# *Human Portable Tripwire – Industry Day*

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Homeland Security

# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire Industry Day**

**Opening Remarks**


***Mr. Warren Stern***

***Director***

***Domestic Nuclear Detection Office***

***Department of Homeland Security***


***October 27, 2011***

Homeland Security

# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire**
**Industry Day**

**Procurement Disclaimer**


***Mr. Bill Fuller-Contracting Officer***

***William.c.fuller@dhs.gov***

***Domestic Nuclear Detection Office***

***Department of Homeland Security***

***October 27, 2011***

Homeland Security

# *DNDO Acquisition Strategy: Shift to Commercial First (cont.)*

- **HPT Industry Day Procurement Disclaimer**
- ***The following disclaimer was presented at the Human Portable Tripwire Industry Day.
- 1. Today's meeting is intended to provide a platform for open discussion and idea exchange and an opportunity for the Government to collect market research data.
- 2. It's also an opportunity for you to gain an understanding of the goals of the HPT program and for you to share Industry developments with the Government representatives here.
- 3. One of the purposes of events like this is to help increase competition when programs do move into the acquisition phase. Discussions today should be limited to technical aspects of the program and should not include discussions regarding future acquisitions.
- 4. This event does not indicate a promise by the Government to issue a request for proposal, quote or a solicitation of any type.
- 5. Follow-up meetings or information requests related to this event do not constitute a solicitation by the Government.
- 6. Capability statements or any other information presented at one-on-one meetings or in response to information requests do not constitute a formal proposal submission and will only be used for Government market research efforts.

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# *DNDO Acquisition Strategy: Shift to Commercial First (cont.)*

- 7. Submission of a capability statement or other information is voluntary and the Government will not reimburse preparation costs.
- 8. Any information submitted in response to a sources sought notice or request for information is subject to disclosure under the Freedom of Information Act, 5 USC 552(a).
- 9. The Government does not request any proprietary information be submitted, nor shall it be liable, for any consequential damages for any proprietary information.
- 10. Nothing discussed in this meeting authorizes you to work, start work, or bill for work on behalf of the Government.
- 11. It is your company's responsibility to monitor FedBizOps for contract opportunities.
- 12. Releasable briefing materials and questions and answers discussed here today will be posted online at www.fbo.gov.
- 13. No unauthorized recording of this event is permitted.
- 14. If you have any questions related to procurements or the information I have presented here, my email address was listed in the FedBizOpps announcement for this meeting. It will also be listed in the follow-up posting.

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# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire**
**Industry Day**

**Objectives**


*Steve Karoly, Assistant Director*

*Product Acquisition and Deployment Directorate*

*Domestic Nuclear Detection Office*

*Department of Homeland Security*

*October 27, 2011*

Homeland Security

# *HPT Industry Day Objectives*

1. Promote DNDO's Acquisition and Commercial Engagement Strategy
   - Broaden engagement and support with industry

2. Describe the capability need for a Human Portable Tripwire (HPT) and provide the government's perspective on a draft set of HPT requirements
   - Performance
   - Interoperability
   - Form Factor / User Interface
   - Reliability, Availability, and Maintainability
   - Personal Safety
   - Environmental

3. Solicit Industry's feedback on the draft set of HPT requirements

4. Provide a forum for stakeholders /end-users to relay their notional HPT CONOPs to industry
   - Description of Federal, State and Local end-users operations

**The venue to facilitate open communication between the government and industry**

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# *Domestic Nuclear Detection Office (DNDO)*

**DNDO Acquisition and Commercial Engagement Strategy (DACES)**

**Overview of "Commercial First"**


*Steve Karoly, Assistant Director*

*Product Acquisition and Deployment Directorate*

*Domestic Nuclear Detection Office*

*Department of Homeland Security*

*October 27, 2011*

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# *DNDO Acquisition Strategy: Shift to Commercial First*

- Due to the rapid advancement of technology, constrained budgets, and market forces, DNDO is shifting focus from government development of material solutions to a Commercial First approach :
  - **Commercial options include GOTS/COTS, Cooperative Research and Development Agreements (CRADA), and Vendor Sponsored Development (e.g., IRAD)**
    - The specific approach will be based on the unique characteristics of a program
    - Requires understanding of the market: COTS availability; potential vendors willingness to use IRAD funds
  - **A Commercial First approach requires early maturation of requirements to adequately support and define the performance and suitability requirements for potential vendors**
    - Requirement effort must focus on what is absolutely required for a minimally acceptable solution
    - However, in some cases, Gov't stakeholders must be willing to operate in the "trade space"
    - Early detailed engagement with end user stakeholders will be required
  - **Industry Days or other "industry engagement" opportunities are used to engage industry on the understanding of the need and other variables such as time frame, cost, emerging technologies…**
  - **There is a potential that DHS may competitively procure systems from manufacturers or vendors or who successfully demonstrate that their systems meet the requirements and provide best value**
    - Multiple solutions may be chosen to move forward toward procurement
    - Evaluation of the best value solution(s) will consider issues not specifically identified in ORD (ie. integration with current end user processes, SOPs, human factors, logistics, etc.)

**Gov't will look first at using commercialization processes and COTS products**

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# *DNDO Acquisition Strategy: Shift to Commercial First (cont.)*

- DNDO will facilitate, and may sponsor, testing to evaluate potential Commercial Solutions
  - **Initial government sponsored testing and/or analysis may be planned to ensure current capability is adequately characterized and determine if any systems already developed will meet the requirements**
    - This testing will typically occur prior to the formal development of an Acquisition Program as part of the Solution Engineering or Concept Definition phase of a new program
  - **Additional DNDO sponsored testing and/or analysis may be planned to evaluate new or improved systems that have been developed by vendors following DNDO industry engagement activities**
    - Additional testing may be performed to evaluate the evolution of commercial solutions prior to formally starting an acquisition effort
      - May include evaluation of GRaDER test data as appropriate
      - Government Directed Testing may be planned to evaluate all commercial solutions that are “ready” by a specified date
    - Testing may be performed to evaluate the maturity of a solution being developed through a CRADA supported commercial effort
  - **Field Testing with user and stakeholder involvement may be conducted**
  - **Test and Analysis will be used to help support development of the FRD**

# *DNDO Acquisition Strategy: Shift to Commercial First (cont.)*

- The intent of DNDO's "Commercial First" initiative will focus on determining the best value solution(s) by utilizing modeling tools and verification and validation (V&V)
  - Along with providing materiel solutions, DNDO will expect vendors to provide their modeling tools which were used in the development of their solutions
    - Government may conduct independent validation of the submitted models and/or simulations
    - DNDO will use an evaluation criteria to assess the best value for the government
      - DNDO is working with DHS Commercialization Office to establish evaluation criteria

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# *DNDO Acquisition Strategy: Shift to Commercial First (cont.)*

- **While a Commercial First approach shifts design and development to industry partners, it does not eliminate the need for DNDO oversight and partnership**
  - Design and development oversight shifts to "industry"
  - DNDO continues to own "Mission Risk"
    - What if industry cannot develop a solution?
    - Commercial First processes will include off ramps to more traditional government acquisitions if necessary
- **DNDO will need to enhance engagement with industry to maintain awareness of industry progress and develop recommendations to adjust approach**
- **DNDO will utilize the DACES strategy to facilitate continuous feedback during the entire acquisition process between industry and user's/stakeholders to continually refine and understand the needed requirements**
- **DNDO will need to continuously monitor commercial products to address life cycle support issues that will arise as commercial products become obsolete or are upgraded**
  - Integration with existing supply/logistics chains and contracts
  - Interoperability
  - Configuration Management
  - Certification & Accreditation

# *Potential Market**

## DoD/DOE

Second Line of Defense
*-Current Quantity: TBD*
*-Future PRD Quantity: TBD*

Others (TBD w/future market Analysis)
*-Current Quantity: TBD*
*-Future PRD Quantity: TBD*

## DHS

Customs and Border Protections
*-Projected HPT Units: ~10,000*

Transportation Safety Administration
*-Projected HPT Units: ~550*

United States Coast Guard
*-Projected HPT Units: ~4000*

## State and Locals Law Enforcement

Jacksonville, Florida Sheriff's Office-Bomb Squad
*-Current PRD's in Use: ~ 166* *-Projected PRD**- ~ 1565*

New York City Police Dept, NYPD Counter Terrorism Div
*-Current PRD's in Use: ~ 2600* *-Projected PRD**- ~ 35,000*

Philadelphia Police Department-Homeland Security Unit
*-Current PRD's in Use: ~ 370* *-Projected PRD**-6,700*
*Note: 370 PRD's throughout Philadelphia Agencies and surrounding counties*

South Carolina State Transport Police
*-Current PRD's in Use: ~ 90* *-Projected PRD**- ~ 120

