

# *Domestic Nuclear Detection Office (DNDO)*

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## *DNDO Overview*

*Summer 2008*



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# Outline

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- DNDO Mission, Objectives and Organization
- Defining the radiological and nuclear threat
- Multi-layered approach to security
  - Global Nuclear Detection Architecture
- Key Mission Areas
  - At Ports of Entry (POEs) / Between POEs / Maritime / Aviation / Domestic Interior / Nuclear Forensics
- Next Generation Technologies
  - Transformational & Applied Research
  - Product Acquisition and Deployment
- Fully Integrated Operating Environment
  - Operations Support
- Critically Assess Capabilities
  - Systems Engineering & Evaluation
  - Red Teaming & Net Assessments
- Organizational Recap and Summary



# *Mission and Objectives*

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**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
- Characterize detector system performance before deployment
- Establish situational awareness through information sharing and analysis
- Establish operational protocols to ensure detection leads to effective response
- Conduct a transformational research and development program
- Provide centralized planning, integration, and advancement of USG nuclear forensics programs

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

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- DNDO is an interagency office comprised of detailees and liaisons from:
  - Department of Energy
  - Department of Defense
  - Department of Justice/Federal Bureau of Investigation
  - Department of State
  - Nuclear Regulatory Commission
- DNDO also works with and has detailees from other DHS components such as the U.S. Coast Guard, Customs and Border Protection, and Transportation Security Administration.
- The National Labs, academia, and private industry conduct research that directly supports the DNDO mission.
- DNDO maintains strong relationships with Federal, State, and local entities to help develop and deploy the domestic nuclear architecture.



# *The Radiological and Nuclear Threat*

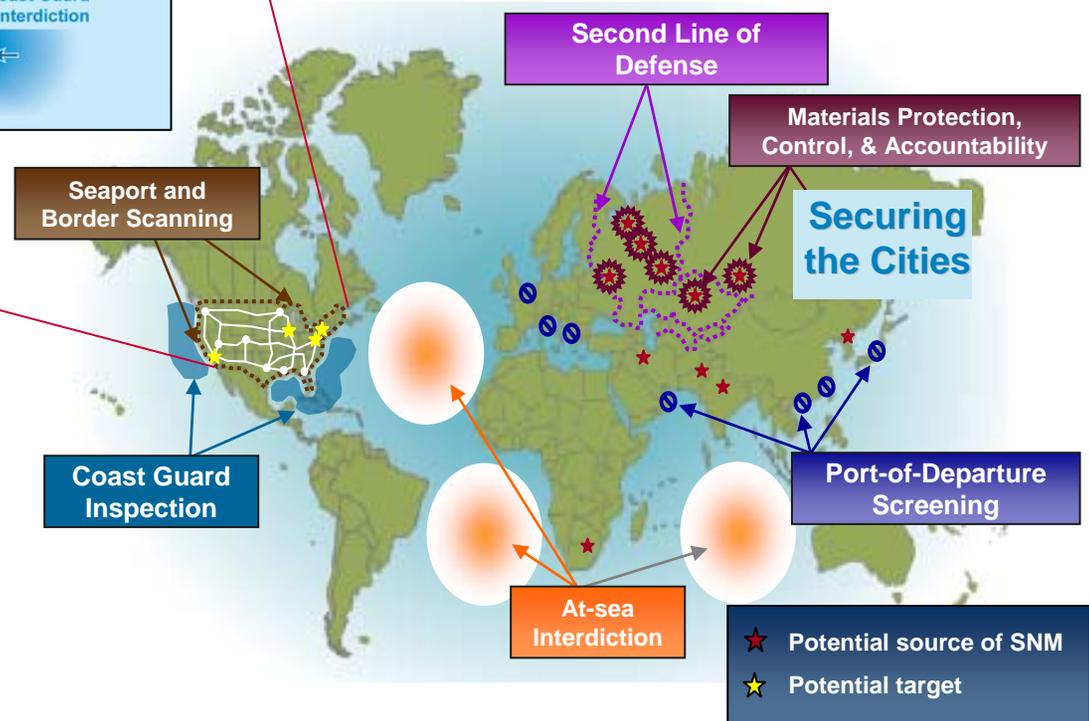
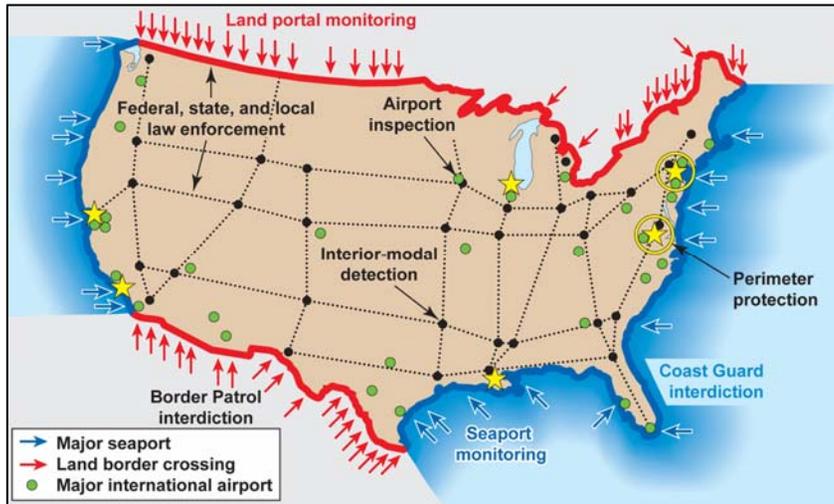
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- The risk of a terrorist acquiring and using a nuclear or radiological device is one of the greatest threats to the Nation
  - A robust, layered defense must be developed
  - Each layer must reduce the terrorist's ability to use such threats against us
- The layered defense concept includes:
  - Eliminating excess stocks of nuclear materials and weapons
  - Protecting existing stocks from theft or diversion
  - Detecting illicit movement of nuclear or radiological material overseas
  - Enhancing domestic detection and interdiction efforts



