

DHS S&T

Borders & Maritime Security

2008 USCG Innovation Expo

From Ideas to Action – A DHS Science and
Technology Perspective

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Deputy Director
Borders & Maritime Security Division
Science and Technology Directorate



**Homeland
Security**

*From Science and Technology...
Security and Trust*

The Challenge: Strengthening Security in a Connected, Internet-Enabled World



**Homeland
Security**

Preparing for the Unexpected in the 21st Century

Acts of Mother Nature

Typhoon Fenghen- Philippines



Floods/Mudslides – NE India



Earthquake – NE Japan



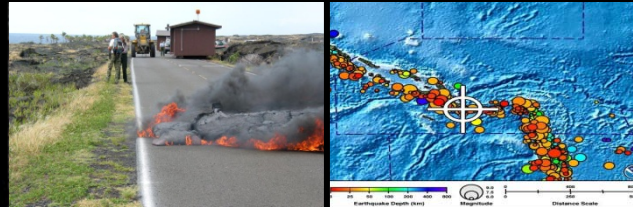
Cyclone Nargis - Burma



Asian Tsunami - 14 countries

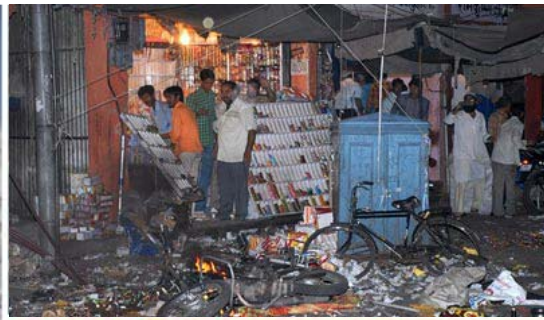


Volcano - Hawaii



Preparing for the Unexpected in the 21st Century

Acts of Man



TERRORIST ROADMAP

LIKELIHOOD OF OCCURRENCE

LOWER

HIGHER

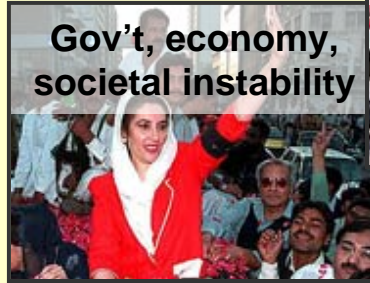
HIGHER

LOWER

CONSEQUENCE OF OCCURRENCE



Physical Critical Infrastructure Attack



Gov't, economy, societal instability



IEDs



Cyber



Trans Nat'l Migration



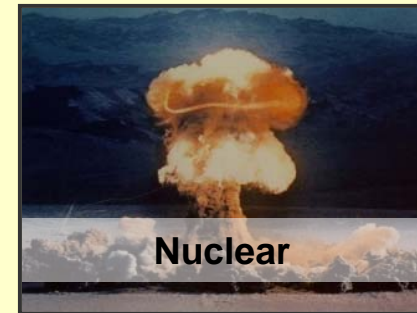
Chemical



Biological



Radiological



Nuclear

BOMBS, BORDERS, BUGS, BUSINESS, BODIES & BUILDINGS

S&T Goals

Consistent with the Homeland Security Act of 2002

- Accelerate delivery of enhanced technological capabilities to meet requirements and fill capability gaps to support DHS Agencies in accomplishing their mission
- Establish a lean and agile GS-manned, world-class S&T management team to deliver the technological advantage necessary to ensure DHS Agency mission success and prevent technology surprise
- Provide leadership, research and educational opportunities and resources to develop the necessary intellectual basis to enable a national S&T workforce to secure the homeland



