

# *Domestic Nuclear Detection Office (DNDO)*

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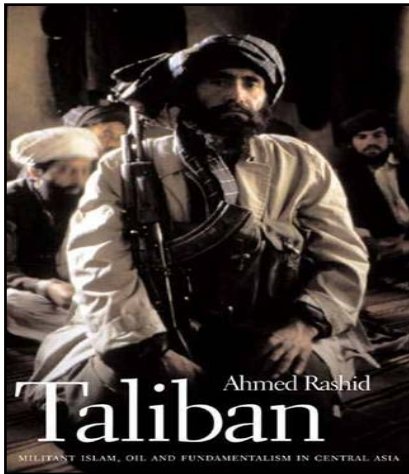
**EFCOG 2007 Executive  
Council Meeting  
February 21-22, 2007**



***Vayl S. Oxford***  
**Director, DNDO**  
**Department of Homeland Security**



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The radiological / nuclear threat could come from any number of sources...



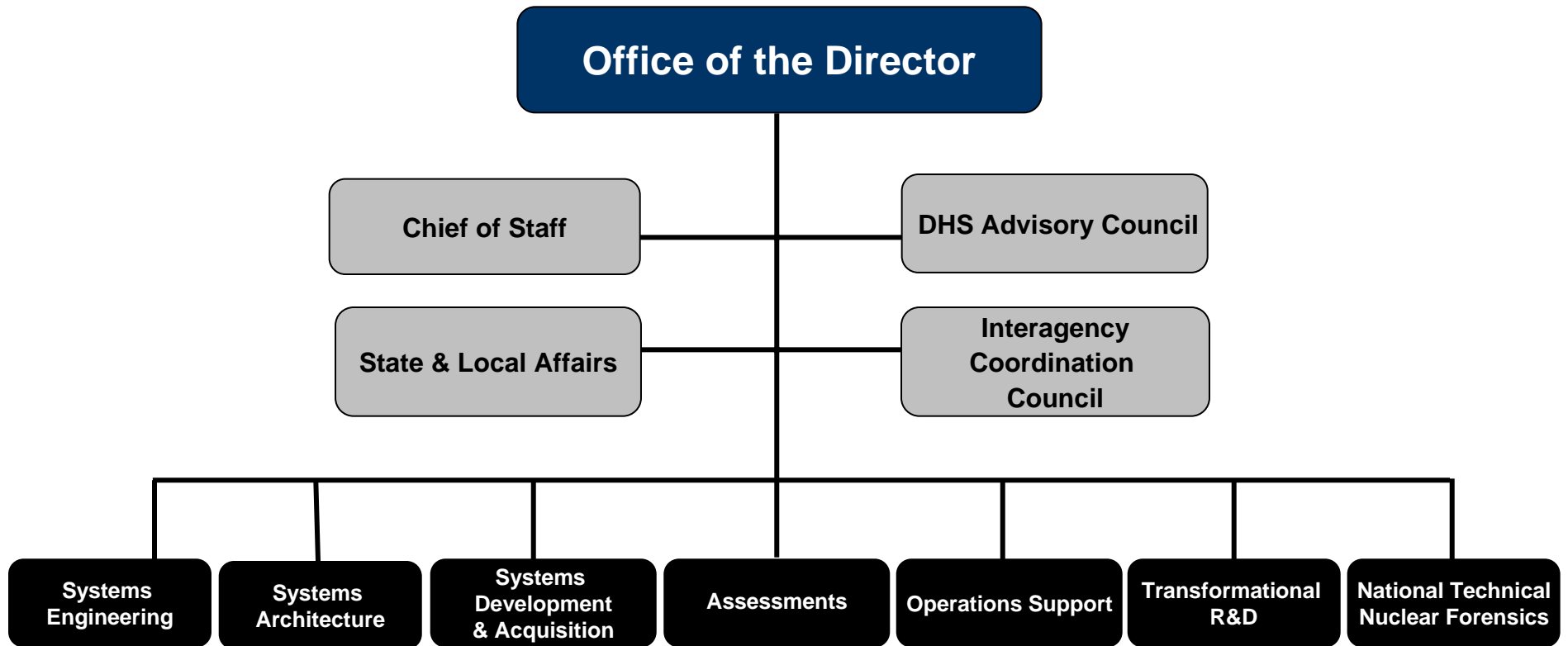
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# ***DNDO Mission and Objectives***

