

Domestic Nuclear Detection Office (DNDO)

NDIA

Joint CBRN Defense Conference

DNDO Overview

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The Radiological and Nuclear Threat

- Nuclear weapon
- Improvised nuclear device (IND)
- Radiological dispersal device (RDD)



Devices can vary greatly in size.



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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 centralized planning and integration of USG nuclear forensics programs



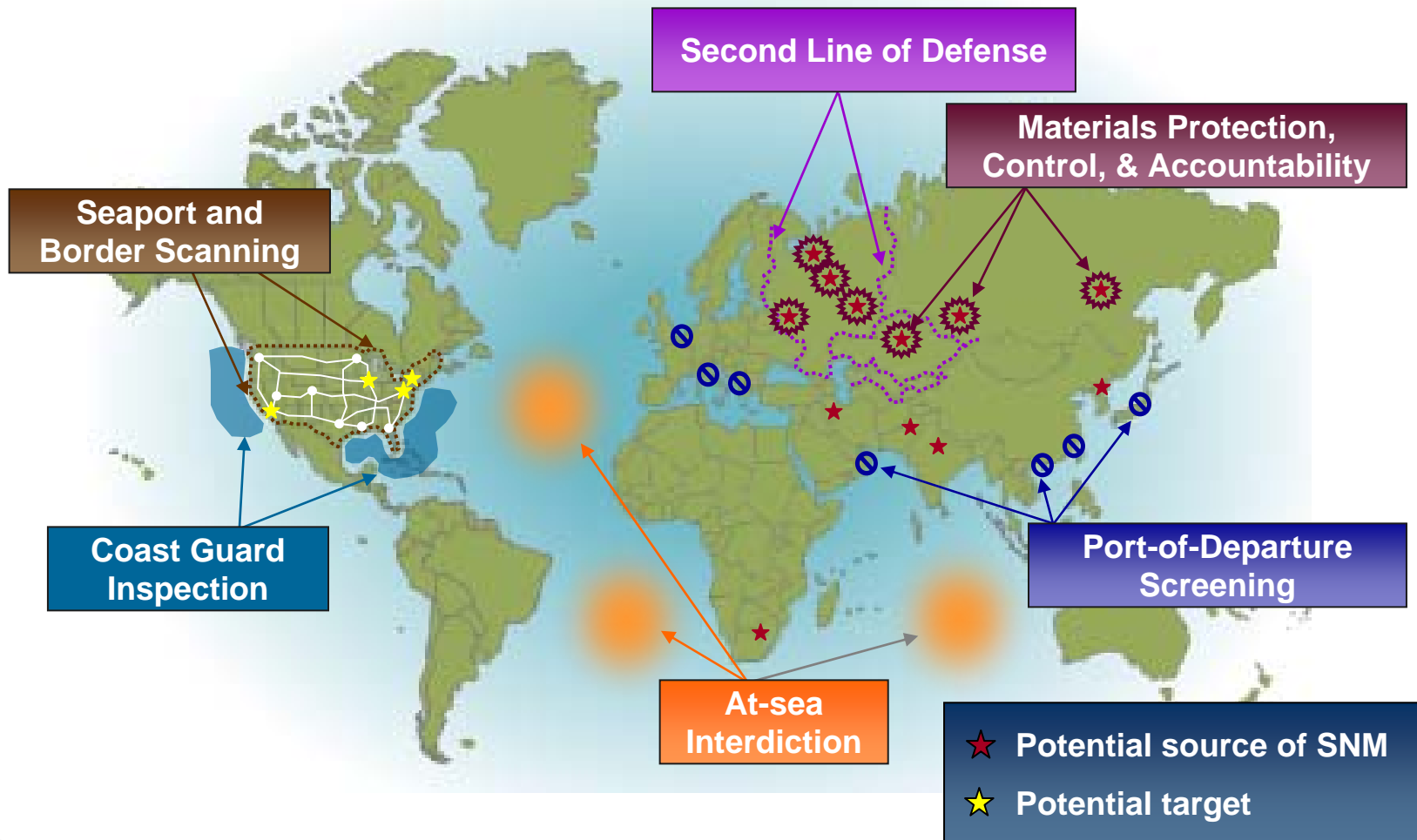
DNDO: An Interagency Office

- 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:
 - U.S. Coast Guard
 - Customs and Border Protection
 - Transportation Security Administration
- The National Labs, private industry, and academia 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.



