

The $0.159 million reduction to the Assistance program will not affect the delivery of capability and support to our state and local partners.

The reductions to the Training ($0.108 million) and Exercises ($0.083 million) programs are a result of operational efficiencies.

Performance

These programs have put in place processes and procedures that will ensure coordination with interagency partners is optimized. The total decrease of ($1.058 million) will have minimal impact on improving and advancing the R/N capabilities to our FSLTT partners.

Federal Assistance
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Federal, State, Local, Territorial, and Tribal Support	$26,168	$25,560	$23,384	($2,176)
Securing the Cities	$21,113	$21,135	$21,135	-
Total	**$47,281**	**$46,695**	**$44,519**	**($2,176)**
Discretionary - Appropriation	$47,281	$46,695	$44,519	($2,176)

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$139	$239	$242	$3
25.1 Advisory and Assistance Services	$17,609	$12,597	$10,434	($2,163)
25.2 Other Services from Non-Federal Sources	-	$548	$573	$25
25.3 Other Goods and Services from Federal Sources	$12,033	$15,611	$15,620	$9
41.0 Grants, Subsidies, and Contributions	$17,500	$17,700	$17,650	($50)
Total - Non Pay Object Classes	**$47,281**	**$46,695**	**$44,519**	**($2,176)**

Federal, State, Local, Territorial, and Tribal Support - PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Federal, State, Local, Territorial, and Tribal Support	-	-	$26,168	-	-	$25,560	-	-	$23,384	-	-	($2,176)
Total	**-**	**-**	**$26,168**	**-**	**-**	**$25,560**	**-**	**-**	**$23,384**	**-**	**-**	**($2,176)**
Subtotal Discretionary - Appropriation	-	-	$26,168	-	-	$25,560	-	-	$23,384	-	-	($2,176)

Federal, State, Local, Territorial, and Tribal Support – PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$26,168		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$26,168**	**$25,560**	**$23,384**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$9,224	$9,305	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$35,392**	**$34,865**	**$23,384**
Collections – Reimbursable Resources	$50	-	-
Total Budget Resources	**$35,442**	**$34,865**	**$23,384**
Obligations (Actual/Projections/Estimates)	$25,976	$34,865	$23,384
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Federal, State, Local, Territorial, and Tribal Support – PPA
Collections – Reimbursable Resources

Dollars in Thousands

Collections		FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Transportation Security Administration	Source	-	-	$50	-	-	-	-	-	-
Total Collections		-	-	**$50**	-	-	-	-	-	-

Federal, State, Local, Territorial, and Tribal Support – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$26,168**
FY 2016 Revised Enacted	**-**	**-**	**$26,168**
FY 2017 Annualized CR	**-**	**-**	**$25,560**
FY 2018 Base Budget	**-**	**-**	**$25,560**
Transfer to R&D Architecture Planning and Analysis due to CAS Realignment	-	-	($1,118)
Total Transfers	**-**	**-**	**($1,118)**
Total Adjustments-to-Base	**-**	**-**	**($1,118)**
FY 2018 Current Services	**-**	**-**	**$24,442**
Federal, State, Local, Territorial, and Tribal Support	-	-	($1,058)
Total, Program Decreases	**-**	**-**	**($1,058)**
FY 2018 Request	**-**	**-**	**$23,384**
FY 2017 TO FY 2018 Change	**-**	**-**	**($2,176)**

PPA Description

FSLTT Support provides advisory and assistance services to FSLTT stakeholders who are developing or enhancing R/N detection capabilities. This support includes assistance in developing and integrating local or regional programs into the GNDA, guiding the development of CONOPS and standard operating procedures, and developing training and exercise products to ingrain those procedures into day-to-day activities. In addition, FSLTT Support includes integration and outreach efforts like state and local working groups and leadership advisory committees necessary to ensure that GNDA partners are aware of, have proper contact information for, and have the knowledge needed to properly leverage available resources to support the R/N detection mission.