Suffolk County, NY Police Dept, Special Patrol Bureau
*-Current PRD's in Use: ~ 600* *-Projected PRD**:~ 2,000

Others:
*-Currently over ~ 600,000 state and law enforcement officers*

- Current PRD Price is approximately $2000
- DNDO has procured *~2400* PRD's for FY-10 and *~5800* PRD's for FY-2011

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•*Potential Market numbers are based on input of the HPT AoA and actual user/stakeholder input received
•**Number of PRD's desired if in an unconstrained resource environment-the projected number of officers who would have a PRD

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# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire**
**Industry Day**

**HPT Analysis of Alternatives**
**Overview**


*Mr. Julian Hill, Assistant Director*

*Systems Engineering and Evaluation Directorate*

**Domestic Nuclear Detection Office**

**Department of Homeland Security**

**October 27, 2011**

Homeland Security

# *Purpose*

- The purpose of this briefing is to offer an overview of the following:
  - HPT Mission
  - Analysis Approach
  - Scenarios Investigated for AoA

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# *HPT AoA Overview*

- The Human Portable Detection Systems (HPRDS) Mission Needs Statement (MNS) identified 4 common roles in which detection capabilities are employed:
  - Tripwire 
  - Wide area search
  - Small area search
  - Secondary screening
- The tripwire role is intended to increase the opportunity and likelihood of detecting rad/nuc material through ubiquitous, constant, non-deliberate rad/nuc scans.

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# *HPT Overview : Gaps in Current Capabilities*

Analysis of Alternatives: Summary of Final Results

- HPT Mission Gaps were indentified in the HPRDS MNS and CDP as capability gaps in the currently employed human portable devices used to perform the tripwire role:

**GAP #1:** Systems cannot detect threat material in certain operational environments due to the size of the conveyances, the size of current detectors, and the operational scenarios in which tripwire capabilities are employed

**GAP #2:** Systems cannot adequately detect or identify certain radiological threat sources that are located near legitimate radiological materials or Naturally Occurring Radiological Material (NORM)

**GAP #3:** Systems using commercially available identification algorithms are frequently not able to identify radiological/nuclear (Rad/Nuc) sources that are present, which impacts the field operator's ability to locally adjudicate Rad/Nuc alarms

**GAP #4:** HPT Systems are not capable of sharing information between other systems, nor are they currently networked to support real time Rad/Nuc threat source localization or reporting

**The HPT program is intended to develop a solution that increases the ability of stakeholders to address capability gaps in the Human Portable Tripwire mission**

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# *HPT Overview: AoA Scope*

## Alternatives

- 38 Alternatives and the Baseline
- 19 functional combinations (Detect, Localize, Adjudicate, Communicate) and 2 Form Factors (Belt and Non-Belt-mountable)
- Some functions performed by HPT; others by locally available equipment and user
- The baseline is the current PRD device plus a RIID

## Scenarios

- 10 scenarios organized into 4 scenario groups based on user input:
  1. Group 1 – Stationary, RIID readily available, 2-8 ft
  2. Group 2 – Dynamic, RIID readily available, 2-8 ft
  3. Group 3 – Stationary, RIID not readily available, 2-8 ft
  4. Group 4 – Dynamic, RIID not readily available, 2-20 ft

## Metrics

- Three COIs (Effectiveness, Suitability & Impact)

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# *HPT Overview*

Scenario Group 1: Stationary, RIID readily available, 2-8 ft

## Scenario Group 1

**Specifics:**

- RIID Readily Available
- Choke Point: 30 encounters/hour
- Static Environment: 20 Sec Integration
- Close Range: 2-8'

**Typical Users:**

- SCSTP
- JAX
- TSA-VIPR

**Example Scenarios:**

- Commercial Vehicle Inspections at Checkpoints and Weigh Stations
- Scanning Large Crowds at National Security Special Events or Other Designated Special Events

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# *HPT Overview*

Scenario Group 2: Dynamic, RIID readily available, 2-8 ft

## Scenario Group 2

**Specifics:**

- RIID Readily Available
- Officer Moving; Low encounter rate, 2 encounters/hour
- Dynamic Environment: 1 Sec Integration
- Close Range: 2-8'

**Typical Users:**

- USCG
- JAX
- CBP A&M
- TSA-VIPR

**Example Scenarios:**

- Maritime Inspection at Port
- Maritime Inspection of Large Cargo Vessels (>300 GT) while Under Way

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# *HPT Overview*

Scenario Group 3: RIID not readily available, 2-8 ft

## Scenario Group 3

**Specifics:**

- RIID Not Readily Available, 30-60 min
- Low encounter rate: 2 encounters/hour
- Static Environment: 20 Sec Integration
- Close Range: 2-8'

**Typical Users:**

- SCSTP
- JAX
- CBP/OBP
- CBP A&M
- USCG
- TSA-VIPR

**Example Scenarios:**

- Roaming Commercial Vehicle Inspections
- Maritime Inspection of Small Recreational Vessels (<300 GT) during Boarding Under Way
- Law Enforcement Vehicle Scans During Traffic Stops
- Inspection of Vehicles and Pedestrians during patrol near the international Borders

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# *HPT Overview*

Scenario Group 4: Dynamic, RIID not readily available, 2-20 ft

## Scenario Group 4

**Specifics:**

- RIID Not Readily Available, 30 min
- High Encounter Rate, Several Hundred/hour
- Dynamic, officer and source moving: 1 sec integration
- Further Range: 2-20'

**Typical Users:**

- USCG
- JAX
- CBP A&M
- TSA-VIPR

**Example Scenarios:**

- TSA VIPR Teams Deployment of Transportation Venues
- Law Enforcement Scanning of the Pedestrian Environment
- Scanning Large Crowds at National Security Special Events or Other Designated Special Events (Non-Chokepoint)

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# *A Few "Take-Aways" from the HPT AoA*

- This AoA was initiated in 2009, and reflects understanding of technology maturity as of 2009/early 2010.
  - RFI issued in early FY-2010
  - Follow up with interested industry parties in early 2010 also
- State of the commercial market in 2010 did not provide a sufficient increase in capability is to warrant upgrading/replacing the existing baseline capability
- Expected future technology developments promised improvements on:
  - Miniaturization of electronics, with enhanced processing capabilities and lower power consumption
  - Development of efficient ID algorithms to run on PDA type devices (such as the HPT concept)
  - Development of dual use materials with gamma and neutron detection capability to fit on HPT envelope
  - Overall low cost systems and materials to allow for ubiquitous deployment of the HPT mission
  - Source localization (directionality) capability to fit within the HPT envelope and with a response time of < 5 secs

# *Recommended Capabilities*

- The recommended employment concept is the HPT worn in place of the current PRD for the purpose of personal radiation safety as well as the Tripwire mission
- The HPT device will include:
  - Rad/Nuc detection (both gamma-only and gamma-neutron versions)
  - Categorization (to include isotope identification)
  - Data communications capabilities (e.g. wireless, hardwire connection, and interface to satellite phone)
  - Personal safety warnings (dose rate)
  - Device can be worn with no user interaction until the device alarms the user of a potential Rad/Nuc sourc in the vicinity
- Additionally, the HPT device:
  - will be rugged enough to be worn in law enforcement environments
  - small and light enough to fit on a service belt
  - simple to operate, maintenance free
  - and less expensive for widespread deployment

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# Engaging the Private Sector

October 2011

**Thomas A. Cellucci, Ph.D., MBA**
Senior Counselor and Chief Commercialization Officer
Science & Technology Directorate
U.S. Department of Homeland Security
Email: SandT_Commercialization@dhs.gov
Website: http://bit.ly/commercializationresources

# Discussion Guide

- Overview of Science & Technology Directorate
- Commercialization Office Initiatives at DHS
- Market Potential is Catalyst for Rapid New Product Development
- Getting on the Same Page
- SECURE Program
- Technology Foraging
- Summary