**DNDO was founded on April 15, 2005 with the signing of NSPD 43 / HSPD 14. It is a jointly-staffed, national office established to improve the Nation's capability to detect and report unauthorized attempts to import, possess, store, develop, or transport nuclear or radiological material for use against the Nation, and to further enhance this capability over time.**

- Develop the global nuclear detection and reporting architecture
- Develop, acquire, and support the domestic nuclear detection and reporting system
- Fully characterize detector system performance before deployment
- Establish situational awareness through information sharing and analysis
- Establish operation protocols to ensure detection leads to effective response
- Conduct a transformational research and development program
- Provide stewardship of USG TNF planning, integration and development

# Domestic Nuclear Detection Office (DNDO)



# ***DNDO: An Interagency Office***

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- DNDO is an interagency office comprised of agencies from:
  - Department of Energy (9)
  - Department of Defense (11)
  - Department of Homeland Security (62)
  - Department of Justice/Federal Bureau of Investigation (6)
  - Department of State (1)
  - Nuclear Regulatory Commission (1)
- DNDO works with intra-agencies such as the U.S. Coast Guard (USCG), Customs and Border Protection (CBP), Transportation Security Administration (TSA), and Office of Grants and Training (OG&T).
- DNDO works closely with Federal, State and local entities to develop and deploy the domestic nuclear architecture.
- DNDO also works with the national labs, industry and academia to conduct research.



# *Accomplishments to Date*

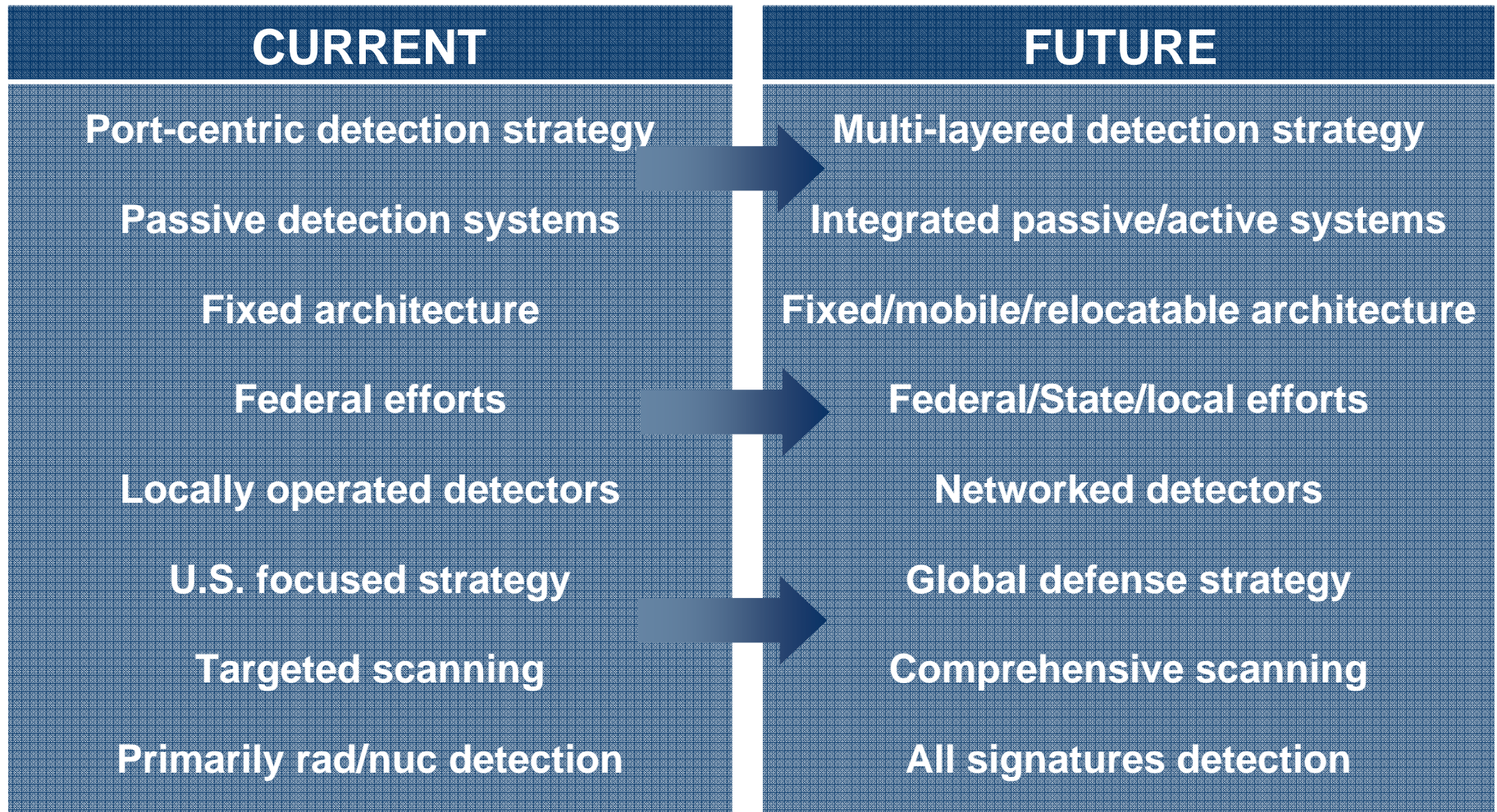
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- Completed first ever global nuclear detection architecture; identified priority initiatives
- Completed performance testing for next-generation RPMs, mobile, handheld, and backpack radiation detection systems, and personal radiation detection systems
- Competitively selected 44 transformational research proposals from National Laboratories; work began in June
- Awarded grants to five States (KY, SC, TN, VA, GA) for the pilot deployment of radiation detection systems to interstate weigh stations through the Southeast Transportation Corridor Pilot (SETCP)
- Conducted approximately 200 assessments of nuclear threats and smuggling cases
- Stood up the National Technical Nuclear Forensics Center (NTNFC) (October 2006)
- Completed training for 402 FY06 (Goal 300) State and Local personnel in Basic and Intermediate, Preventive Rad/Nuc Detection Courses. Currently trained to date 369 FY07 (Goal 1200).