Federal, State, Local, Territorial, and Tribal Support – Program Overview

Program	Project	FY 2018 Funding ($000)	Level of Effort	General Description
Joint Analysis Center	JAC Operations	$4,109	Ongoing	The JAC serves as an interagency coordination mechanism for the implemented GNDA, maintaining situational awareness of GNDA programs, activities, and capabilities, to include status of R/N detection operations, visibility into the status of R/N alarms, and awareness of R/N-related incidents and events.
Joint Analysis Center Collaborative Information System (JACCIS)	JACCIS	$3,350	Ongoing	JACCIS is a web-based system that provides FSLTT stakeholders with alarm adjudication connectivity, a detector database, and situational awareness regarding the events and activities relating to R/N detection and the GNDA.
Federal, State, and Local Outreach	State and Local Stakeholder Working Groups	$300	Semi-Annual, ongoing	SLSWG are DNDO-sponsored strategic engagements intended to promote capability development and sustainment and foster strong relationships with and among SLTT agency mission stakeholders.
	Executive Steering Council	$100	Semi-Annual, ongoing	ESC meetings provide an opportunity for policy coordination, discussion, and implementation among DNDO and senior-level state and local leaders regarding R/N detection programs and the GNDA.
Training	Training	$4,423	Ongoing	The Training Program supports FSLTT GNDA stakeholders. Training establishes qualification standards for R/N detection operations, builds curricula to support the standards, enables agencies and their instructors to teach the material, and captures feedback used for process and product improvement.
Exercises	Exercises	$2,259	Ongoing	The Exercises Program supports FSLTT and international GNDA stakeholders in developing and/or enhancing R/N detection plans, policies, procedures, communications, tactics, and operations with other relevant stakeholders. The Exercises Program supports the development, validation, and dissemination of R/N detection-specific exercise templates, guidance, and standards; validates that R/N detection equipment is properly employed and alarm adjudication processes are operated per Federal, state, and local protocols; and ensures notifications are escalated to appropriate U.S. Government (USG) agencies. Notably, requests for expertise to enhance exercise design and evaluation methodology continue to increase from Federal and international partners.
Assistance	Assistance	$4,772	Ongoing	The Assistance Program provides standardized processes and products to assist FSLTT agencies with planning, developing, implementing, and sustaining R/N detection programs. Assistance efforts facilitate multi-jurisdictional, multi-disciplinary policy makers, program managers, and

Program	Project	FY 2018 Funding ($000)	Level of Effort	General Description
				operational administrators working together to develop and implement interior and maritime R/N detection programs to expand and enhance the GNDA.
	Mobile Detection Deployment Units (MDDU)	$4,071	Ongoing	MDDUs are national "surge" assets that supplement first responders' existing R/N detection and reporting capabilities in support of national and other special security events. MDDUs contain R/N detection equipment packages housed in mobile trailers that are located throughout the United States and maintained in coordination with the Department of Energy's (DOE) Radiological Assistance Program (RAP).

Joint Analysis Center (JAC) Program

The JAC Program provides a timely information-sharing and analysis capability that monitors the status of and facilitates the analysis and distribution of information from both overseas and domestic portions of the GNDA. The JAC serves as an interagency coordination mechanism for the GNDA, maintaining situational awareness of GNDA capabilities to include status of R/N detection operations, visibility into the status of R/N alarms, and awareness of R/N-related incidents and events. The JAC participates in adjudication of nuclear detection events; drafts technical requests for information; analyzes intelligence and sensor information; provides technical support to SLTT authorities; and assists in the USG technical response to R/N detection incidents.

The JAC Program maintains a common operating picture for GNDA stakeholders and provides technical assistance, data mining relating to the current status and disposition of GNDA resources, and vulnerability and threat trend analyses to GNDA decision makers. JAC activities are aligned around two key functions: information sharing and information analysis.

JAC Information Sharing

The information sharing function of the JAC supports collaboration among GNDA partners and provides timely data and analyses regarding the current status and disposition of GNDA resources, vulnerabilities, and threat trends to enable sound and timely leadership decisions. The primary activities under this project include:

- Information product development and deployment which generate packaged information on both a routine and on-demand basis and delivers products directly to stakeholders or publishes information on appropriate community of interest sites. These products include Situational Awareness Reports and Weekly Open Source Reports.
- Operational planning which provides information to DNDO Federal Assistance projects and stakeholders to support and promote the planning and execution of R/N detection operations.