# Global Nuclear Detection Architecture

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



# *System Architecture*

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- In order to strengthen the Nation's layered defense, the DNDO **Systems Architecture Directorate** is determining gaps and vulnerabilities in the existing Global Nuclear Detection Architecture, and then formulating recommendations and plans to develop an enhanced architecture.
- The global architecture comprises several key elements:
  - A multi-layered structure of rad/nuc detection systems, deployed both domestically and overseas;
  - A well-defined and carefully coordinated network of interrelationships among them;
  - Guidelines governing the architecture's design and evolution over time.
- Proposed improvements in the architecture must be balanced, robust, adaptive/responsive, cost-effective, and supported by disciplined system engineering approach.

**Substantial risk reduction is the aim.**



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# *Key Mission Areas*

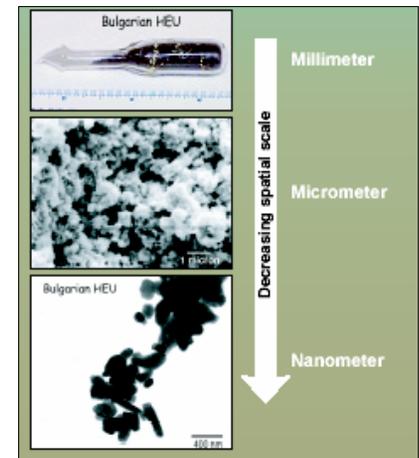
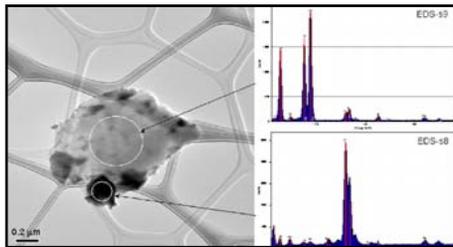
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- DNDO focuses on increasing detection capabilities in key mission areas as part of a comprehensive strategy to protect the Nation against radiological and nuclear threats.
  - At Ports of Entry
  - Between Ports of Entry
  - Small Maritime Vessels
  - General Aviation
  - Domestic Interior
- Through its **Mission Management Directorate**, DNDO collects requirements and develops integrated plans with executing partners in each mission area that address:
  - Technology acquisition and deployment
  - Training and exercises
  - Information sharing and alarm resolution