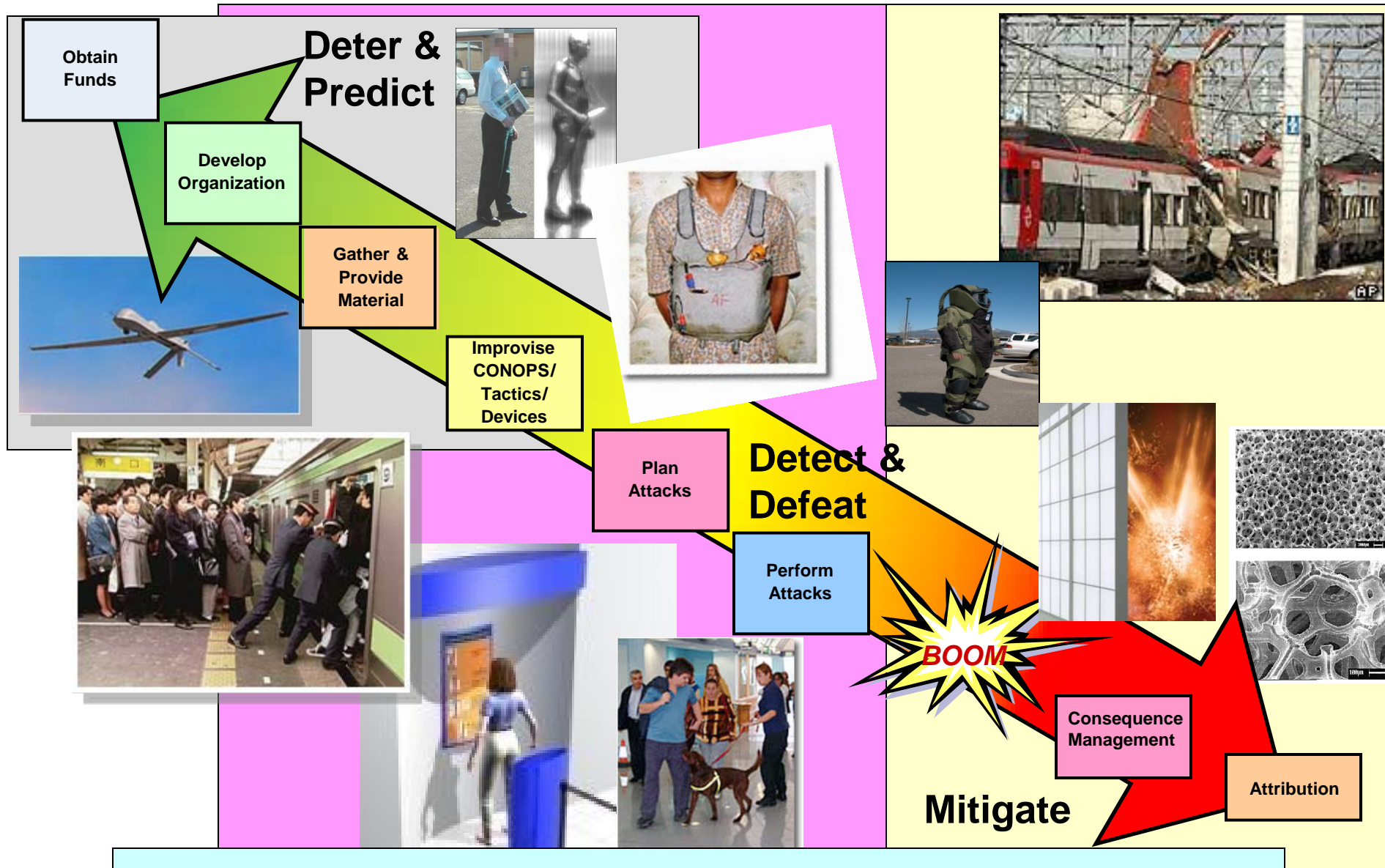
DHS S&T Investment Portfolio

FY 2009

Balance of Risk, Cost, Impact, and Time to Delivery

<p>Product Transition (0-3 yrs)</p> <ul style="list-style-type: none">▪ Focused on delivering near-term products/enhancements to acquisition▪ Customer IPT controlled▪ Cost, schedule, capability metrics	<p>Innovative Capabilities (2-5 yrs)</p> <ul style="list-style-type: none">▪ High-risk/High payoff▪ “Game changer/Leap ahead”▪ Prototype, Test and Deploy▪ HSARPA
<p>Basic Research (>8 yrs)</p> <ul style="list-style-type: none">▪ Enables future paradigm changes▪ University fundamental research▪ Gov’t lab discovery and invention▪ Homeland Security Institute	<p>Other (0-8+ years)</p> <ul style="list-style-type: none">▪ Test & Evaluation and Standards▪ Laboratory Operations & Construction
<p>Customer Focused, Output Oriented</p>	