- Cross-jurisdictional collaboration which facilitates the timely delivery of operational information to appropriate stakeholders to enhance situational awareness of ongoing operations.

JAC Information Analysis

The information analysis function of the JAC consists of adjudication support and data fusion and trend analysis in coordination with DOE's National Nuclear Security Administration. Data fusion and trend analysis ensures that stakeholders are provided with complete and relevant information to include spectral analysis support to ensure timely adjudication of detection events. Data fusion and trend analysis integrates historical knowledge of the operational situation with data derived from a detection event to help set adjudication and post-adjudication action priorities.

- The JAC provides a 24-hour/7-days-per-week (24/7) capability to facilitate the adjudication of radiation detection alarms and share GNDA information with stakeholders to plan an appropriate response.
- To accomplish data fusion and trend analysis, the JAC conducts fusion of multiple data sources to provide a complete view of the operational environment, develops awareness within the nuclear detection community to enable alarm resolution at the lowest level possible, and ensures that the community has access to and training on the best analytic tools.
- The JAC maintains a qualified and trained expert workforce to accomplish all of the above duties.

In FY 2016, the JAC initiated mapping of the international portion of the GNDA. The JAC also continued to provide recurring products for DNDO leadership and GNDA stakeholders, including weekly presentations of GNDA-related intelligence information, Situational Awareness Reports, and Weekly Open Source Reports for FSLTT stakeholders.

In FY 2017, the JAC will continue its mapping of the international portion of the GNDA, drawing upon a new data sharing arrangement. The JAC will also provide the secure infrastructure and initial planning for a DNDO crisis management function for awareness during global incidents.

In FY 2018, the JAC will lead the DNDO crisis management function with 24/7 support to leadership and other designated stakeholders during ongoing situations.

Joint Analysis Center Collaborative Information System (JACCIS) Program

To support the JAC's information sharing and information analysis roles, DNDO developed its information technology system, the Joint Analysis Center Collaborative Information System (JACCIS). JACCIS receives, manages, analyzes, transfers, and reports on data relevant to the GNDA. JACCIS integrates information the JAC receives through focused fusion of data from multiple sources

(alarm adjudication, intelligence sources, etc.). This system also facilitates the sharing of radiation detection data among FSLTT users and empowers the lowest level of authority to evaluate detection events as either threat or non-threat, rapidly determining the appropriate response while reducing the impact on commerce and personal movement. This system is also the backbone for resolving detection alarms by moving technical data from operators in the field to technical experts around the United States. Prior to JACCIS achieving initial operational capability in FY 2011, the JAC relied on resource-intensive phone and e-mail communication to integrate data.

In FY 2016, JACCIS 2.0 transitioned into a cloud environment providing a faster, scalable, and lower-cost hosting solution that incorporates a live feed into the DHS National Operations Center Common Operating Picture. In FY 2017, JACCIS will incorporate a detector information and port-of-entry wiki. This wiki – a collaboratively-edited repository of information – will continue to grow as it adds additional detector data sets for a growing number of states and major urban areas, will aid in alarm adjudication awareness, and will continue to build upon FSLTT relationships via coordination with the Assistance and Training Programs. In FY 2018, JACCIS will integrate data analysis tools for use by FSLTT stakeholders.

Federal, State, and Local Outreach Program

Central to the success of an integrated, layered national defense against the R/N threat is a strong partnership with FSLTT agencies responsible for the R/N detection mission within their areas of responsibility. The Federal, State, and Local Outreach Program maintains engagement with key mission partners and increases awareness of DNDO threats and risk by executing broad outreach efforts that include:

- Conducting stakeholder events; and
- Establishing communication mechanisms to facilitate interactions with and among state and local stakeholders.

A key to developing, maintaining, and expanding R/N detection programs and capabilities across the United States is affording FSLTT stakeholders the opportunity to engage one another and share best practices and challenges. The major elements of this program include the SLSWG and ESC projects. These activities support the development of a sustainable partnership between DNDO and the state and local community to strengthen national R/N detection capabilities in support of the GNDA.