# *Desired End State*

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# ***DNDO Approach to Planning***

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*A successful architecture must:*

*- Encounter the adversary*

**Capacity**

*- Detect the threat*

**Capability**

*- Identify or classify the threat*

*- Successfully Interdict*

**Operational  
Effectiveness**

$$P_{\text{success}} = P_{\text{encounter}} \times P_{\text{detection}} \times P_{\text{identification}} \times P_{\text{interdiction}}$$

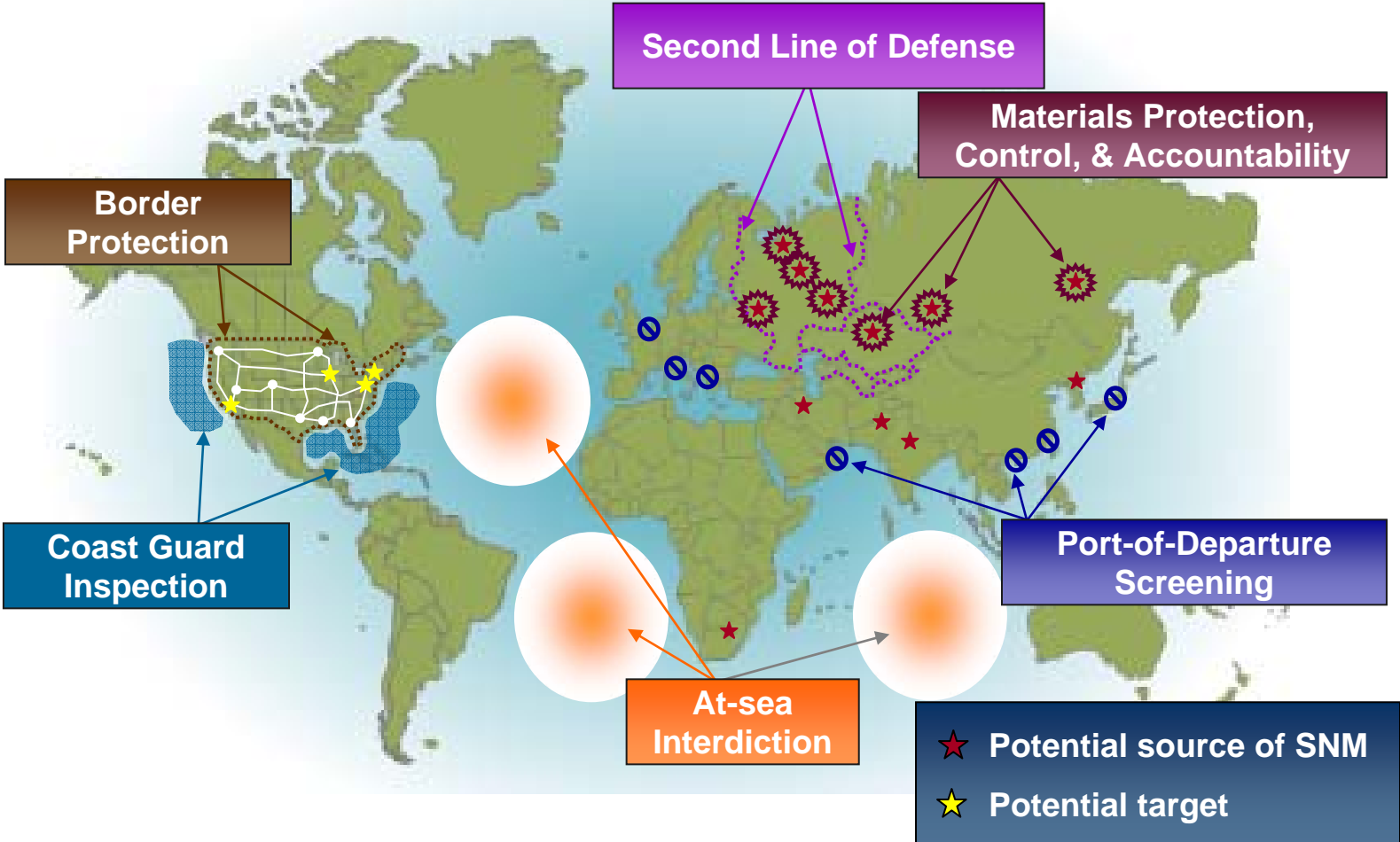


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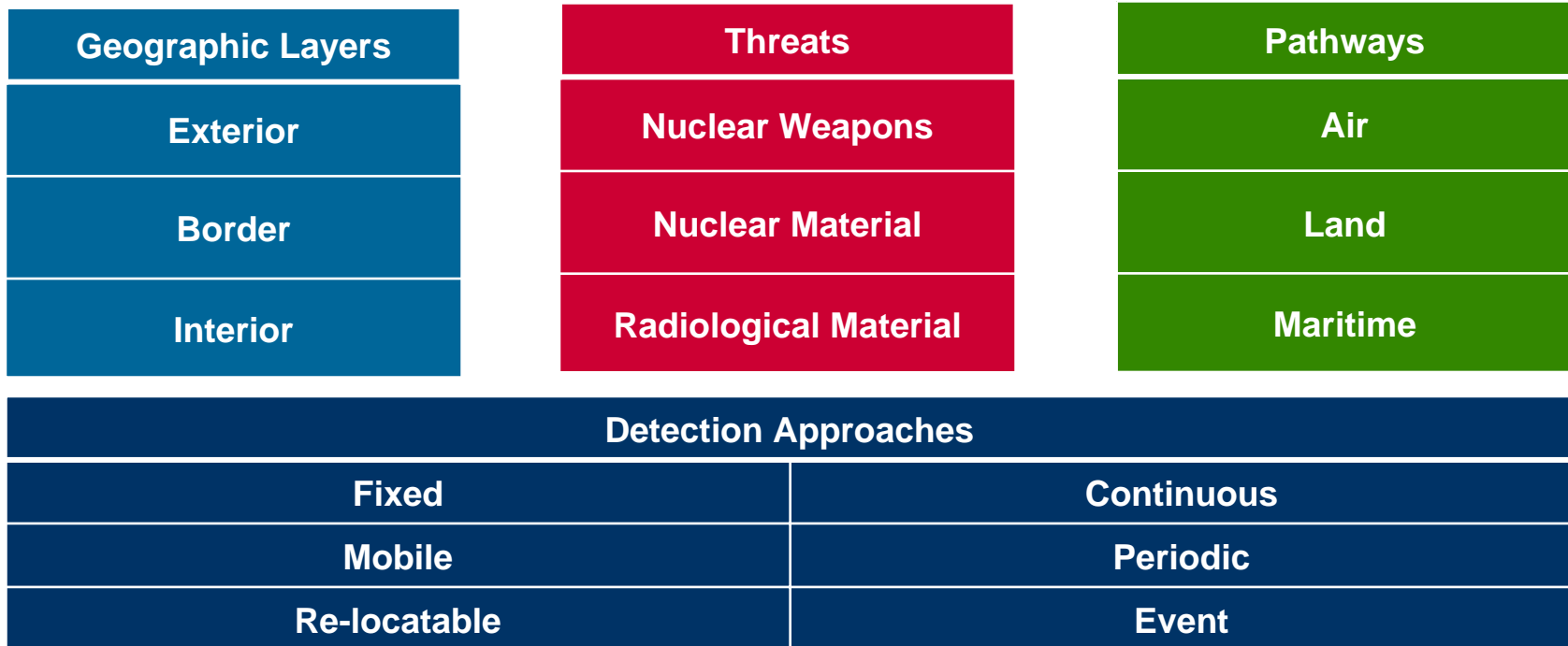
# Global Nuclear Detection Architecture