Countering the IED Threat



Breaking the links in the IED Delivery Chain



Innovation/HSARPA

FY 2008 Demonstration Timeline

People Screening

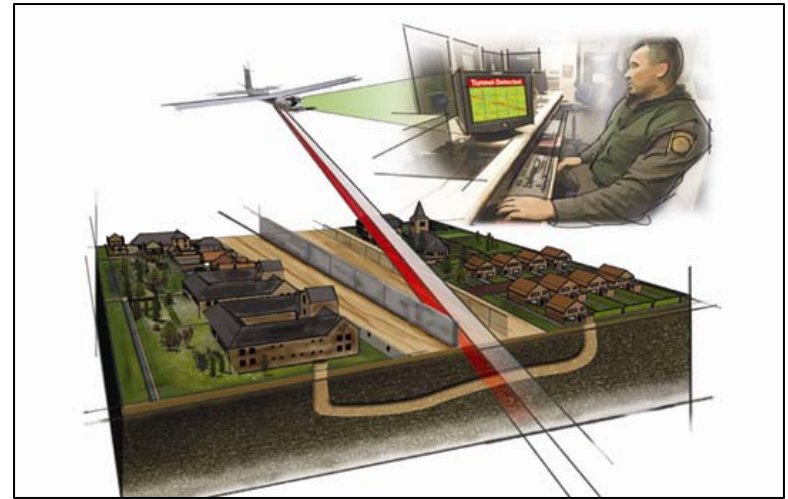
June 24 & September 17-18



Provides a non-intrusive means of screening people using micro-facial and physiological cues.

Tunnel Detection

July 2



Seeks real-time capability to detect tunnels using Unmanned Aerial Vehicles that are controlled by Border Patrol agents

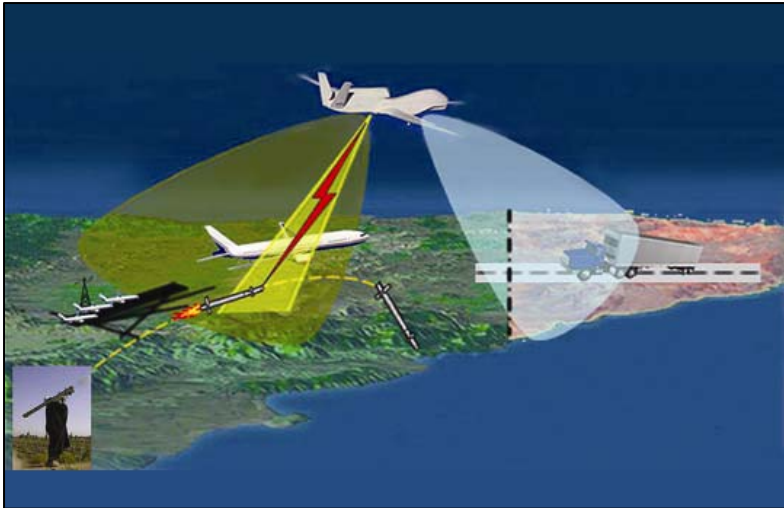




Innovation/HSARPA

FY 2008 Demonstration Timeline

High Altitude Counter-MANPADS **September 9**



Determine the ability to detect, track and put laser energy on the dome/seeker of a Man-portable air-defense systems (MANPADS) missile from a platform flying >50,000 feet above the target

Rapid Repair of Levee Breach **September 30**



Test capability of containing flood waters from a failing levee by deploying various methods that involve the use of inflatable water-filled bags, large tarps, and a modified barge to reduce the surge