State and Local Stakeholder Working Group (SLSWG) Project

As required in the Security and Accountability For Every (SAFE) Port Act (Public Law 109-347), DNDO is responsible for coordinating with state and local jurisdictions across the Nation. The SLSWG Project is a key mechanism for information sharing and coordinating activities with the mission community. SLSWGs are DNDO-sponsored strategic engagements intended to promote R/N detection capability development and sustainment, and foster strong relationships with and among mission stakeholders. Annual

SLSWG meetings provide a forum for stakeholders to exchange best practices, obtain feedback on DNDO's initiatives, and interact with subject matter experts. At SLSWG meetings, participants present and discuss current activities and initiatives, lessons learned, available tools, and reports.

Executive Steering Council (ESC) Project

The ESC annual meetings provide an opportunity for policy coordination, discussion, and implementation among DNDO and senior-level state and local leaders regarding R/N detection programs. The ESC attendees include Homeland Security Advisors and other executive-level stakeholders. Like the SLSWG, the ESC is a mechanism to solicit input from stakeholders on their successes, evolving requirements, and challenges. Unlike the SLSWG, the focus of this group is less on operations and more on coordination of capabilities, understanding gaps in the GNDA, and providing insight into how state and local policies integrate with the GNDA. Meeting topics include classified R/N threat updates, mission challenges, and Federal efforts to improve FSLTT coordination. The ESC meeting apprises executive leadership of ongoing efforts in support of their jurisdictions and promotes the senior-level mission advocacy needed to sustain state and local R/N detection programs and capabilities. Attendance at the ESC meetings has grown over the years, with a four-fold increase in numbers of attendees and numbers of states represented, demonstrating the success of DNDO outreach efforts and that GNDA stakeholders value the meetings.

Assistance Program

The Assistance Program provides standardized processes and products to assist SLTT agencies with planning, developing, implementing, and sustaining R/N detection programs. The Assistance Program is designed to facilitate multi-jurisdictional, multi-disciplinary policy-makers, program managers, and operational administrators working together to develop and implement interior and maritime R/N detection programs to expand the interior layer and enhance the GNDA.

Since January 2014, the Assistance Program has implemented an aggressive outreach strategy to raise awareness of the R/N detection mission and to improve U.S. interior R/N detection capabilities by assisting states, major Urban Area Security Initiative (UASI) cities, and United States Coast Guard (USCG) Area Maritime Security Committees (AMSC) to develop, implement, and sustain R/N detection programs. A focused activity within the Assistance Program is maritime capability development which works with the AMSCs to develop maritime based R/N detection programs that support the region's Area Maritime Security Plans and assist the USCG Captains of the Port in assessing vulnerabilities, mitigating risks, and sharing information to address the small vessel threat.

The Assistance Program uses a system of standardized processes to guide SLTT authorities through a series of development phases. This phased approach includes providing comprehensive guidance for the planning, organizing, equipping, training, and exercising process creating a sustainable framework for the administration of a domestic preventive R/N detection program at the senior

policymaking, middle management, and operational levels. The Assistance Program met its FY 2015 goal to make positive contact with all 50 states, consisting of introductory awareness-raising meetings with senior state officials. The program followed up on these contacts to work with the states to develop and implement R/N detection programs consisting of CONOPS, agency and special event standard operating procedures, and training and exercise plans. The Assistance Program has produced steady progress in numbers of states developing and implementing R/N detection programs with underlying capabilities. By the end of FY 2018, the program's goal is for all 50 states, all 11 major UASIs, and all 43 USCG Sector AMSCs to have active, viable, and sustainable R/N detection programs.

DNDO continues to work with DHS partners to enhance their R/N detection program and capabilities. In addition to work with U.S. Customs and Border Protection, the USCG, and Transportation Security Administration, DNDO is working with other DHS agencies to assist in designing and implementing a comprehensive R/N detection program and capability. These assistance efforts include: supporting training and exercises, planning, facilitating meetings and workshops, and providing equipment information for R/N detection equipment purchasing.

Mobile Detection Deployment Units (MDDU) Project

The MDDU Project provides detection equipment packages for FSLTT authorities to augment their R/N detection capability and support special events and enhanced steady state operations. The MDDU Project includes six units pre-staged at DOE RAP team locations around the United States and outfitted with R/N detection equipment. Requests to deploy an MDDU by FSLTT agencies are evaluated based on an assessment of the event's risk and on the readiness of the region to incorporate the MDDU into their operations.