A multi-layered, international system offers multiple opportunities for detection.



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# Architecture Structure



- Threats could originate in either the Exterior (international) or Interior (domestic) layers
- Depending upon origin, threats may pass through one or three layers
- Adversaries may use one or more pathways in each layer or layer transition

# *Vision for Domestic Screening*

## **Priorities**

- Continue to increase the percentage of inbound cargo scanned for the presence of radiological and nuclear threats at U.S. ports of entry (POEs).
- Expand to Non-POEs (General Aviation, Small Maritime Craft and Land).
- Domestic Interior.



## **Integrated approach to detection of special nuclear material**

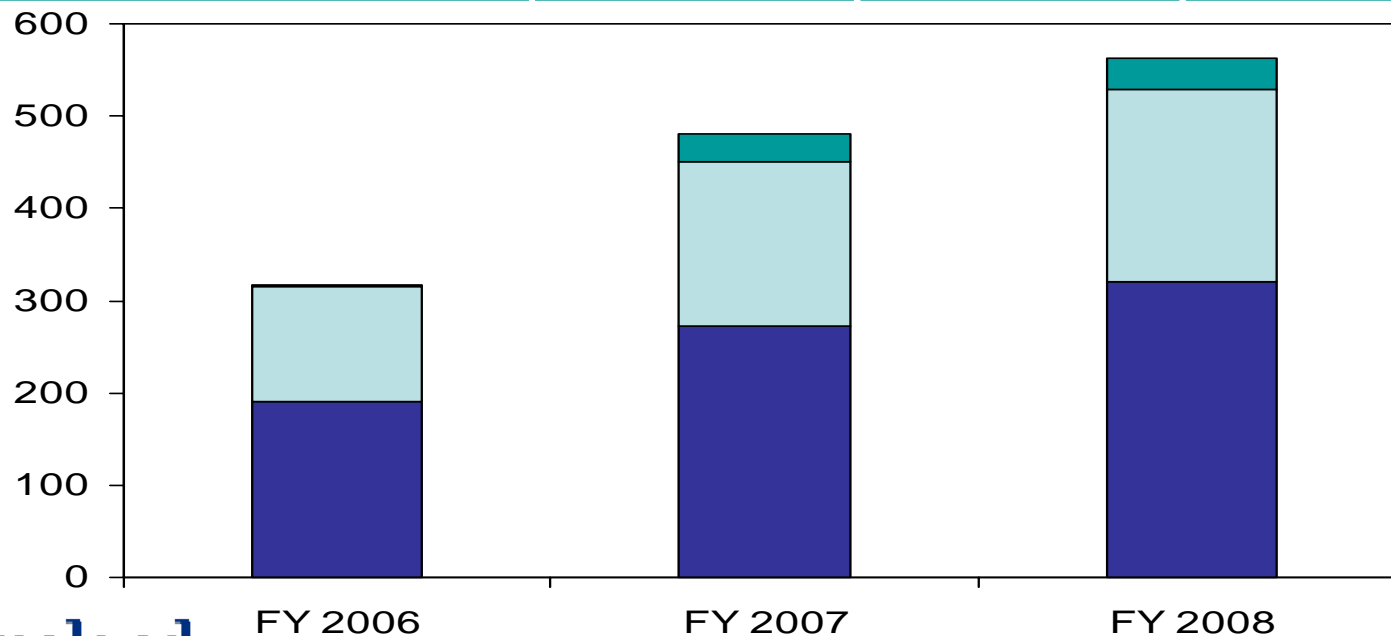
- Detection of unshielded or lightly shielded materials accomplished with current and next-generation RPMs -- *Advanced Spectroscopic Portals (ASP)*.
- Automatic detection of high density shielding that might be used to avoid passive detection accomplished -- *Cargo Advanced Automated Radiography System (CAARS)*.
- The Portable technology that will be used for secondary screening of cargo to identify and localize radiological material after a primary alarm has been triggered -- *Human Portable Radiation Detection Systems (HPRDS)*