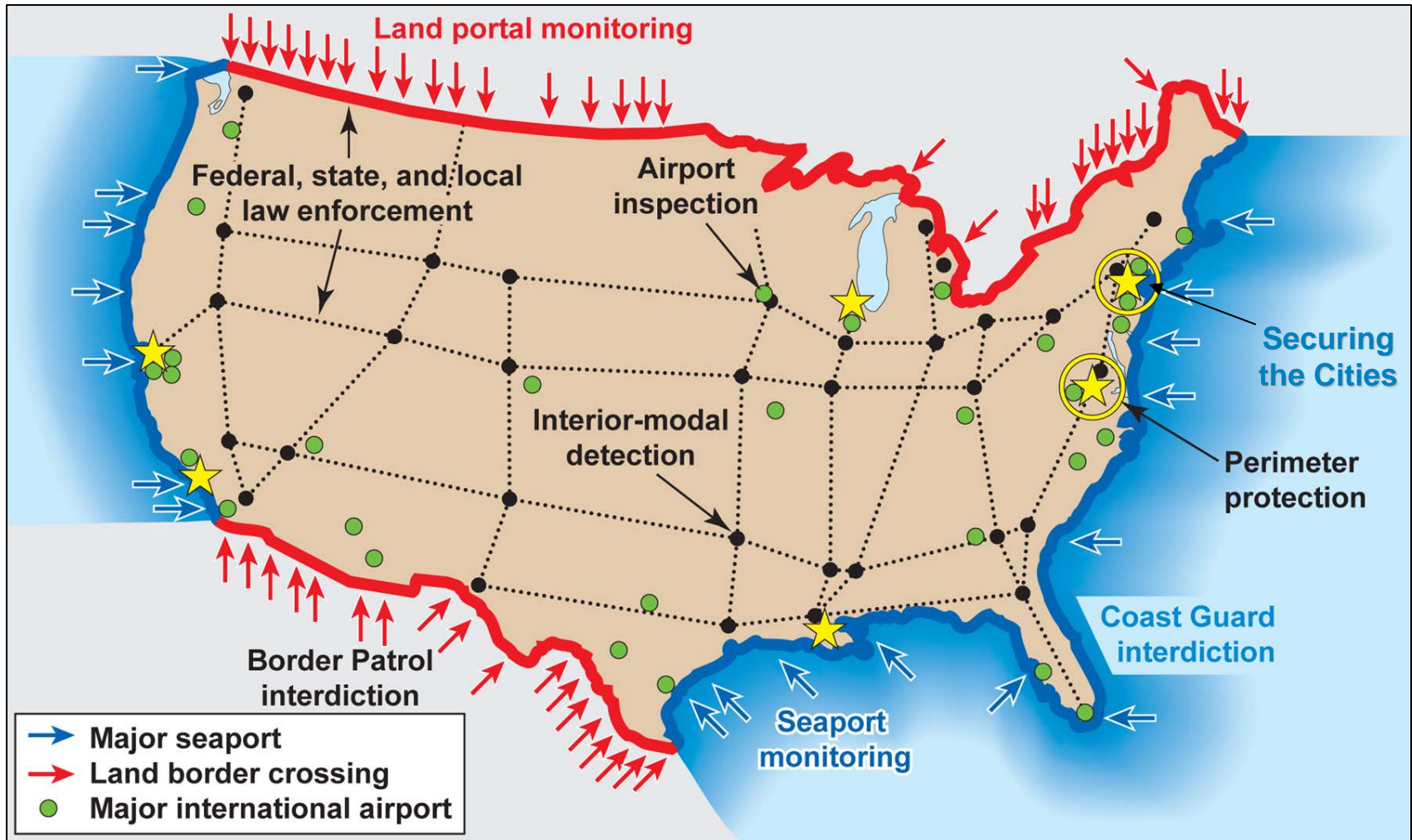
Global Nuclear Detection Architecture

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



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Domestic Nuclear Detection Architecture