As a result of the engagement via the Assistance Program, there were 110 MDDU deployments in FY 2016, an increase of more than 30 percent over the 83 MDDU deployments in FY 2015. The MDDU program anticipates a deployment increase of 10 percent per year over the next two years. To address increased demand in MDDU support, the Assistance Program has implemented a more efficient deployment methodology by shipping equipment only instead of deploying a full MDDU package when possible. This package can be accompanied by one subject-matter expert to provide training, operational recommendations and equipment technical support. This agile model will allow the program to support additional requests over time.

Training Program

The Training Program supports FSLTT stakeholders in developing or enhancing their R/N detection training. The Training Program evaluates GNDA stakeholder R/N detection capability and provides data used to assess R/N detection operational effectiveness. It is responsible for the development, oversight, and administration of the design, delivery, evaluation, and continual improvement of R/N detection training. The program's primary objective is to improve operational capabilities at the FSLTT levels through the

development of training standards and curricula. The Training Program is developing and/or improving curricula in basic radiation safety, equipment operations, and tactical deployment; maritime and aerial detection; spectroscopy analysis; and special event planning.

The Training Program is developing and/or improving effective Training Standards and Qualifications for R/N detection to assist state and local agencies in developing uniform training qualification standards. To achieve a national-level standardized preventive R/N detection (PRND) capability, the Training Program has submitted the definitions for the roles and responsibilities of PRND primary and secondary screeners, team operators, team leaders, and prerequisite training standards to Federal Emergency Management Agency's National Integration Center – the organization responsible for managing the implementation and review of the National Incident Management System (NIMS) - for review and inclusion in national preparedness doctrine. These PRND-related NIMS resource type positions and National Training Standards and Qualifications will be part of a NIMS resource typing specific to the PRND mission. NIMS typing provides guidance on required training and establishes desired PRND capabilities levels while also helping to institutionalize the R/N detection training curriculum across the Nation. This will result in responders having more standard PRND capabilities when working missions across multiple jurisdictions.

The Training Program both develops and delivers PRND training in concert with partner training providers in order to reach as many stakeholders as possible. Training "delivery" consists of courses actually taught by Training Program staff or contracted instructors, while "supported" training consists of training activities where the Training Program contributed to a course by providing content, instructors, or radiological sources.

In FY 2016, the Training Program conducted 36 courses and supported another 225, which combined, trained more than 6,000 participants. In FY 2017, the program will deliver 34 courses and support another 250, which combined, will train an estimated 6,500 participants. In FY 2018, the program will deliver 34 courses, support another 250, and when combined with the expansion of the current on-line training courses will train an estimated 8,000 participants. These efforts will result in significant increases in R/N detection capability within a variety of agencies throughout the United States.

Exercise Program

The Exercises Program seeks to validate and enhance emerging capabilities and systems in an effort to coordinate and integrate detection of nuclear or other radioactive materials out of regulatory control. This is accomplished by providing a range of support services and expertise to FSLTT and international GNDA stakeholders. The Exercise Program regularly updates R/N detection-specific exercise materials, both for use by exercise planners and distribution for use by stakeholders and partners upon request, including a variety of templates, tools, and guidance. These proven exercise practices are all in accordance with the Homeland Security Exercise and Evaluation Program (HSEEP) methodology and are also applicable for exercise requirements not associated

with the HSEEP methodology.

The level of direct support provided for the planning, design, execution, and evaluation of exercises is dependent upon the stakeholders' level of knowledge and experience in conducting the R/N detection mission, as well as the availability of resources to the requesting stakeholder. The majority of support requests received by the Exercise Program are to lead the planning, design, conduct, and evaluation of the exercise. The Exercise Program does, however, frequently support limited requests, such as providing licensed radioactive sources or subject-matter experts for exercise evaluation of specific R/N detection capabilities.

Areas of priority for the Exercise Program in FY 2017 and FY 2018 include advancing the GNDA mission through continued direct exercise support, increased sharing of exercise best practices, incorporating innovative exercise efficiencies, and promoting self-sustainment through enhanced collaboration with federal partners.