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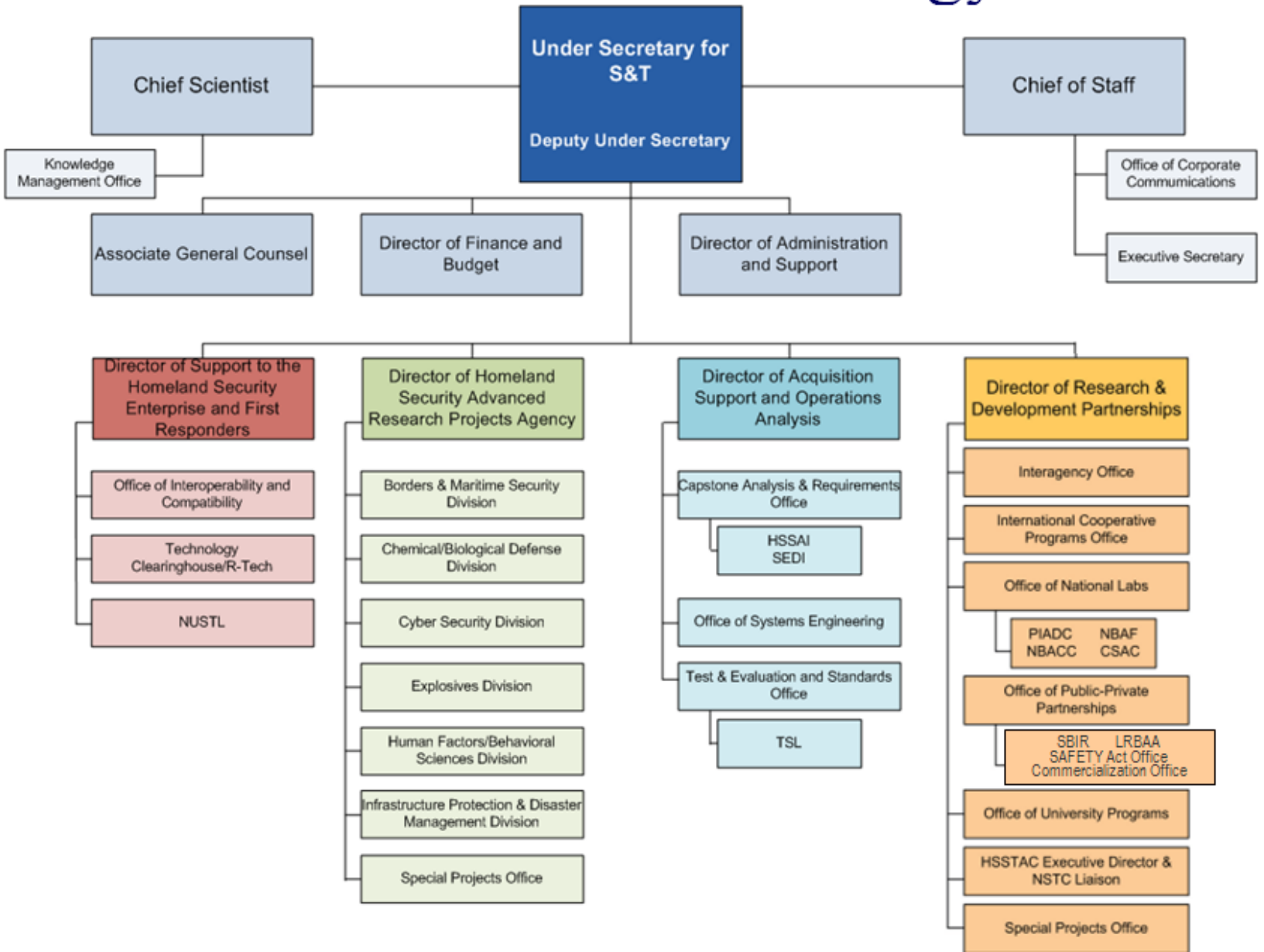
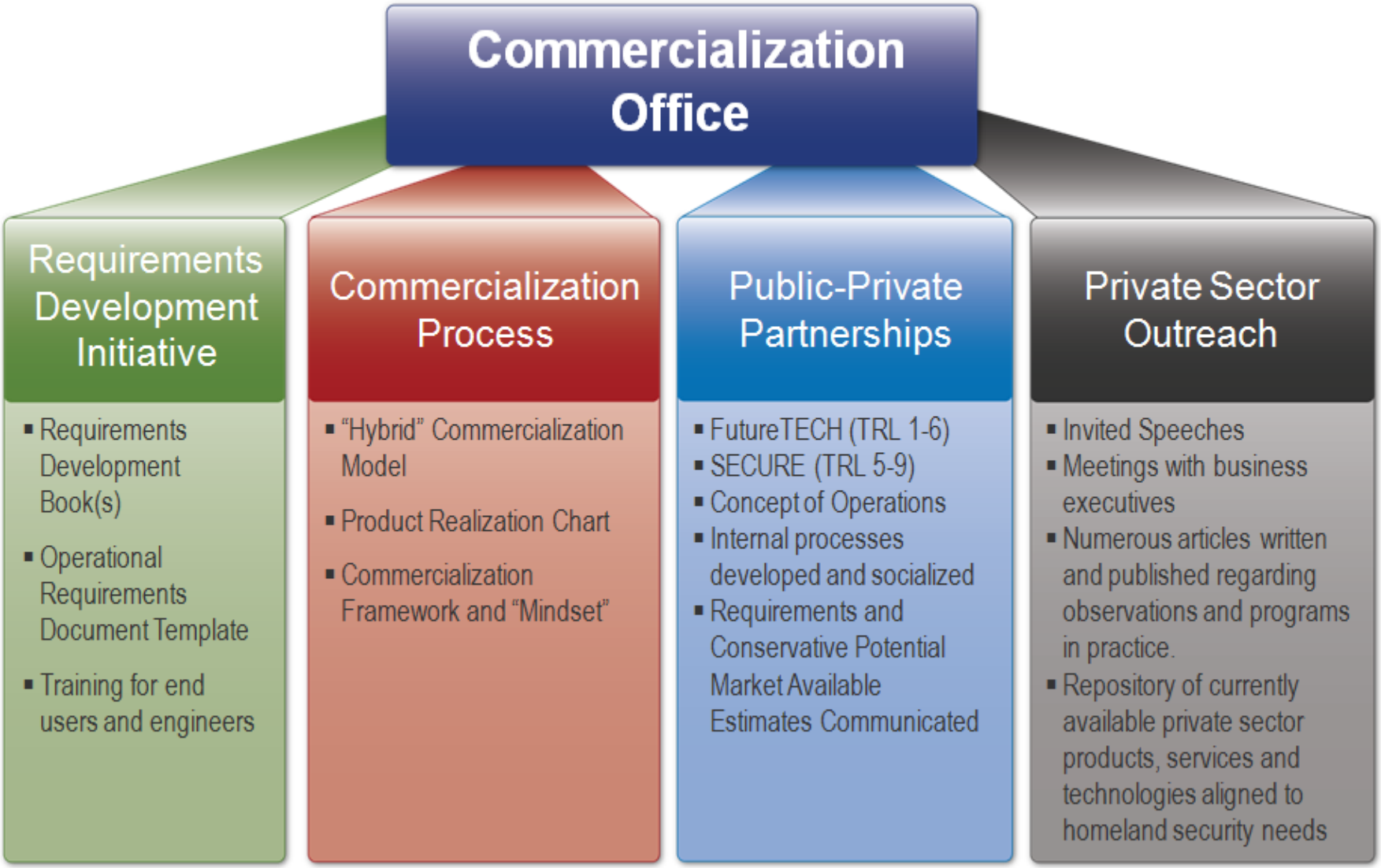
# Office of the Under Secretary for Science and Technology



# Commercialization Office: Major Activities

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http://www.dhs.gov/xabout/structure/gc_1234194479267.shtm