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Ports of Entry (POE) Mission

Strategy/Objectives:

- Close vulnerability gaps (threat pathways) at POEs (Land, Rail, Sea Cargo, Air Cargo)
- Minimize impact on the flow of commerce
- Strengthen Partnerships with POE Stakeholders
- Enhance POE Domain and Situational Awareness

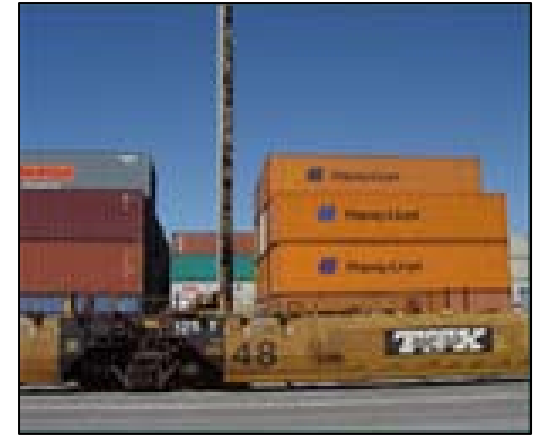


Cargo Scanning Goals:

- ✓ Complete 100% of Southern border container traffic by the end of CY 2007
- ✓ Complete 98% of seaport container traffic by the end of CY 2007
- Complete 98% of land and seaport container traffic by the end of CY 2008
- Complete 100% of Northern border container traffic by the end of CY 2009

Other Cargo Venues

- **Air Cargo**
- **International Rail**
- **On-Dock Rail**
 - Established a Rail Test Center (RTC) for intermodal radiation detection at the Port of Tacoma (2007)



Maritime Mission

Objectives:

- Deploy maritime detection and reporting capabilities
- Develop and implement maritime CONOPS for alarm resolution & response protocols
- Provide rad/nuc detection training



Program Activities:

- West Coast Maritime Pilot
 - Seattle, Washington
 - San Diego, California
- Enhance rad/nuc detection capability for select USCG boarding teams
- Deliver Maritime Module for Rad/Nuc Detection Program Management Handbook



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Aviation Mission

Strategy:

- DHS components working to address threat posed by IGA
 - Regulations
 - Deployment of COTS systems to Aircraft POEs
 - Evaluate COTS & next-gen detectors and alternate CONOPS
- Work with Canada and Mexico to develop a North American Nuclear Detection Architecture



Program Activities:

- Scan 100% of I-GA at domestic APOEs
- Evaluate enhancements for:
 - Detector performance
 - Scanning procedures
 - Reachback and alarm resolution process
- Identify required follow-on capabilities



Non-POE Land Border Mission

Boundary Defenses

- Fences
- Natural Barriers



Intrusion Detection

- Unattended Sensors
- Camera Systems



1) Unattended Sensor Concepts

Patrol Operations

- Observation
- Response/Interdiction



2) Vehicle-Mounted and Human-Portable Systems

Interior Checkpoints

- Traffic Screening
- Vehicle Inspection



3) Fixed and mobile RPMs for Permanent & Tactical Checkpoints

Ongoing Activities:

- Joint field evaluation of Radiation Portal Monitors (RPMs) and Personal Radiation Detectors (PRDs)
- Phased Deployment Implementation Plan (PDIP) for CBP and DNDO through FY12, based on field evaluations of equipment
- Equip 21 sectors (northern and southern borders)

Domestic Interior Mission

Strategy:

- Enhance domestic detection capabilities through:
 - Training and exercises
 - Regional reachback
 - Pilot deployments
 - Program management handbooks



Program Activities:

- Complete Southeast Transportation Corridor Pilot (9 States and DC) with full scale exercise
- Evaluate Surge Program with DOE
- Develop statewide rad/nuc detection program in Florida
- Continue training
 - Over 4,000 personnel trained to date
 - Plan to train 1,700 in 2008



Securing the Cities Initiative

Objective:

- Implement an architecture for coordinated detection and interdiction of illicit R/N materials within the NYC region.