Adjustments to Base Justification

DNDO continues to examine and mature its implementation of the Common Appropriation Structure. As part of a review of program alignment, adversary analysis and capability integration activities and funding were identified as being more effectively integrated into the Architecture Planning and Analysis PPA in Research and Development. This $1.118 million transfer would consolidate adversary analysis and capability-based planning functions with architecture, risk, and other similar functions already in the Architecture Planning and Analysis PPA. This will result in more holistic analysis products that better advance DNDO's ability to understand, anticipate, and reduce the threat of radiological and nuclear terrorism.

Federal, State, Local, Territorial, and Tribal Support – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Federal, State, Local, Territorial, and Tribal Support	$26,168	$25,560	$23,384	($2,176)
Total	**$26,168**	**$25,560**	**$23,384**	**($2,176)**
Discretionary - Appropriation	$26,168	$25,560	$23,384	($2,176)

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$101	$208	$207	($1)
25.1 Advisory and Assistance Services	$14,034	$9,193	$6,984	($2,209)
25.2 Other Services from Non-Federal Sources	-	$548	$573	$25
25.3 Other Goods and Services from Federal Sources	$12,033	$15,611	$15,620	$9
Total - Non Pay Object Classes	**$26,168**	**$25,560**	**$23,384**	**($2,176)**

Federal, State, Local, Territorial, and Tribal Support – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Joint Analysis Center	$6,915	$7,063	$4,109	($2,954)
JACCIS	$3,557	$3,541	$3,350	($191)
Assistance	$8,648	$8,239	$8,843	$604
Training	$3,843	$3,966	$4,423	$457
Exercises	$1,840	$1,879	$2,259	$380
Federal, State, and Local Outreach	$1,365	$872	$400	($472)
Total – Non Pay Cost Drivers	**$26,168**	**$25,560**	**$23,384**	**($2,176)**

NARRATIVE EXPLANATION OF CHANGES

DNDO balanced program requirements while supporting the FY 2018 President's Budget. The changes in the previous table reflect the $1.118 million transfer to the Architecture Planning and Analysis PPA and the $1.058 million program change for FSLTT Support PPA. The funding transfer is made to align with DNDO's mission to prevent nuclear terrorism by continuously improving capabilities to deter, detect, respond to, and attribute attacks, in coordination with domestic and international partners. The transfer consolidates adversary analysis and capability-based planning functions with architecture, risk, and other similar functions already in the Architecture Planning and Analysis PPA. This will result in more holistic analysis products that better advance DNDO's ability to understand, anticipate, and reduce the threat of radiological and nuclear terrorism. The remaining adjustments align program funding with objectives for FY 2018 and reflect prioritization between program areas.

Securing the Cities - PPA

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Dollars in Thousands

Organization	FY 2016 Revised Enacted			FY 2017 Annualized CR			FY 2018 President's Budget			FY 2017 to FY 2018 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Securing the Cities	-	-	$21,113	-	-	$21,135	-	-	$21,135	-	-	-
Total	**-**	**-**	**$21,113**	**-**	**-**	**$21,135**	**-**	**-**	**$21,135**	**-**	**-**	**-**
Subtotal Discretionary - Appropriation	-	-	$21,113	-	-	$21,135	-	-	$21,135	-	-	-

Securing the Cities – PPA
Budget Authority and Obligations

Dollars in Thousands

Budget Authority	FY 2016	FY 2017	FY 2018
Enacted	$21,113		
Transfers & Reprogrammings	-		
Delta in Enacted Fee Estimate to Fee Actuals	-		
Enacted Rescissions to Prior Year	-		
Revised Enacted/Request	**$21,113**	**$21,135**	**$21,135**
Carryover and/or Recoveries (Actual/Estimates/Projections)	$565	$1,455	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	**$21,678**	**$22,590**	**$21,135**
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	**$21,678**	**$22,590**	**$21,135**
Obligations (Actual/Projections/Estimates)	$21,110	$22,590	$21,135
Personnel: Positons and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Securing the Cities – PPA
Summary of Budget Changes