# Commercialization Office Books

Published to Date

## Requirements Development Guide

April 2008

Homeland Security

## Developing Operational Requirements

A Guide to the Cost-Effective and Efficient Communication of Needs

May 2008

Homeland Security

## Developing Operational Requirements

A Guide to the Cost-Effective and Efficient Communication of Needs

November 2008

Homeland Security

## Harnessing the Valuable Experience and Resources of the Private Sector for the Public Good:

DHS's Entry into Commercialization

February 2009

Homeland Security


## First Responder Capstone IPT

Delivering Solutions to First Responders

May 2009

Homeland Security

## Critical Infrastructure & Key Resources

Using Commercialization to Develop Solutions Efficiently and Effectively

January 2010

Homeland Security

## Harnessing the Valuable Experience and Resources of the Private Sector for the Public Good:

Innovative Public-Private Partnerships

June 2010

Homeland Security

## Innovative Public-Private Partnerships

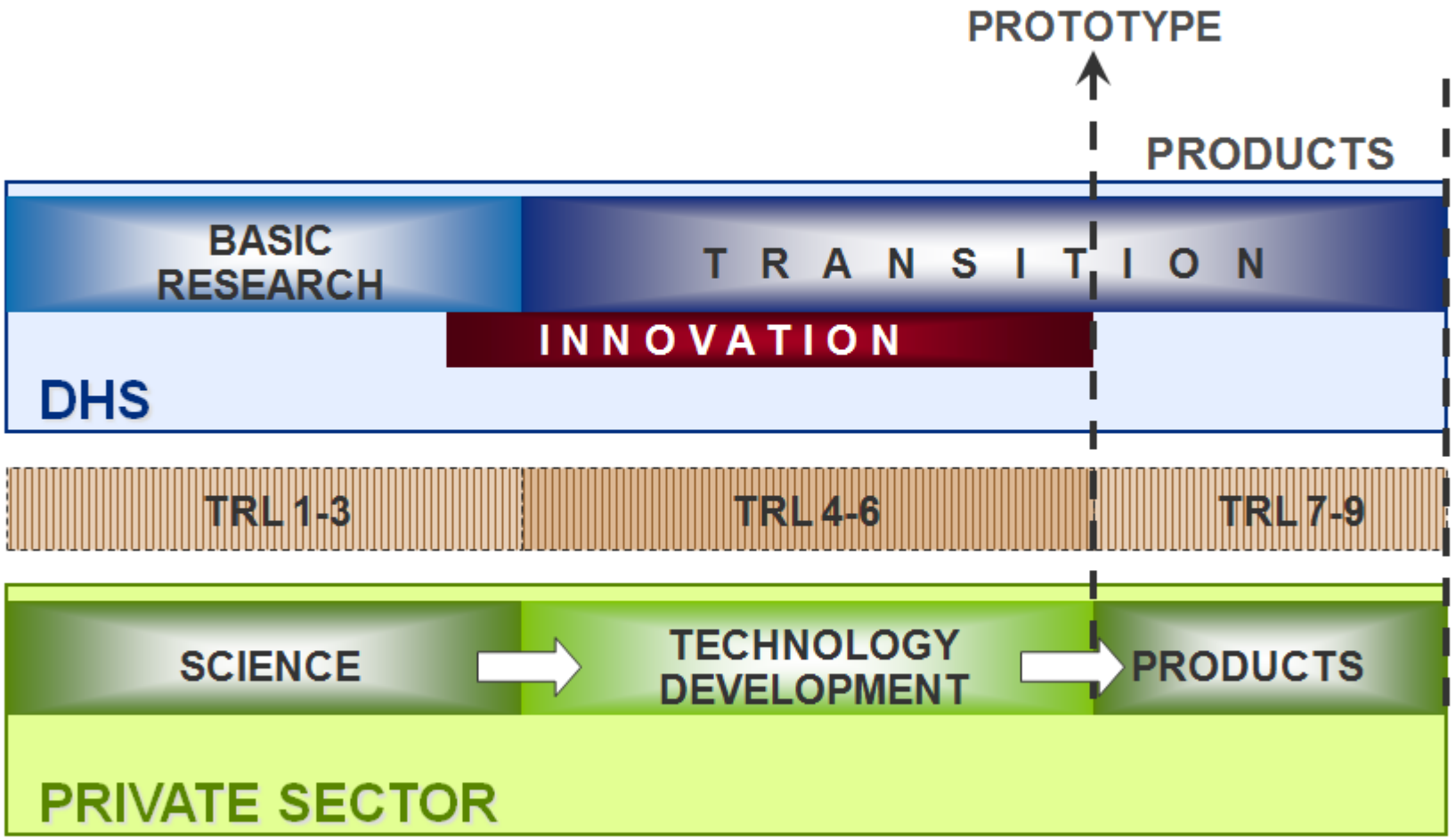
Pathway to Effectively Solving Problems

July 2010

Homeland Security

Homeland Security

# TRL Correlation: DHS and Private Sector

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# ORD: Operational Requirements Document

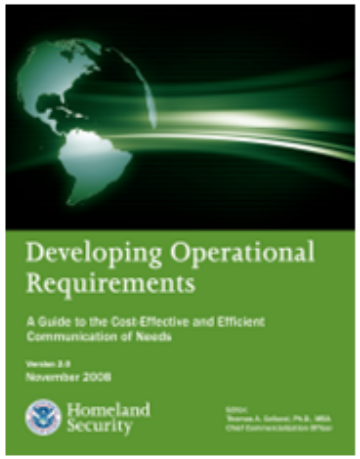
***What:*** ORDs provide a clear definition and articulation of a given problem.

***How:*** Training materials have been developed to assist drafting an ORD.

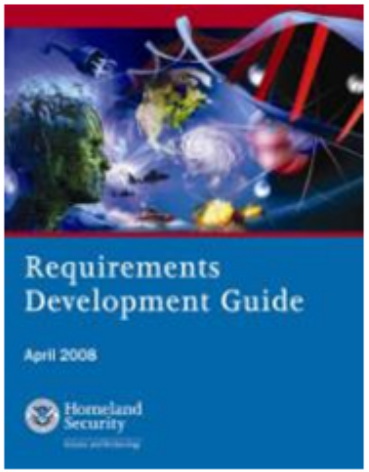
- *Developing Operational Requirements,* 353pp. Available online: http://www.dhs.gov/xlibrary/assets/Developing_Operational_Requirements_Guides.pdf

***When:*** For Use in Acquisition, Procurement, Commercialization and Outreach Programs –Any situation that dictates detailed requirements (e.g. RFQ, BAA, RFP, RFI, etc.)

***Why:*** It's cost-effective and efficient for both DHS and all of its stakeholders.





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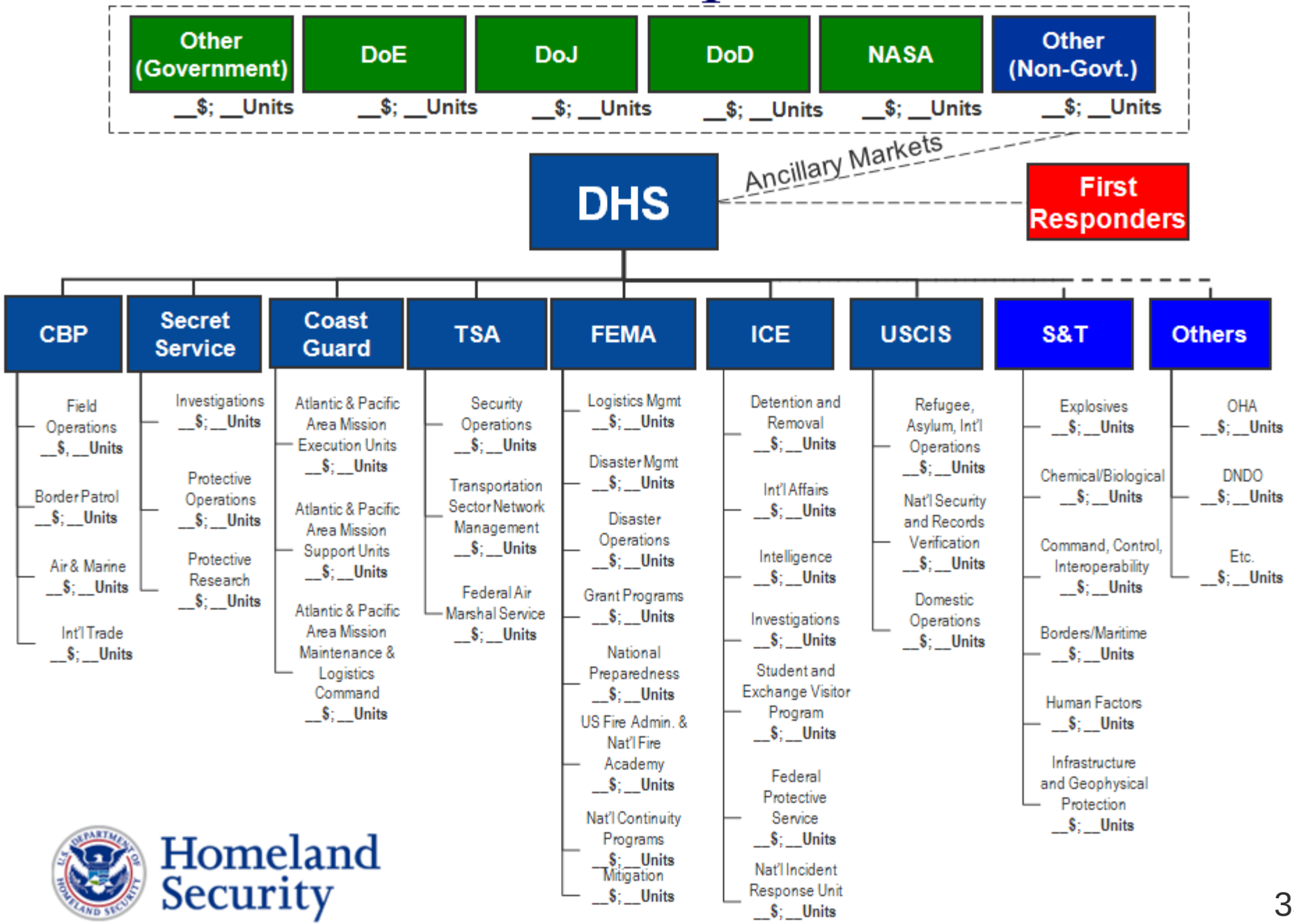
# Market Potential Template