# National Technical Nuclear Forensics Center

- The same principles of integration and coordination that underlie the DNDO nuclear detection mission are replicated in the **National Technical Nuclear Forensics Center (NTNFC)**
- NTNFC provides national-level stewardship, centralized planning and integration for an enduring national technical nuclear forensics (TNF) capability
  - Takes an end-to-end global perspective to integrate all relevant national agencies and capabilities, including DHS, DOE, DoD, DOS, DOJ, IC
  - Ensures national TNF capabilities meet law enforcement, homeland security, and national security requirements for accuracy, timeliness, and credibility to support the broader goal of attribution
- NTNFC also serves as the “capability provider” for pre-event / pre-detonation rad/nuc materials forensics



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# *Next Generation Technologies*

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- DNDO is focused on developing technologies that will improve radiation detection capabilities across the architecture, can be deployed in a variety of operating environments, and are synchronized with needs from the mission areas
  - Identified the technological gaps present in the current global nuclear detection architecture
  - Gathered customer requirements for next-generation technology development
- Available tools include: radiation portal monitors, radiography systems, mobile systems, and handhelds and backpacks
- DNDO conducts both long-term (**Transformational & Applied Research Directorate**) and near-term (**Product Acquisition & Deployment Directorate**) development

# Next-Generation Technologies

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- The **Transformational and Applied Research Directorate** conducts, supports, coordinates, and encourages an aggressive, long-term 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
  - Academic Research Initiative
  - Advanced Technology Demonstrations (ATDs)
    - Stand-off detection and imaging
    - Intelligent, personal detection systems
  - JINII/Cargo Advanced Automated Radiography Systems



# Next-Generation Technologies

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- The **Product Acquisition & Deployment Directorate** is responsible for the engineering development, production, developmental logistics, procurement and deployment of current and next generation nuclear detection systems
- Programs include:
  - Advanced Spectroscopic Portal Program (ASP)  
Radiation Portal Monitor Program (RPMP)
  - Human-Portable Radiation Detection Systems (HPRDS)



# Fully Integrated Operating Environment

- Deployment of detection technologies alone will not ensure mission success
- Through the **Operations Support Directorate** DNDO develops the information sharing and analytical tools necessary to create a fully integrated operating environment, as well as conducts training, exercises and engagements related to preventive radiological and nuclear detection.
- Programs include:
  - Joint Analysis Center
  - Nuclear Assessment Program
  - Technical Reachback
  - Training, Exercises and Engagements



# Critically Assess Capabilities

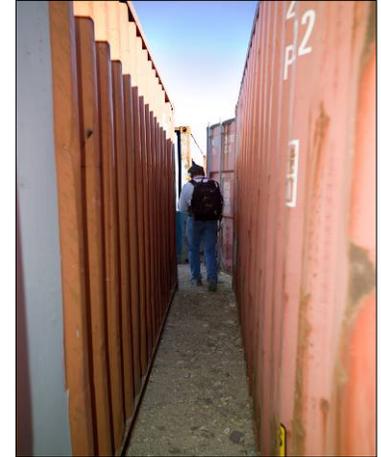
- The **Systems Engineering & Evaluation Directorate** ensures that integrated and balanced solutions are developed for the global nuclear detection system, and that all technologies, tactics, and processes are comprehensively evaluated and demonstrated prior to deployment
  - Establishes systems performance requirements and specifications
  - Operational modeling and simulation studies to inform policy decisions
  - Conducts test and evaluation campaigns of Commercial Off-the-Shelf (COTS) systems, as well as next-generation technologies under development
  - Works with National Institute of Standards and Technology (NIST) and with other Federal entities to develop threat-based “technical capability standards”