Dollars in Thousands

Budget Formulation Activity	Positions	FTE	Amount
FY 2016 Enacted	**-**	**-**	**$21,113**
FY 2016 Revised Enacted	**-**	**-**	**$21,113**
FY 2017 Annualized CR	**-**	**-**	**$21,135**
FY 2018 Base Budget	**-**	**-**	**$21,135**
FY 2018 Current Services	**-**	**-**	**$21,135**
FY 2018 Request	**-**	**-**	**$21,135**
FY 2017 TO FY 2018 Change	**-**	**-**	**-**

PPA Description

The STC Program seeks to reduce the risk of a successful deployment of a R/N terrorist weapon against major metropolitan regions in the United States by establishing sustainable capability within the GNDA partner agencies to detect, analyze, and report nuclear and other radioactive materials out of regulatory control.

STC is a multi-year R/N detection capability development project. FA funds are disbursed under the STC Program through competitively awarded cooperative agreements to a lead agency. The lead agency then uses local procurement procedures to acquire equipment and services in support of STC goals and objectives and also establishes a regional governance structure among the major law enforcement, first response, emergency management, and public health agencies to implement a regional R/N detection program.

Program	Project	FY 2018 Funding ($000)	Level of Effort	General Description
Securing the Cities	National Capital Region (NCR)	$2,080	Annual, ongoing	The STC Program seeks to reduce the risk of a successful deployment of a R/N terrorist weapon against major metropolitan regions in the United States by establishing sustainable capability within the GNDA partner agencies to detect, analyze, and report nuclear and other radioactive materials out of regulatory control within their jurisdictions. Funding for the NYC/Newark and LA/Long Beach implementations is complete.
	Houston	$4,801	Annual, ongoing	
	Chicago	$9,825	Annual, ongoing	
	Implementation #6 - TBD	$3,495	Annual, ongoing	
	STC Program Support	$934	Annual, ongoing	STC Program Office contracted services and travel that supports all STC implementations. Contracted services include program office support personnel and establishing information sharing capabilities.

The STC Program employs a three-phase strategy to provide financial assistance to multiple regions simultaneously while expanding capabilities to further implement the domestic portion of the GNDA. The three phases of the program are:

Phase I – Initial Operating Capability

STC provides a mechanism for cities to develop an initial operating capability to detect and report the presence of nuclear and other radioactive materials that are out of regulatory control using equipment, protocols, and personnel in support of the GNDA. During Phase I, efforts focus on satisfying the immediate needs of state and local agencies in developing detection and reporting capabilities. STC provides financial resources and expertise to boost partners' understanding and awareness of the nuclear threat, enhance regional capabilities to detect and interdict nuclear threats, and increase cooperation and coordination among regional jurisdictions and agencies. Initial capabilities include development of operations plans including alarm adjudication protocols, deployment of equipment, training and exercise support, and technical program assistance. Phase I concludes when the region establishes a nuclear detection program encompassing coordinated operations, self-delivered nuclear detection training and exercise capabilities, and a plan to sustain the program over time in support of the GNDA. This phase of the implementation is expected to take the first three years of the engagement.

Phase II – Integration

STC provides additional financial resources to enable development of enhanced detection, analysis, communication, and coordination functionality. This builds on the integration of state and local capabilities with USG activities and the GNDA that previously existed or were established during Phase I. In this phase, the USG leverages capabilities established locally in Phase I to partner with state and local jurisdictions to ensure a national coordinated response in support of the GNDA. In addition, STC works with partners to define end-states for direct support to state and local activities. Phase II concludes when a region successfully demonstrates its ability to integrate into a national nuclear detection framework in support of the GNDA.

This phase of the implementation is expected to take two years.

Phase III – Sustainment

Following the conclusion of Phase II, DNDO provides indirect, non-financial support to sustain the program in accordance with the cooperative agreement with region. STC maintains connectivity with the established local architecture through alarm adjudication and subject-matter expertise to provide advice on training, exercises, and other program support. Examples of other R/N detection programs within DNDO that provide support include:

- Systems engineering and evaluation programs which provide detection equipment testing to aid partners in making equipment decisions.
- Product acquisition and deployment support programs which provide guidance to help interpret equipment specifications so STC partner operators clearly understand equipment capabilities.
- Transformational and applied research program offices which explore emerging radiation detection technology and partner with Phase III STC implementations to be test-beds for technology demonstrations.
- Red Teams which operate in overt or covert modes to assist STC stakeholders in understanding potential vulnerabilities.
- Operations support teams which provide training materials and exercise support.