Levee Breach Rapid Repair Demo

September 30, 2008 ▪ Stillwater, Oklahoma



Homeland Innovative Prototypical Solutions Levee Strengthening and Rapid Repair



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Innovation/HSARPA

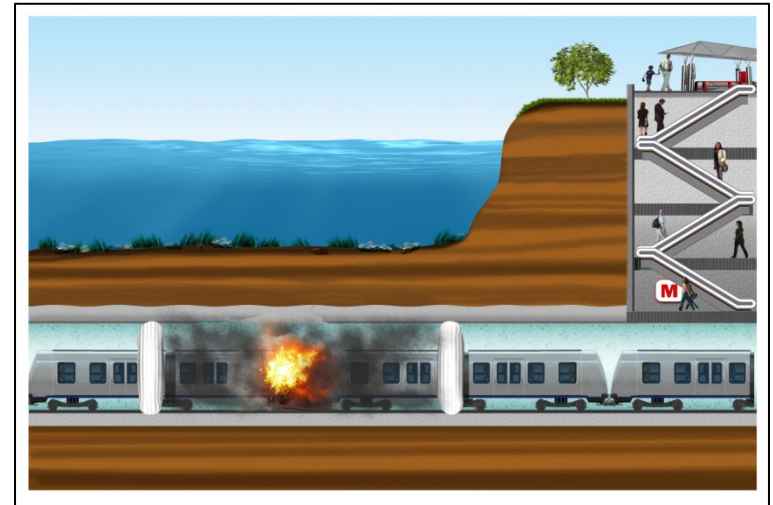
FY 2008 Demonstration Timeline

Liquid Explosives Screening August 8



Advance screening capabilities to better detect liquid threat substances so the flying public will not have to remove liquids from baggage

Resilient Tunnel August 10



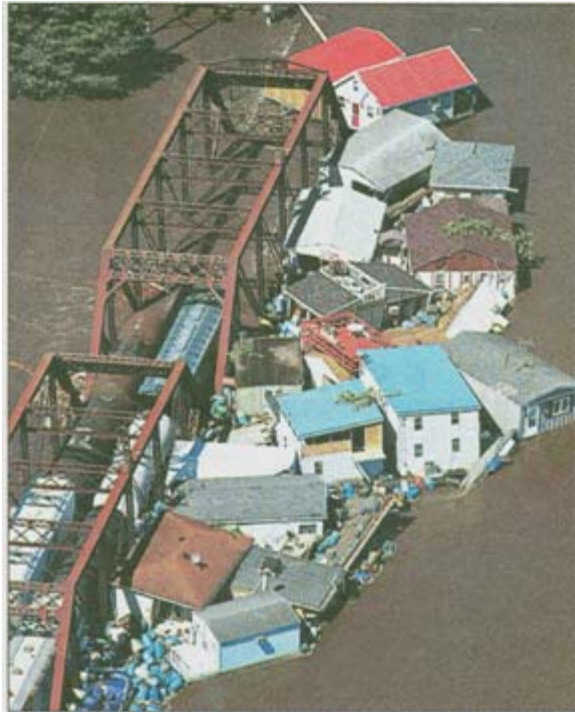
Develop capability to contain a fire or surge of water in a tunnel using giant inflatable plugs to quickly isolate and contain impacted areas



Vehicle Stopping Technology



Rivers Bedevil Iowa Towns



FLOOD COUNTS

Some numbers from the widespread flooding in Iowa:

- Number of deaths: 3
- Evacuees: Roughly 36,000
- Counties declared federal disaster areas: 24
- Sandbags used: 4.8 million
- Acres of corn lost: 1.3 million