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# *FY 2006 – 2008 Budget Profile*

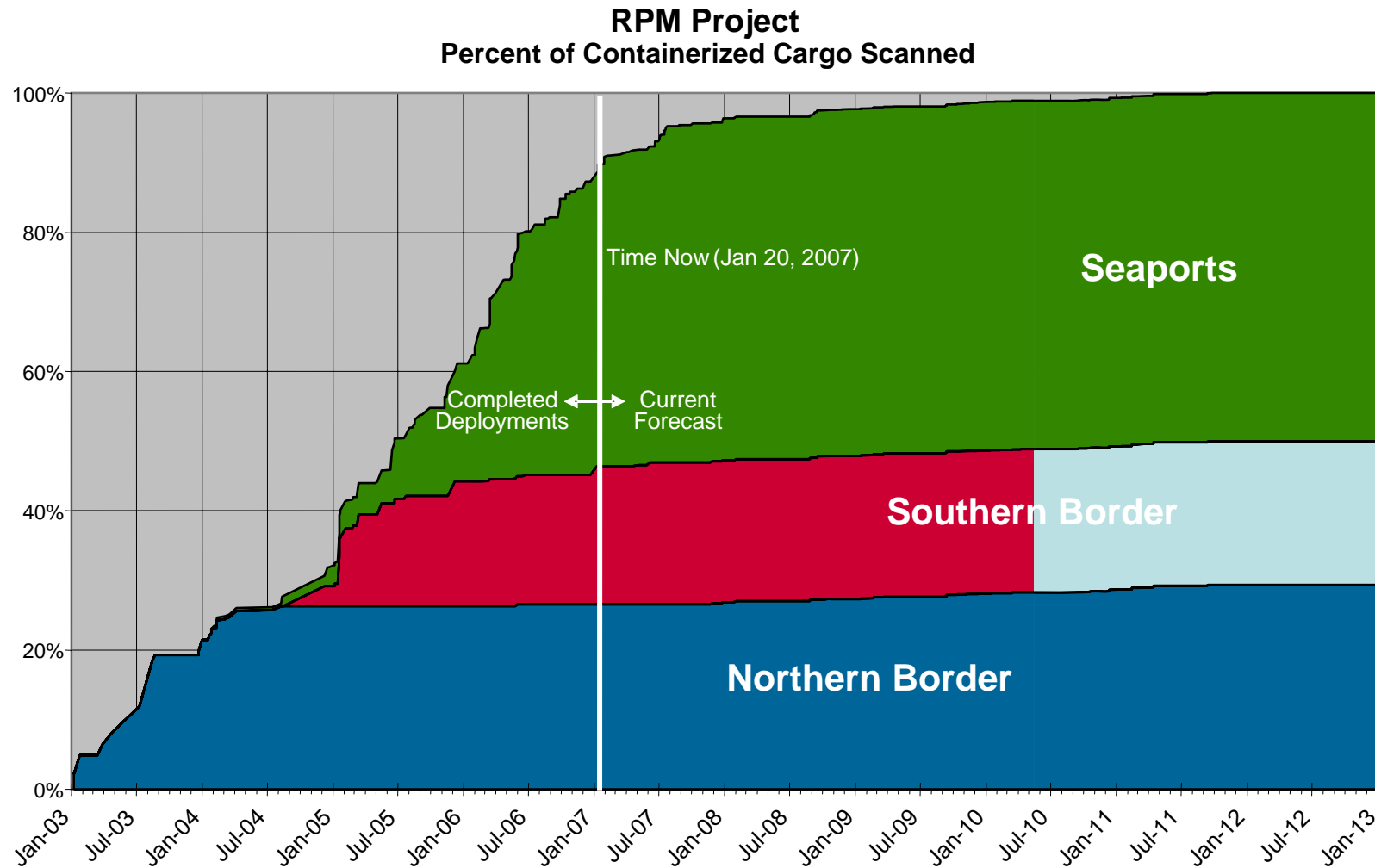
	FY 2006 Enacted	FY 2007 Enacted	FY 2008 Request
<b>Research, Development, and Operations (RD&amp;O)</b>	<b>\$189.8M</b>	<b>\$272.5M</b>	<b>\$319.9M</b>
<b>Systems Acquisition</b>	<b>\$125.0M</b>	<b>\$178.0M</b>	<b>\$208.0M</b>
<b>Management and Administration (M&amp;A)</b>	<b>\$2.6M</b>	<b>\$30.5M</b>	<b>\$34.0M</b>