STC typically requires a nine-month process to issue a cooperative agreement for each metropolitan area. This causes cooperative agreements to be issued late in the fiscal year and implementation start dates beginning in the following fiscal year.

The Los Angeles/Long Beach implementation received its last STC funding installment in late FY 2016 and is projected to transition into the Sustainment Phase in FY 2018. The region will no longer receive STC funding, but DNDO will continue to provide indirect non-financial assistance as described in Phase III activities above.

The NCR is expected to complete Phase I activities during FY 2017. In FY 2018, the region is projected to receive its last STC funding installment of up to $2 million as it completes Phase II activities in FY 2019.

The Houston region will continue Phase I activities through FY 2018. The region is projected to receive up to $5 million in late FY 2018 and enter Phase II in FY 2019.

The Chicago region is projected to receive up to $10 million in FY 2018 as it builds its Phase I initial operating capability.

The sixth and seventh STC implementations will be selected via a competitive funding opportunity late in FY 2018. The initial award of up to $5 million for STC implementation six is scheduled to occur before the end of FY 2018 with initial Phase I activities scheduled to occur in FY 2019.

Securing the Cities – PPA
Non Pay Budget Exhibits

Non Pay Summary

Dollars in Thousands

Organization	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Securing the Cities	$21,113	$21,135	$21,135	-
Total	**$21,113**	**$21,135**	**$21,135**	-
Discretionary - Appropriation	$21,113	$21,135	$21,135	-

Non Pay by Object Class

Dollars in Thousands

Non-Pay Object Classes	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Change
21.0 Travel and Transportation of Persons	$38	$31	$35	$4
25.1 Advisory and Assistance Services	$3,575	$3,404	$3,450	$46
41.0 Grants, Subsidies, and Contributions	$17,500	$17,700	$17,650	($50)
Total - Non Pay Object Classes	**$21,113**	**$21,135**	**$21,135**	**-**

Securing the Cities – PPA
Non Pay Cost Drivers

Dollars in Thousands

Leading Non Pay Cost-Drivers	FY 2016 Revised Enacted	FY 2017 Annualized CR	FY 2018 President's Budget	FY 2017 to FY 2018 Total Changes
Los Angeles / Long Beach	$1,800	-	-	-
National Capital Region	$6,360	$4,300	$2,080	($2,220)
Houston	$8,315	$8,100	$4,801	($3,299)
Chicago	$3,500	$7,125	$9,825	$2,700
Implementation #6 – TBD	-	-	$3,495	$3,495
STC Program Support	$1,138	$1,610	$934	($676)
Total – Non Pay Cost Drivers	**$21,113**	**$21,135**	**$21,135**	**-**

NARRATIVE EXPLANATION OF CHANGES

The Los Angeles/Long Beach implementation received its last STC funding installment in late FY 2016 and is projected to transition into the Sustainment Phase in FY 2018. The region will no longer receive STC funding, but DNDO will continue to provide indirect non-financial assistance as described in Phase III activities.

The National Capital Region is expected to complete Phase I activities during FY 2017. In FY 2018, the region is projected to receive its last STC funding installment of up to $2 million as it completes Phase II activities in FY 2019.

The Houston region will continue Phase I activities through FY 2018. The region is projected to receive up to $5 million in late FY 2018 and enter Phase II in FY 2019.

The Chicago region is projected to receive up to $10 million in FY 2018 as it builds its Phase I initial operating capability.

The sixth and seventh STC implementations will be selected via a competitive funding opportunity late in FY 2018. The initial award of up to $5 million for STC implementation six is scheduled to occur before the end of FY 2018 with initial Phase I activities scheduled to occur in FY 2019.

Projected STC Program Support funding requirements decreased due to reduction in level of effort for the contract providing information sharing services and the reduction in STC Program Office support contractor staff.