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# SECURE Program

## Developing Solutions in Partnership with the Private Sector

- 'Win-Win-Win" Public-Private Partnership program benefits DHS's stakeholders, private sector and –most importantly- the American Taxpayer
- Saves time and money on product development costs leveraging the free-market system and encouraging the development of widely distributed products for DHS's stakeholders
- Detailed articulation of requirements (using MD 102-01 ORD template) and T&E review provides assurance to DHS, First Responders and private sector users (like CIKR) that products/services perform as prescribed


http://www.dhs.gov/xres/programs/gc_1211996620526.shtm

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# SECURE Program

## Benefit Analysis "Win-Win-Win"

| Taxpayers | Private Sector | Public Sector |
|---|---|---|
| 1. Citizens are better protected by DHS personnel using mission critical products | 1.Save significant time and money on market and business development activities | 1. Improved understanding and communication of needs |
| 2. Tax savings realized through Private Sector investment in DHS | 2. Firms can genuinely contribute to the security of the Nation | 2. Cost-effective and rapid product development process saves resources |
| 3. Positive economic growth for American economy | 3. Successful products share in the "imprimatur of DHS"; providing assurance that products really work | 3. Monies can be allocated to perform greater number of essential tasks |
| 4. Possible product "spin-offs" can aid other commercial markets | 4. Significant business opportunities with sizeable DHS and DHS ancillary markets | 4. End users receive products aligned to specific needs |
| 5. Customers ultimately benefit from COTS produced within the Free Market System – more cost effective and efficient product development | 5. Commercialization opportunities for small, medium and large business | 5. End users can make informed purchasing decisions with tight budgets |

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# Technology Foraging Mission at DHS S&T

Discussions underway to create a coordinated technology foraging capability at DHS S&T

- Provide valuable, actionable information for strategic and programmatic decision making.
- Identify and leverage technologies, programs and/or services already in use or being developed by the private sector, government entities, international partners, and academia to increase speed-of-execution of S&T programs/projects.
- Establish S&T as a premier provider to HSE for technology analysis, trending, technical alternatives and technical landscapes.
- Maximize S&T investments and impact to the HSE.

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# *Human Portable Tripwire – Industry Day*

| Start | Stop | Topic | Presenter |
|---|---|---|---|
| 0730 | 0755 | Registration | |
| 0755 | 0800 | Administrative Remarks | Mr. Todd Pardue |
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| TBD | | Reading Room Session #4 (If required) | |

# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire**
**Industry Day**

**Overview of Draft Requirements**


***Todd Pardue, Principal Deputy Assistant Director (P-DAD)***

***Product Acquisition and Deployment Directorate***

***Domestic Nuclear Detection Office***

***Department of Homeland Security***

***October 27, 2011***

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# *HPT Draft Requirements Overview*

- The HPT mission is comprised of passive monitoring operations intended to increase the opportunity and likelihood of detecting illicit rad/nuc material

  – Devices should be easy to use, cost-efficient, and deployable to a large number of users

  – Devices should provide detection, identification and categorization, communications to reachback, interoperability, and radiation level display functionalities

  – Devices should not interfere with the ability of the user to perform their primary missions

    - Should be wearable (hands-free operation until alarm)
    - Should have high reliability
    - Should not require operator maintenance
    - Should be able to function in a wide environmental range
    - Minimum of false alarms to include incorrect, statistical, and nuisance alarms

# *HPT Draft Requirements Overview*

- A draft HPT Operational Requirements Document (ORD) was prepared during the HPT AoA process with stakeholder involvement (CBP, USCG, TSA, state and local law enforcement)

- 23 draft requirements were identified in the draft HPT ORD

- The draft HPT requirements are grouped by:
  - Performance (Detection, Identification, Categorization, False Alarm, Power Supply Life)
  - Interoperability
  - Form Factor / User Interface
  - Reliability, Availability, and Maintainability
  - Personal Safety
  - Environmental

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# *HPT Draft Requirements Overview*

- **Performance**
  - **ORD-01 (KPP)***
    Static Gamma Detection
    - The HPT device shall be able to detect static gamma radiation sources that can be used in RDDs.
  - **ORD-02**
    Dynamic Gamma Detection
    - The HPT device shall be able to detect dynamic gamma radiation sources that can be used in RDDs.
  - **ORD-03**
    Static Neutron Detection
    - The HPT device shall be able to detect static neutron radiation sources
      - Neutron detection is mandatory for USCG
      - A variant HPT with a neutron detector is acceptable for this purpose
  - **ORD-04**
    Identification
    - The HPT device shall be able to correctly identify gamma and neutron (when applicable) radiation detected
      - Communications to reachback can be used in cases where the device produces ‘unknown’ identifications

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*** (KPP): Key Performance Parameter**

# *HPT Draft Requirements Overview*

- **Performance**
  - **ORD-05** (**KPP**)
    Categorization
    - For adjudication support, the device shall display correct categories, per ANSI 42.48-2008
      - SNM, Medical, NORM, and Industrial
      - Additional categories (e.g. Weapon Indicating) can be included per specific end-user need
  - **ORD-07**
    False Alarm Rate
    - Per ANSI 42.48-2008, the false alarm rate for gamma and neutron (when applicable) shall be less than or equal to one alarm activation in a 10 hour period when operated in a stable background environment
      - To avoid interruptions in the user's ability to perform their primary mission
  - **ORD-19**
    Shall operate for extended periods without recharging the system's power supply
    - Per end-user need
      - 24 continuous hours in detect mode with 18 identifications required
      - 24 continuous hours in detect mode with 24 identifications as objective

# *HPT Draft Requirements Overview*

- **Interoperability**
  - **ORD-08-1** (**KPP**)
    Wireless Communications to Reachback
    - The ability to transfer data wirelessly to a reachback location
      - A wired connection, as backup, is also required
  - **ORD-08-2**
    Collaborative Networking
    - The ability to send and receive data among units is desired, as an objective, for improved detection, localization, and search operations
  - **ORD-09**
    GNDA Interoperability
    - The system shall be able to provide interoperable, secure, and operationally effective information

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# HPT Draft Requirements Overview

- **Form Factor / User Interface**
  - **ORD-17 (KPP)**
    Wearable, light, small and does not interfere with movement/activities
    - Threshold
      - Total mass ≤ 450 grams
        Total footprint ≤ 15cm in height, 7cm in width, and 3cm in depth (Gamma Only Detector)
        Total footprint ≤ 15cm in height, 8.5cm in width, and 5cm in depth (Gamma + Neutron Detector)
    - Objective
      - Total mass ≤ 300 grams
        Total footprint ≤ 12cm in height, 6.5cm in width, and 2.5cm in depth
  - **ORD-18**
    Selectable discreet and indiscreet notification options
    - The HPT device shall provide the capability to set user notification for alarms (visual, audible, vibrate) as part of the normal mode functionality
  - **ORD-20**
    User interfaces for operational and maintenance functionalities
    - Visual and physical interfaces
    - Display of all relevant information

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# HPT Draft Requirements Overview

- **Reliability, Availability, and Maintainability**
  - **ORD-10**

    Shall be reliable
    - MTBF of 15,000 to 20,000 operational hours required
    - MTBF of 30,000 to 40,000 operational hours as objective
  - **ORD-11**

    Shall support a high operational availability
    - Operationally available 95 – 99 % of the time required
    - Operationally available 99 – 99.6 % of the time as objective
  - **ORD-12**

    The system shall operate without any scheduled maintenance action
    - No periodic repairs, maintainability or calibration
    - Built-in test capability; built-in energy calibration capability; self health monitoring capability; and modular design for ease of part replacement required
  - **ORD-13**

    Operator maintenance shall be no more than battery replacement and external cleaning

# *HPT Draft Requirements Overview*

- **Personal Safety**
  - **ORD-06** (**KPP**)
    Personal Protective Equipment (PPE)
    - The HPT device shall provide a distinct notification when gamma and neutron (when applicable) dose rates exceed settable thresholds, per specific user doctrine
  - **ORD-15**
    Shall not directly endanger the operator's safety during use
    - UL Certification IEC 61010-1 required
    - UL913 Class I, II, and III, Intrinsically Safe as objective

# HPT Draft Requirements Overview

- **Environmental**
  - **ORD-14**
    Shall be ruggedized
    - Per ANSI 42.48-2008 drop test requirement
  - **ORD-16**
    Shall not emit any electromagnetic or radiofrequency signals that interfere with HERO-classified "Safe" or "Susceptible" ordnance in the maritime environment
    - Radiated emissions entirely within the “No Hazard” region of Figure 2-2 of NAVSEA OP 3565
  - **ORD-21**
    Shall operate without degradation in all operational environments, including indoor and outdoor (all-weather) conditions
    - Per MIL-STD-810G, Part 2:
      (High Temperature; Low Temperature; Temperature Shock ; Humidity; Salt Fog); and
    - IEC IP-68
  - **ORD-22**
    Shall operate without degradation in a Radio Frequency Electromagnetic Environment (EME)
    - Per MIL-STD-464C, TABLE 1. Maximum external EME for deck operations on Navy ships