Program Activities:

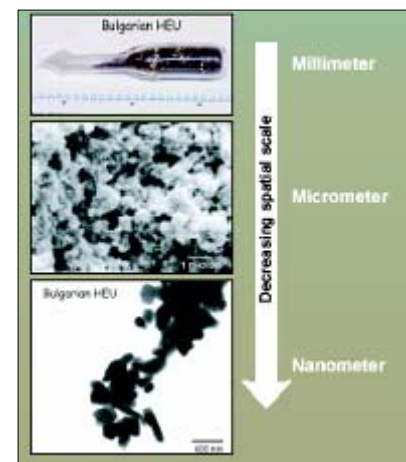
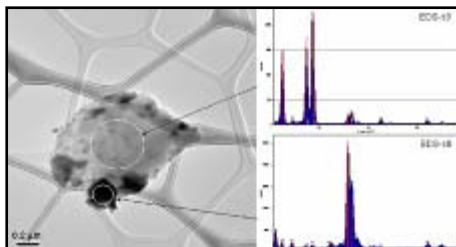
- Develop and implement technical and operational concepts for scanning operations
 - Mobile checkpoint
 - SUV-based detection operations
 - Maritime rad/nuc scanning in New York, New Jersey and Connecticut
- Develop C4 regional capability
- Deploy rad/nuc detection equipment
- Continue training
 - Over 2,000 personnel to date
 - Up to 4,500 personnel in FY 2008
- Conducted four roadways-based and two maritime drills with multiple regional agencies



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Technical Nuclear Forensics Mission

- **National Technical Nuclear Forensics Center** (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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Detection Techniques

- Passive
 - Signal emissions generated by target itself
 - Relatively simple and inexpensive
 - Most familiar and deployed form of radiation detection
 - Affected by shielding and masking
- Radiographic
 - X-ray and gamma-ray transmission imaging
 - CBP currently deployed ~ 150 units to search for contraband
 - Can be expanded to detect high-Z material, including SNM
- Active
 - External stimulation needed to generate measurable signal
 - Effective against shielded and masked targets
 - Usually involves irradiating target with gammas, neutrons, or other radiation
 - Complex, expensive, with potential health effects
 - Not yet deployed



Advanced Spectroscopic Portal Program

Program goals:

- Detect and identify radiation sources with high confidence
- Provide significant increase in capability from current system
- Decrease the operational impact to CBP and other stakeholders



Current Activities (Summer 2008):

- System Qualification Testing
 - Vendor sites and PNNL
- Deployment Readiness Testing
 - 331-G, PNNL
- Performance testing
 - NTS
- Field Validation
 - Long Beach, CA
 - NYCT, NY
 - Laredo, TX
 - Port Huron/Detroit, MI

Human Portable Radiation Detection Systems

Program Mission:

- To develop next-generation handheld and backpack systems

Program Objectives:

- Improve radiation detector sensitivity
- Improve radioisotope identification and reduce false alarm rates
- Provide clear and actionable signals for system operators
- Provide simplified reachback capability
- Provide field updateable algorithms
- Transfer successful HPRDS systems to acquisition phase for field deployment in appropriate mission areas



HRPDS
Communication
Package (HCP)



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Radiographic Detection

Cargo Advanced Automated Radiography System (CAARS)

- Program Goals

- Develop a radiography system that automatically detects threat materials in mixed commerce without impeding the flow of commerce
- Improved penetration capability



Exploratory and Academic Research

Program goals:

- Develop and demonstrate proof of concept for detection technologies and analysis techniques

Technical goals:

- Explore the limits of physics for the detection and identification of rad/nuc materials
- Explore innovative radiation detection materials for the detection and identification of rad/nuc materials
- Explore innovative analysis and signal processing techniques for the exploitation of gamma and neutron signatures
- Explore alternate signatures for detection of radiological and nuclear threats