Amphib Alaska



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TechSolutions Projects

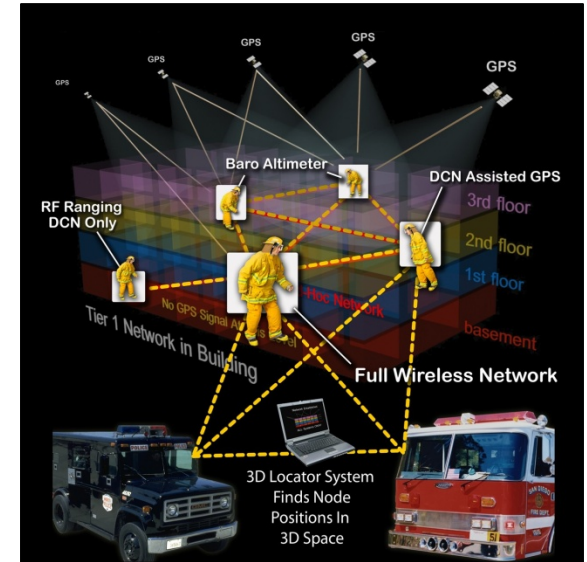
Next Generation Breathing Apparatus



Ocular Scanning Nerve Agents/Toxic Gases



3-D Location



Biometric Identification



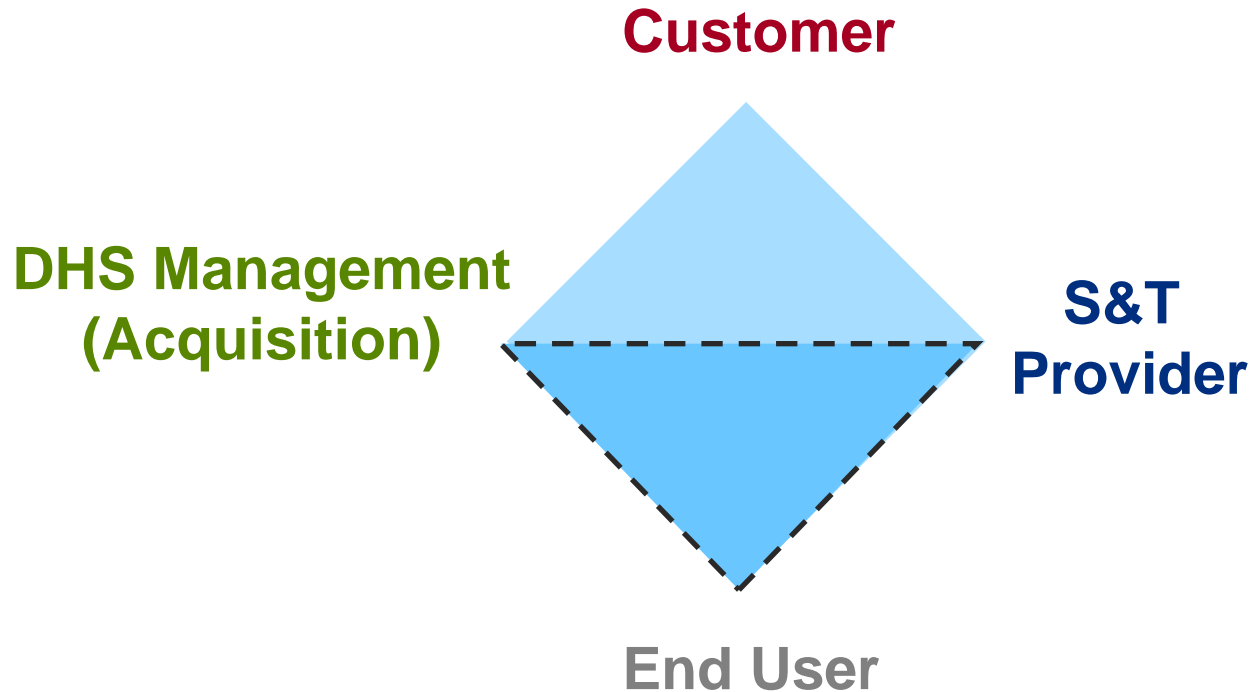
Fire Ground Compass



Carrizo Cane – Bio Agent

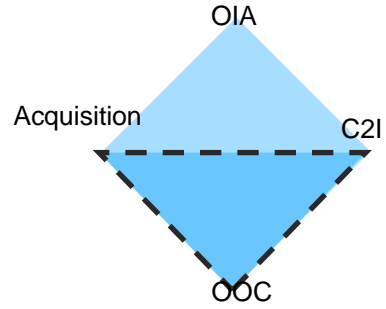


S&T Capstone IPT Key Members

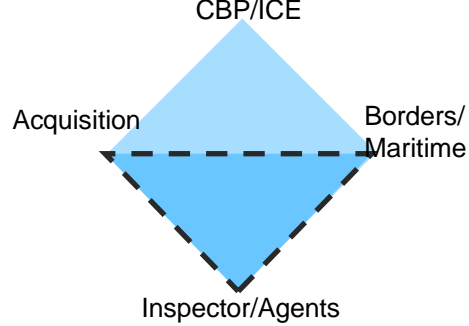


DHS Requirements/Capstone Integrated Product Teams

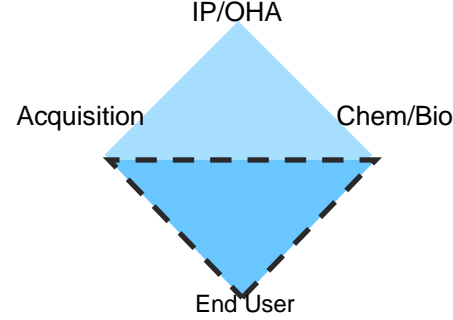