# *HPT Draft Requirements Overview*

- **One-on-One Meetings**
  - DNDO will meet with interested vendors to discuss how currently available devices comply with the draft HPT requirements presented or a plan to achieve full compliance
  - Vendors can register for individual meetings with DNDO on a first come, first served basis for ***November 15, 16, 17, 29, or 30***
  - Meetings, which will last up to one (1) hour, will take place at DNDO's offices in Washington, DC
  - Vendor material to be presented, indicating how the devices meet (or plan to meet) each requirement shall be sent to DNDO no later than ***5:00 PM (Eastern Time) on November 9, 2011***
    - PDF, MS Word, or MS PowerPoint are acceptable formats
    - A maximum of 25 pages will be allowed
  - If available, vendors can bring their devices to the meeting in addition to the submitted technical information
  - DNDO will send out a notification with date and time of meetings to all registered vendors as soon as a final schedule is in place

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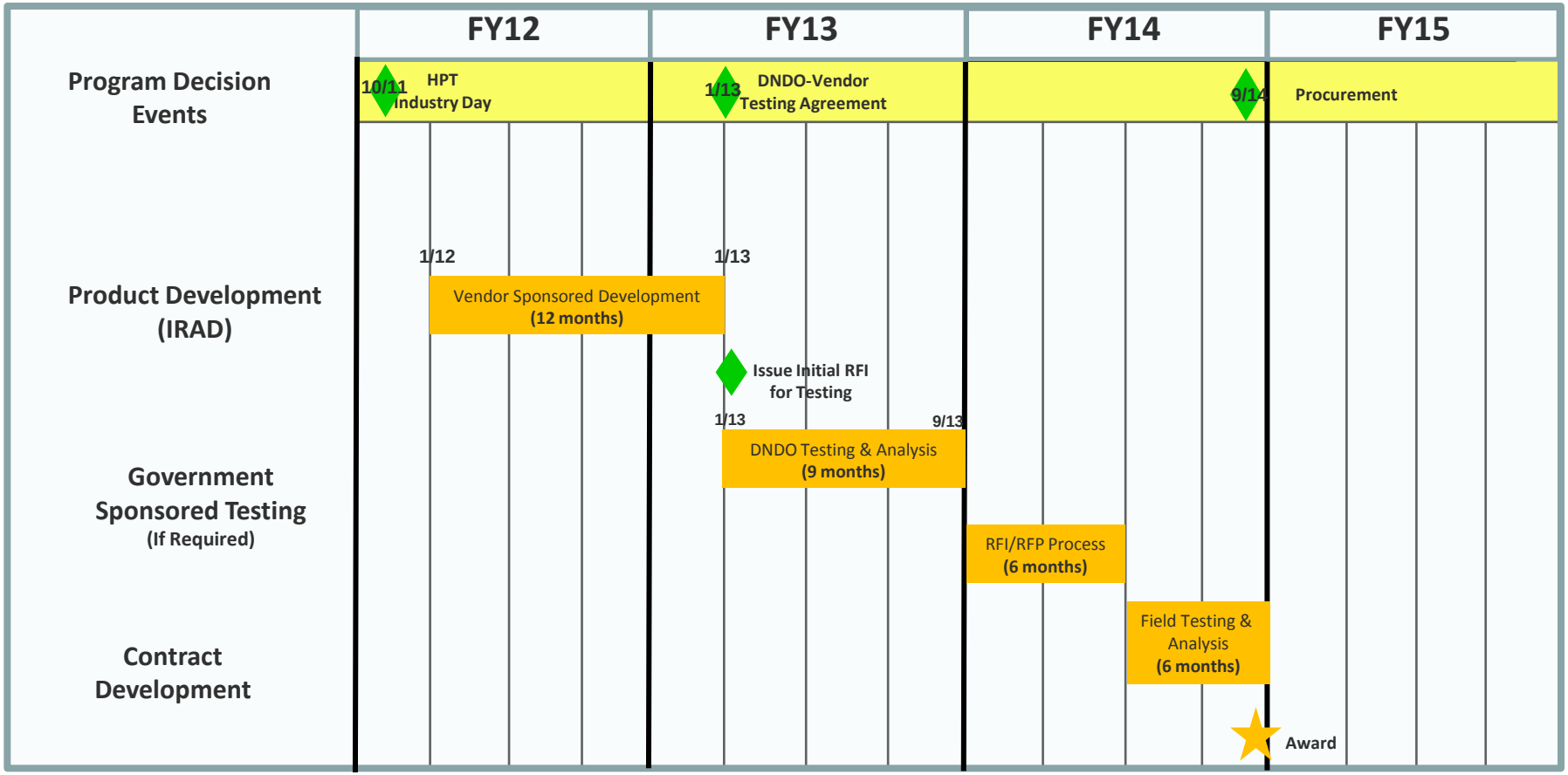
# HPT Draft Requirements Overview

## Notional Schedule

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# HPT Draft Requirements Overview

- **Conclusion**
  - The list captures the necessary draft requirements currently identified for HPT mission effectiveness and suitability
  - One hour follow-up meetings will be conducted starting the week of November 15 to discuss how vendors' devices meet stated requirements
  - Interested vendors will have twelve (12) months to develop or upgrade their devices, followed by a Government sponsored testing period
  - Expected acquisition of HPT devices by 4th Quarter FY14

Looking for industry feedback on draft set of requirements

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# *Human Portable Tripwire – Industry Day*

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# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire Industry Day**

**Intelligent Radiation Sensing System (IRSS)**


*Rich Vojtech Ph.D., Principal Deputy Assistant Director*
*Transformational and Applied Research Directorate*
***Domestic Nuclear Detection Office***
***Department of Homeland Security***
***October 27, 2011***

Homeland Security

# *Agenda*

- Background and potential environments
- IRSS Concept, Goals and Objectives
- Technical Approach
- Vendors
- Summary

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# *Background*

**Problem & Solution:**

- There are particular locations where it is not possible to scan for anomalous radioactive materials by routing traffic through a single point of entry, such as maritime boardings, general aviation facilities, non-entry border locations and National Security Special Events (NSSE).
- A robust distributed detector array can address these situations. This system, consisting of networked detector units, could be worn by personnel while performing other duties or conducting rad/nuc searches. These detector devices should be small and lightweight, especially for users where radiation detection is not their primary duty.

**Prior Influences:**

- The DNDO Transformational & Applied Research Directorate (TARD) conducted an advanced technology demonstration for the Intelligent Personal Radiation Locator (IPRL), resulting in a pocket-sized spectroscopic radiation locator that detects threat radiation, delineates source type, and locates the source.
- The TARD has sponsored efforts for new and innovative materials developments. These materials enhance the detection and location abilities of small portable detector systems.

# *Potential Environments*


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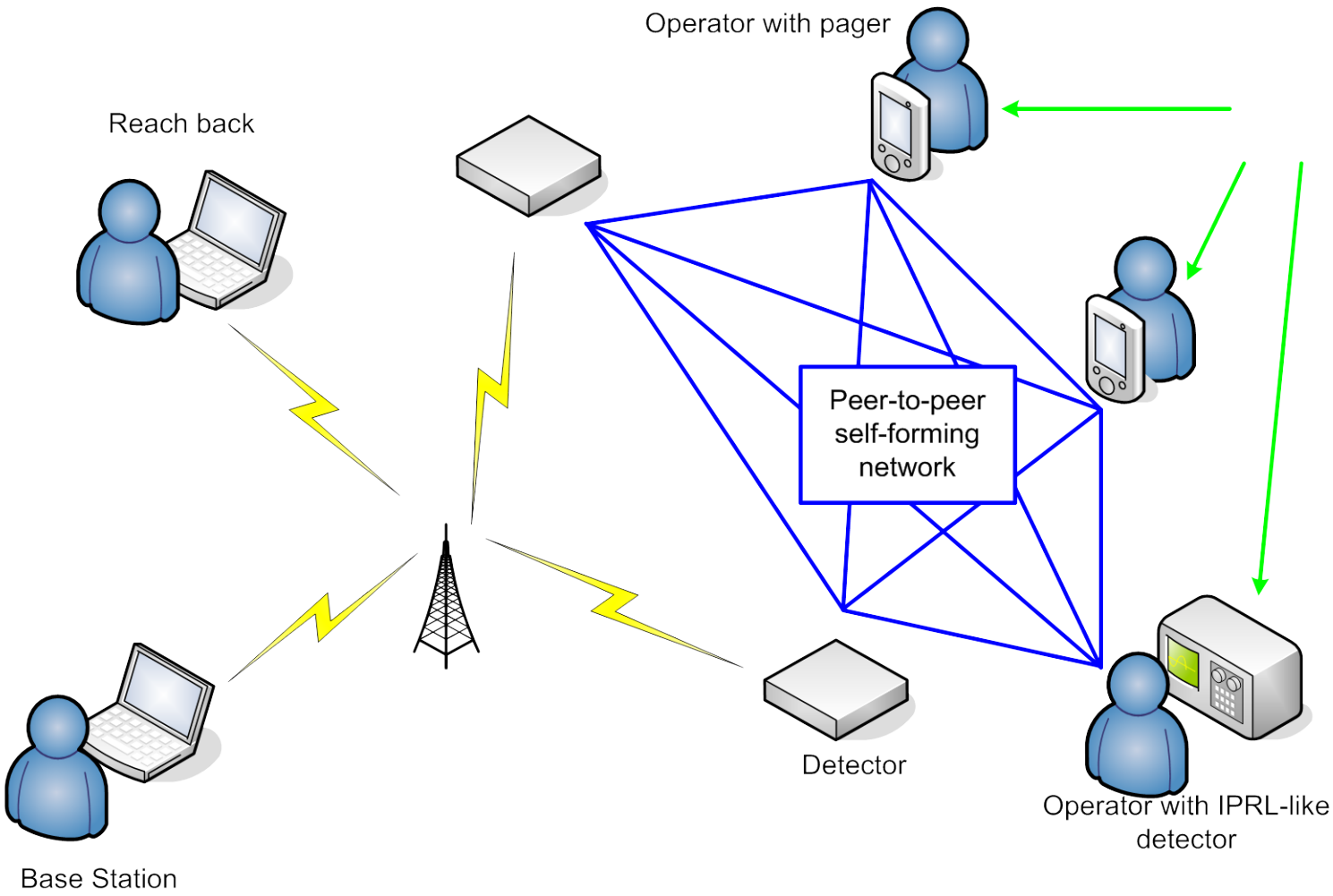
# IRSS Concept