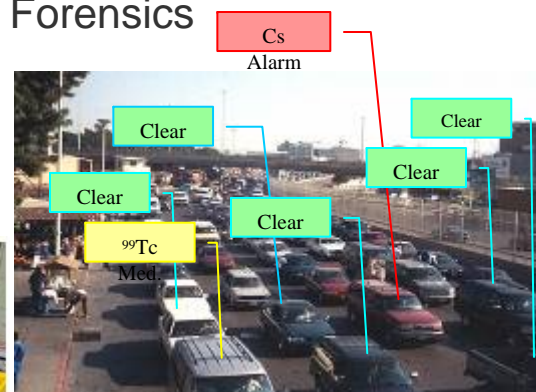
Progress:

- Funded the Academic Research Initiative to 22 separate projects in partnership with the National Science Foundation
- Approximately 50 projects addressing all major technical thrust areas:
 - Materials Development
 - Passive Techniques
 - Active Techniques
 - Integrated Approaches
 - Nuclear Forensics



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Benchmark Experiments



Concept of Integrated Video and Radiation Imaging

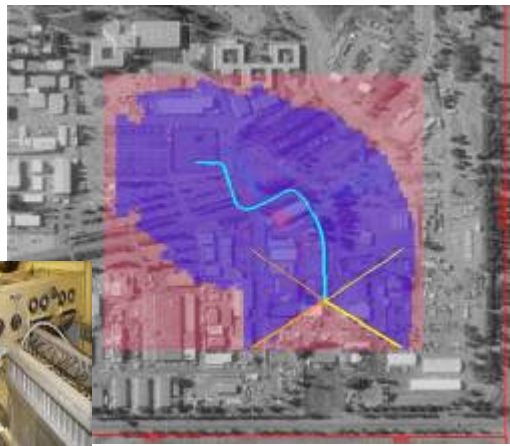
Advanced Technology Demonstration (ATD)

Program Objectives:

- Build upon technology concept previously demonstrated under the ERP or equivalent
- Develop and test in a simulated operational environment to generate performance data for cost-benefit decision to transition to commercial system development and acquisition



IPRL



Coded Aperture data

Near Term ATDs:

- Intelligent Personal Radiation Locator
 - Pocket-sized system with advanced capabilities in identification, directionality, connectivity (FY06 Start)
- Standoff Detection Systems
 - Enhanced standoff detection capabilities in mobile system through imaging, large area, advanced detector techniques (FY07 Start)
- SNM Verification
 - Active interrogation systems for shielded SNM (FY08 start)



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Fully Integrated Operating Environment

- Deployment of detection technologies alone will not ensure mission success
- Provides the necessary technical support to ensure that equipment is used effectively, alarms are resolved accurately, and the appropriate personnel are notified in the event of a legitimate detection of a threat
- Maintains situational awareness by sharing information and databases with the Intelligence Community, counterterrorism resources, Fusion Centers, FBI Joint Terrorism Task Forces, DOE, CBP, and other US agencies, as well as State, county and municipal law enforcement communities
- Programs include:
 - Joint Analysis Center
 - Nuclear Assessment Program
 - Technical Reachback
 - Training, Exercises and Engagements



National Preventive Rad/Nuc Training

- **Personal Radiation Detection (PRD) Course**
 - Teaches effective employment of Personal Radiation Detectors (PRD)
- **Detector Enabled Law Enforcement (DELE) Course**
 - Teaches individual patrol officers to detect, verify, locate, measure, identify, assess, and, if warranted, report radiation and radioactive material
- **Advanced Radiation Detection (ARD) Course**
 - Teaches individual detection skills using advanced detection equipment and how to apply those skills in a detection team



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Alarm Resolution and Technical Reachback

- Program mission:
 - To provide 24/7 technical capability to facilitate radiation detection alarm resolution and effectively transition to response operations
- Program Activities:
 - Develop analytic tools and reports to assist, evaluate and enhance radiological and nuclear alarm adjudication
 - Provide subject matter expertise to Federal, State, and local detection operations
 - Operate the National Reachback capability at the weapons laboratories to support alarm resolution
 - Established two regional reachback regions dedicated to supporting alarm resolution for state and local authorities

Summary

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

- 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
- 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





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