Information Sharing/Mgmt



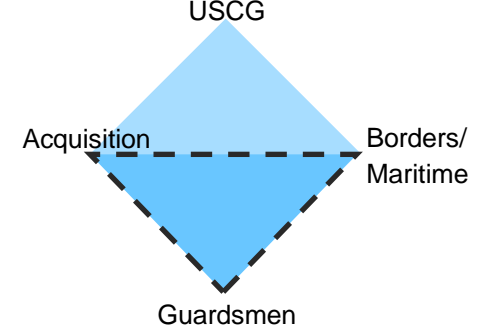
Border Security



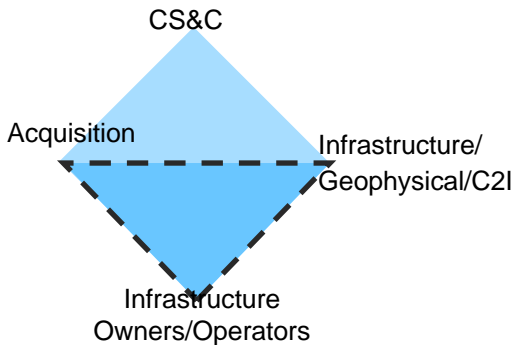
Chem/Bio



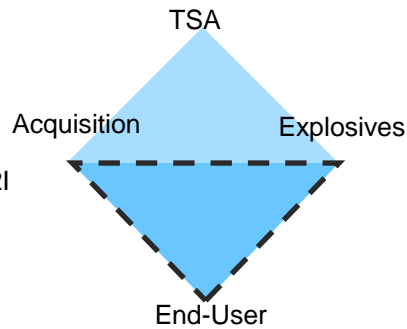
Maritime Security



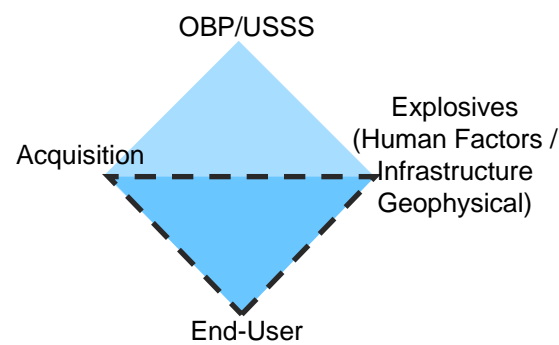
Cyber Security



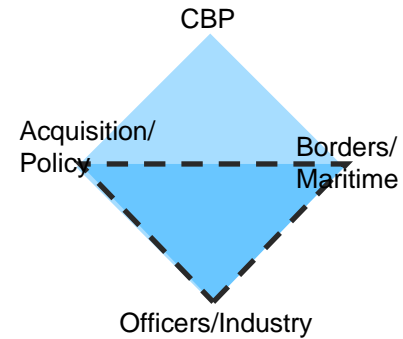
Transportation Security



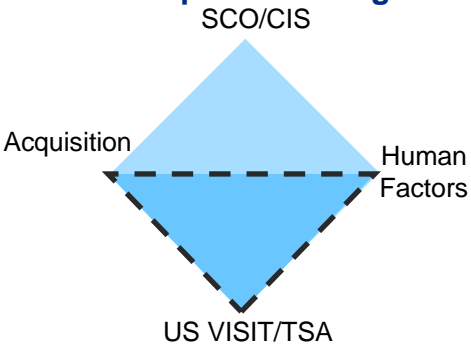
Counter IED



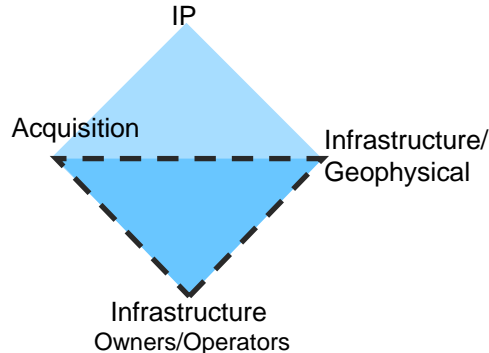
Cargo Security



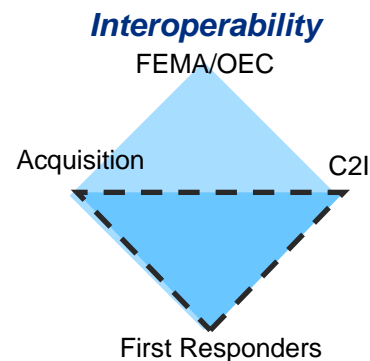
People Screening