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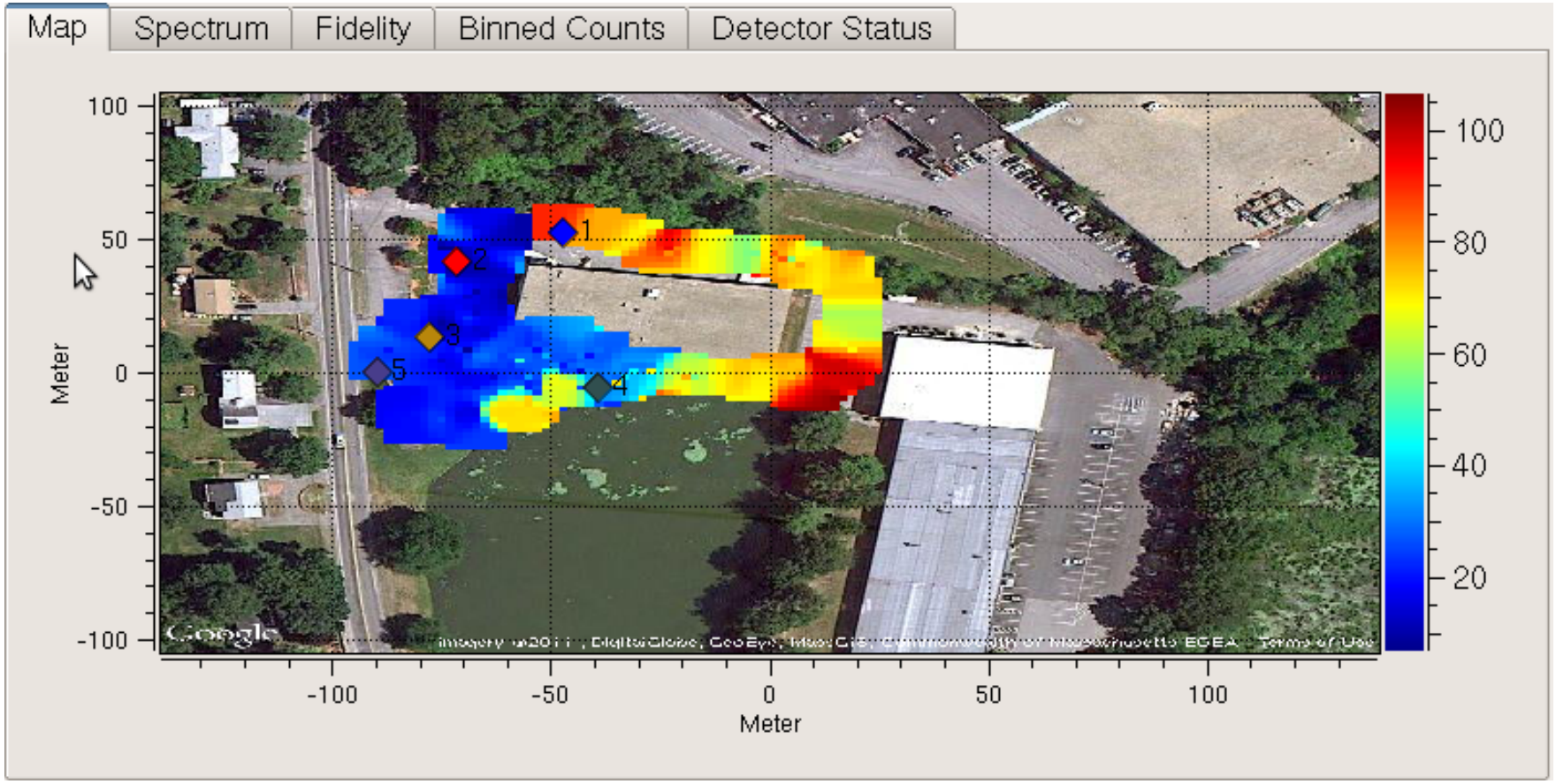
# *IRSS Usage*

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# *IRSS Goal*

The IRSS ATD will demonstrate the advanced technologies required to **improve the ability to detect, localize, and identify** radiological sources by integrating data from multiple portable radiation detectors.

Important points:

- The IRSS ATD is not a demonstration of networked radiation detectors transmitting alarms back to a base station.
- The IRSS ATD is a demonstration of an inter-communicating radiation detector system fusing radiation, spatial, and temporal data from small mobile sensors.

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# *IRSS Objectives*

- IRSS will demonstrate a cost-effective networked system of radiation detectors to monitor radiological sources in environments where it is not feasible to move traffic through a single location.
- Technologies critical to a robust, distributed sensing system will be demonstrated. These technologies include portable detectors, wireless networks, flexible data structures, and advanced algorithms, as well as those technologies required for the integration of the complete sensor system.

# *IRSS Technical Approach*

- **Detectors** – Use currently available portable detectors as the basis for a distributed sensor system. The IRSS program is focused on maximizing information and capabilities of existing hardware.
- **Wireless Network** – Develop a robust two-way communications for fielded detector hardware.
- **Data Structure** – Implement a well-defined data structure which allows the flexibility to incorporation new devices or algorithms while maintaining compliance with external data standards.
- **Algorithms** – Integrate advanced algorithms taking data from the entire system to provide an enhanced ability to rapidly locate and identify radioactive sources.
- **Sensor System** – Develop a complete distributed sensor system with performance superior to a similar system of individual stand-alone detectors.

# *Summary*

- There are mission locations where it is not possible to scan for anomalous radioactive materials by routing traffic through a single point of entry.
- The Intelligent Radiation Sensor System (IRSS) Advanced Technology Demonstration (ATD) will demonstrate the advanced technologies required to improve the ability to detect, localize, and identify radiological sources by integrating data from multiple portable radiation detectors.
- The IRSS ATD is a demonstration of an inter-communicating radiation detector system fusing radiation, spatial, and temporal data from small mobile sensors.

# *Domestic Nuclear Detection Office (DNDO)*

**Human Portable Tripwire Industry Day**

**Advanced Radiation Monitoring Device (ARMD)**


***Cameron Cupp, SETA Support to ARMD***
***Transformational and Applied Research Directorate***
***Domestic Nuclear Detection Office***
***Department of Homeland Security***
***October 27, 2011***

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# *Outline*

- Background
- ARMD Goal and Objectives
- Technical Approach
- Project Status
- Summary

# *Background*

**Problem:**

- Current small Personal Radiation Detectors (PRD) systems lack both the sensitivity and specificity to enable high confidence detection of radiological and nuclear threats for common operational scenarios, while minimizing operational burdens and False Alarm Rate (FAR).