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# RPM/ASP Land and Seaport Progress and Plan

## Systems Development and Acquisition



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# RPM/ASP Program – Current Deployment Status

## Systems Development and Acquisition

Vector	Operational RPMs (Net RPM Installations at completion)		Volume Coverage	
	Total Required	Status	Status	
			Cargo	POV
North Land	605	241	91%	81%
South Land	374	329	96%	91%
Seaports	752	330	89%	--
<b>Total Sea and Land</b>	<b>1731</b>	<b>900</b>	<b>91%</b>	<b>--</b>
Mail/ECCF	57	57	--	--
Rail	50	0	--	--
Airports	516	0	--	--
Other Sites (test)	194	6	--	--
<b>Total</b>	<b>2548</b>	<b>963</b>	<b>--</b>	<b>--</b>
ASP Systems Only	977	0	--	--





# *Advanced Spectroscopic Portal Program*

**Award Date:** July 14, 2006

## **Program Goals:**

- Develop next-generation passive detection systems for multiple applications
- Initial focus on fixed portals for POEs; substantial investment in rail, mobile, and re-locatable assets for non-POE venues
- Provide 100% passive detection capability at all official POEs
- Deploy fixed and re-locatable systems to non-POE locations

## **Status:**

- DNDO will begin high fidelity testing to fully characterize performance prior to full scale production in February.



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# *Cargo Advanced Automated Radiography Systems*

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**Award Date:** September 13, 2006

## **Program Goals:**

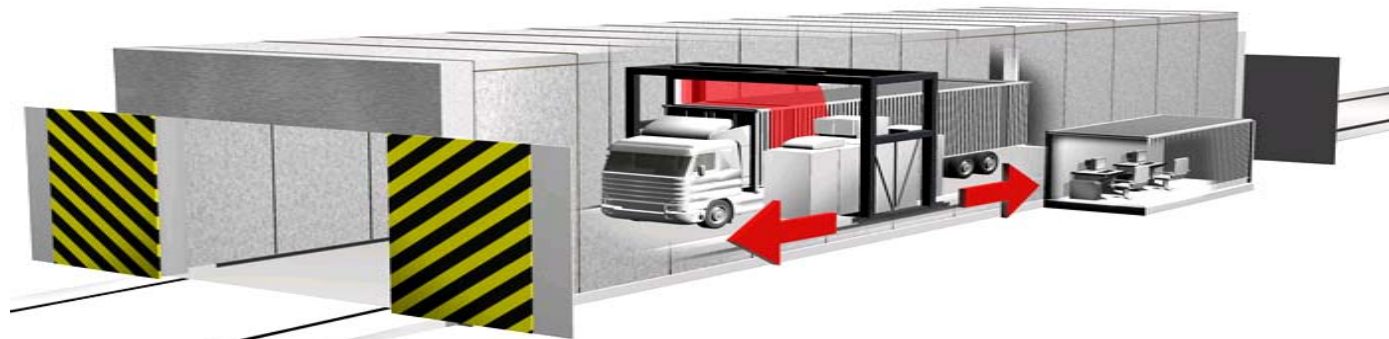
- Develop and deploy a radiography system that automatically detects threat materials in mixed commerce without impeding the flow of commerce
- Conduct radiographic inspection of 50% of all incoming cargo by 2012
- Improved penetration capability