# Critically Assess Capabilities

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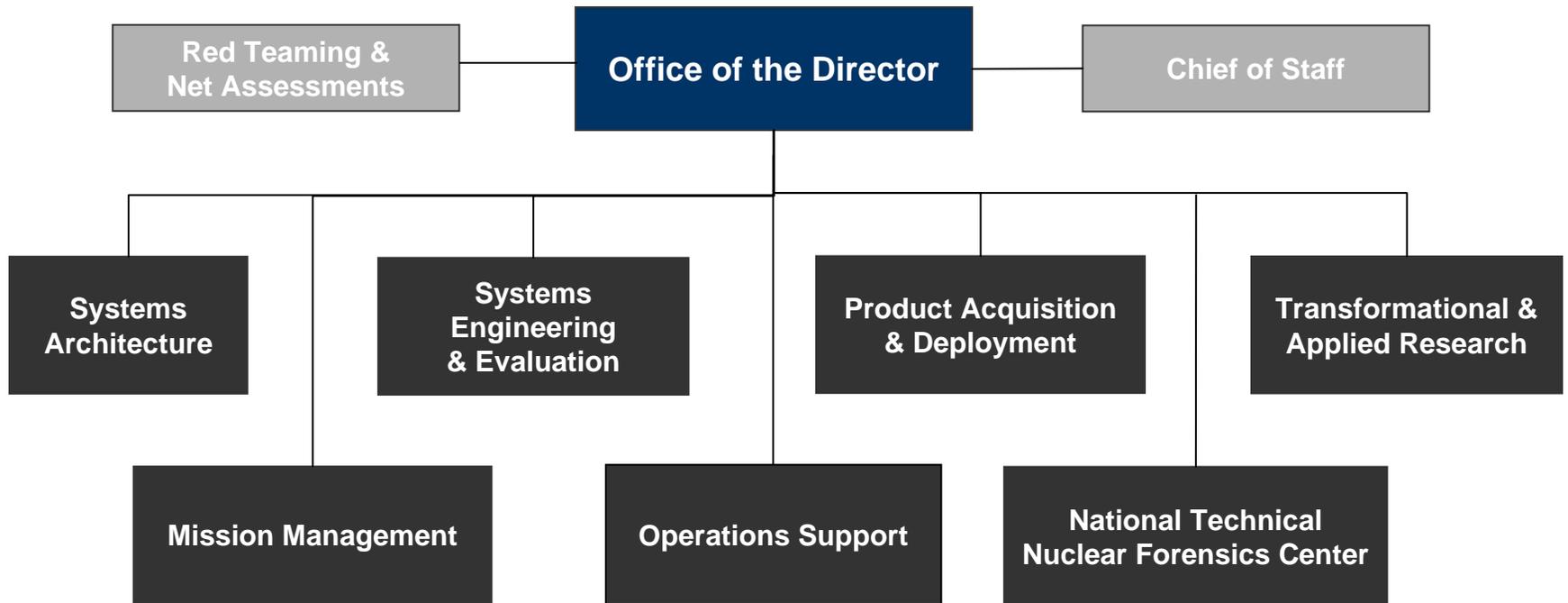
- The **Red Teaming & Net Assessments Directorate** independently assess the operational performance of planned and deployed capabilities, including technologies, procedures, and protocols
- Conducts Red Teaming operations, from an adversary's perspective, to identify vulnerabilities in Federal, State, & local capabilities
- Conducts Net Assessments to validate Red Teaming findings and evaluate effectiveness of technologies and operational protocols and procedures



# Organizational Recap

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- DNDO and its Directorates are oriented towards addressing key mission areas while meeting the functional objectives outlined in its founding Presidential Directive.



# 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 maintains an aggressive system development and acquisition process to rapidly deploy detection systems
- DNDO has conducted several test series as well as red teaming operations to evaluate the effectiveness of technologies and deployed systems.
- Transformational & Applied Research has been identified to reduce risk across other elements of the architecture
- DNDO is providing on-going operational support to the deployed architecture, including support for Federal, State and local implementing partners



# Homeland Security