**Solution:**

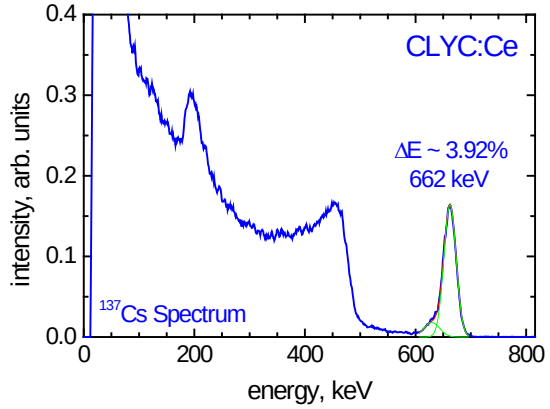
- Novel systems approaches are required to provide substantive improvements in the ability to detect, locate, and identify threats across various Global Nuclear Detection Architecture (GNDA) domains, pathways and mission areas.
- A Spectroscopic Personal Radiation Detector (SPRD) based on prior DNDO Transformational & Applied Research Directorate (TAR) detector material research efforts can address these situations. This spectroscopic system, with location and reach-back capability, could be worn by personnel while performing other duties or conducting rad/nuc searches. These detector devices should be small and lightweight, especially for users where radiation detection is not their primary duty.

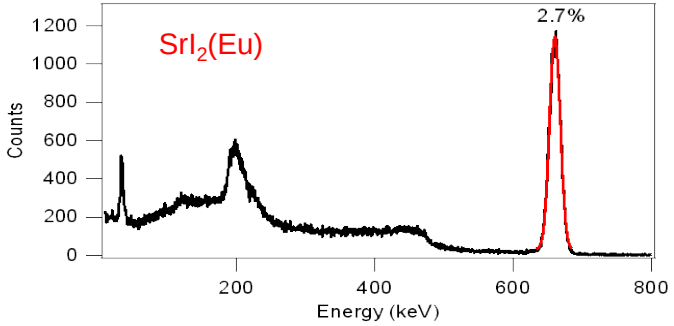
# *Prior Influences*

**Leverage results and experience gained from past work in TAR:**

- First ATD conducted was on the CZT-based Intelligent Personal Radiation Locator (IPRL) compact handheld devices in 2008-2009. Material showed promise in terms of detection, identification, and localization. However, material yield and fragility issues have affected the price point of CZT-based detectors in general.
- TAR has sponsored efforts for new and innovative materials development. These materials, including strontium iodide (**$SrI_2$**) and cesium lithium yttrium chloride (**CLYC**), have the potential to enhance the detection and location abilities of small portable detector systems.

| Material | Energy Resolution (662 keV) | Other Considerations |
|---|---|---|
| CZT | ~ 1-3% | Low growth yield; High cost |
| $SrI_2$ | ~3% | High growth yield; Decreased cost |
| CLYC | ~3-5% | Performs as both gamma and neutron detector; Decreased cost |

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# *ARMD Goals and Objectives*

- Development of a sensitive, compact and highly accurate Spectroscopic Personal Radiation Detector (SPRD)

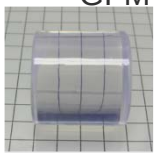
- Characterize the performance envelope of the core detector module (CDM) as it relates to overall SPRD performance
  - Time to Detect/ID
  - Energy Resolution
  - Directional Accuracy
  - Size, Weight, Battery Life, and Cost

- Assess the technology potential and maturity of these materials as well as supporting technologies necessary for their use in an advanced SPRD system based on the new scintillator materials

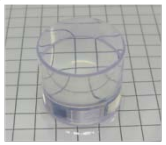
# *Technical Approach - ARMD*

- Scintillator materials ($SrI_2$ and CLYC) developed under the Exploratory Research project are being supplied as Government Furnished Materials (GFM)
- Packaging of new scintillators that optimizes light collection and protection from moisture and other environmental factors
- Mating them to compact, low power, low noise photon conversion devices and front end electronics
- Signal processing and algorithm development that optimizes device energy resolution, neutron detection (if applicable), and ability to identify and locate radioactive materials of concern with low false alarm rates
- Maintaining high sensitivity in a compact design with relatively long battery life

GFM Crystals

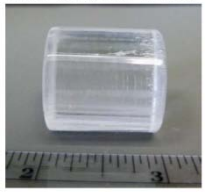


$SrI_2$ 71-1: Side view

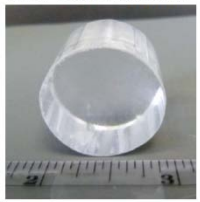


$SrI_2$ 71-1: Oblique view

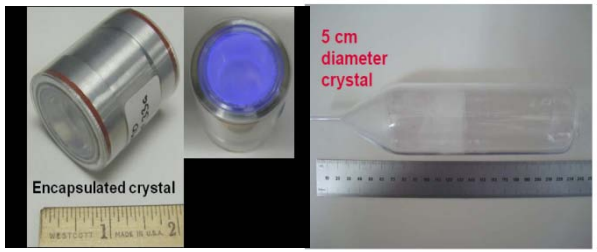
CLYC-1157: Side View #1



CLYC-1157: End View #1



Crystal Packaging

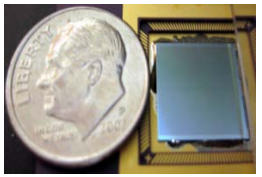



Strontium Iodide ($SrI_2$)

$Cs_2LiYCl_6$ (CLYC)

Readout


Silicon Diode



Solid State Photo Multiplier Tube

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# *Project Status*

- 3 vendors selected
  - SAIC
  - Sanmina-SCI
  - Canberra
- Currently developing design of detector (in preparation for Critical Design Review)
  - Exploring $SrI_2$, CLYC, $CeBr_3$ as scintillator materials
  - 1″ mini-PMTs, silicon photomultipliers (SiPMs), and silicon drift photodiodes (SDPDs) being considered as photon conversion technologies
- Characterization activities scheduled for November 2012

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# *Summary*

- ARMD focus is the development of a sensitive, compact and highly accurate Spectroscopic Personal Radiation Detector (SPRD)
  - Improve the ability to detect, localize, and identify radiological sources by exploiting emerging scintillation detection materials, as well as photon-to-electron conversion technologies
  - Characterize and assess the maturity/potential of the technology
- Emerging technologies being investigated include $SrI_2$, CLYC, and solid state photon-to-electron readout devices
- 3 vendors currently in critical design development, and characterization activities scheduled to start in November 2012

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# Human Portable Tripwire – Industry Day

| Start | Stop | Topic | Presenter |
|---|---|---|---|
| 0730 | 0755 | Registration | |
| 0755 | 0800 | Administrative Remarks | Mr. Todd Pardue |
| 0800 | 0820 | Welcome, Introduction, Opening Remarks | Mr. Warren Stern , DNDO Director |
| 0820 | 0830 | Procurement Disclaimer | Mr. Bill Fuller, Contracting Officer |
| 0830 | 0850 | HPT Industry Day Objectives and Commercial Strategy Overview | Mr. Steve Karoly, DNDO PADD Assistant Director |
| 0850 | 0915 | HPT AoA Overview | Mr. Julian Hill, DNDO SEED Assistant Director |
| 0915 | 1000 | DHS Chief Commercialization Officer Presentation | Dr. Thomas Cellucci, DHS Senior Counsel |
| 1000 | 1015 | Break/Reading Room Session #1 | Assignments Distributed |
| 1015 | 1045 | HPT Draft Requirements Overview | Mr. Todd Pardue |
| 1045 | 1115 | Transformational Applied Research Overview | Dr. Richard Vojtech and Mr. Cameron Cupp |
| 1115 | 1145 | Summary and Q/A session | Mr. Todd Pardue |
| 1145 | 1300 | Lunch/Reading Room Session #2 | Assignments Distributed |
| 1300 | 1315 | Introduction of CONOPS Session | Mr. Todd Pardue |
| 1315 | 1330 | Customs and Border Protection-OBP | Ms. Kathleen Christie-Assistant Chief |
| 1345 | 1400 | TSA Joint Coordination Center | Mr. Jeff Buzzi, Asst. Supv. Air Marshal in Chg. |
| 1400 | 1415 | United States Coast Guard | Mr. Tom Murphy, CBRNE Program Manager |
| 1415 | 1430 | Jacksonville, Florida Sheriff's Office Bomb Squad | Sergeant Tim Willingham, Supervisor (Virtual) |
| 1430 | 1445 | NYPD Counter Terrorism Division | Lieutenant Art Mogil |
| 1445 | 1500 | Philadelphia Police Department | Matthew Fleming, Police Officer |
| 1500 | 1515 | South Carolina State Transport Police | Lance Corporal Troy Smoak, Program Coord. |
| 1515 | 1530 | Suffolk County Police Department | Inspector Stuart Cameron, CO |
| 1530 | 1545 | Break/Set Up for Panel/Reading Room Session #3 | Assignments Distributed |
| 1545 | 1700 | Panel Session-Questions and Answers | |
| TBD | | Reading Room Session #4 (If required) | |

Afternoon Stakeholder presentations will be followed up in a different posting upon final review for release.

# DNDO HPT INDUSTRY DAY CONCLUSION

# THANK YOU FOR PARTICIPATING

Homeland Security