## **Performance Requirements:**

- Automated detection of small (volume > 100 cm<sup>3</sup>), very dense ( $Z > 72$ ) objects in containerized cargo
- Increase radiographic penetration capability from 10" steel to >16" steel
- Automatically inspect containers or cargo at a throughput rate of 40 - 120 per hour

## **Status:**

- The CAARS program is currently in the two-year prototype development period.



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# *Mobile and Human-Portable Radiation Detection Systems*

Award Date: October 25, 2006

## Program Goals:

- Substantial investments are being made in developing handheld, backpack, mobile, and re-locatable assets for POE and Non-POE venues.
- Systems are designed to integrate into existing law enforcement operations, providing cues for further investigative action when radiation is detected.

## Status:

- **Target Costs:** Handhelds ~\$10k, backpacks ~\$40k, and High Purity Germanium handheld systems ~ \$35k
- **Lightweight** package for Handhelds (5 lbs), backpacks (15 lbs), and High Purity Germanium systems (20 lbs)
- **Probability of Detection greater than 90%**
- **Pursue high energy resolution** detection material such as  $\text{LaBr}_3$
- **Improved and standardized** display and controls
- **Improved** algorithms for detection and isotope identification
- **Improved and standardized connectivity** to computers and reach back



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# *Assessments Program*

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- Assessments ensures all technologies, tactics, and processes developed and acquired in support of the DNDO mission are:
  - Comprehensively evaluated and demonstrated prior to widespread deployment
  - Independently assessed once placed in routine use on the front line
- Programs include:
  - Securing the Cities
  - Southeast Transportation Corridor Pilot
  - Annual Program Related Testing
  - Red Teaming Exercises
  - Net Assessments



# *Transformational Research and Development*

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- Transformational research and development conducts, supports, coordinates, and encourages an aggressive R&D program to address significant architectural and technical challenges unresolved by R&D efforts on the near horizon.
- Programs include:
  - Exploratory Research
    - Innovative detection materials and concepts
    - Physics-based phenomenology, experimentation, modeling
  - Advanced Technology Demonstrations (ATDs)
    - Stand-off detection and imaging
    - Intelligent, personal detection systems
  - Academic Research Initiative





# *Operations Support Goals*

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- Operations Support is responsible for developing the information sharing and analytical tools necessary to create a fully integrated operating environment. This integrated approach to detection and information analysis provides substantial improvements in alarm resolution, threat assessments, data trend analysis, and overall probability of mission success.
- Programs include:
  - Joint Analysis Center
  - Nuclear Assessment Program
  - Technical Reachback
  - Training and Exercises
  - State & Local Engagement





# *Operations Support to Domestic Screening*

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## **Joint Analysis Center**

- Integrate the identification, detection, and tracking of the illicit transfer of nuclear and radiological materials within the legitimate movement of commerce. Provide incident adjudication through the fusion of intelligence information and detector data trend analysis.

## **Nuclear Assessment Program**

- Utilize intelligence information, scientific principles and behavioral analysis in order to provide the USG with rapid, accurate and actionable assessments of nuclear/radiological trafficking events and communicated threats

## **Technical Reachback Support**

- Provide highly specialized 24/7 scientific expertise for the technical adjudication of nuclear and radiological detection alarms from Federal, State and local jurisdictions.

## **Training and Exercise**

- Increase and enhance the operational detection capabilities of State and Local Law Enforcement and Response Personnel to detect and interdict radiological and nuclear materials and/or devices within the United States



# Summary

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DNDO is working to develop and deploy a global nuclear detection and reporting architecture to reduce the risk from the nuclear threat

- Critical vulnerabilities in the existing architecture have been identified and alternatives are being developed
- DNDO has developed an aggressive system development and acquisition process to rapidly deploy detector systems
- First-ever, radiation detector test series complete
- Critical Transformational R&D identified to reduce risk across other elements of the architecture
- Providing on-going operational support to the deployed architecture

**DNDO is working to reduce risk by balancing capacity, capability, and operability.**



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