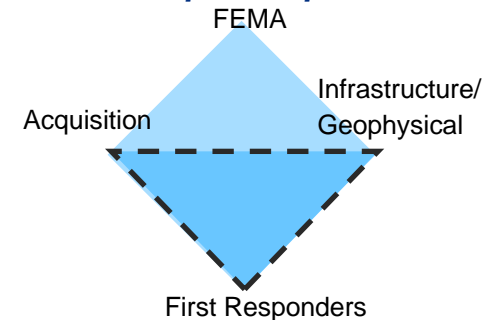
Infrastructure Protection



Incident Management



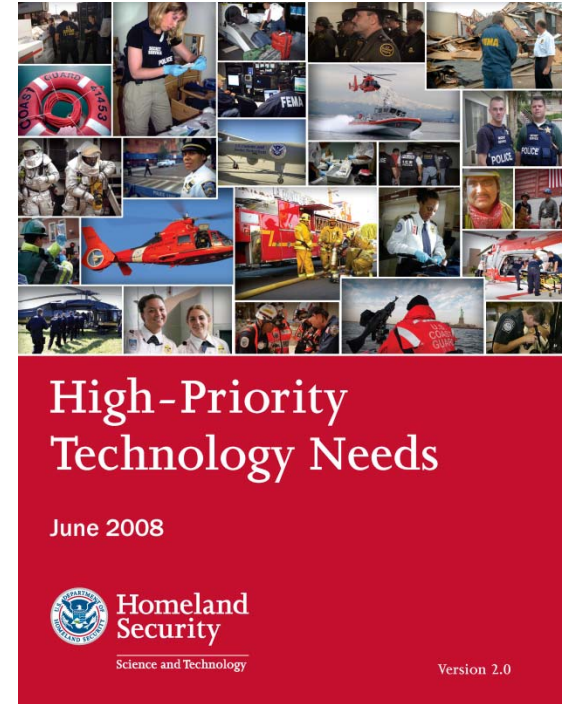
Prep & Response





High Priority Technology Needs

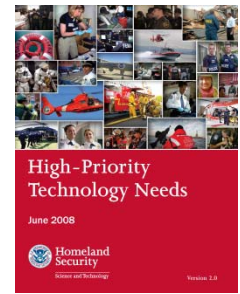
- S&T investments are tied directly to the technology needs of our customers, represented by leadership of DHS components, and *their* customers on the front lines of homeland security
- Requirements are updated on annual cycle aligned with DHS funding and acquisition processes
- **New!** Updated High Priority Technology Needs brochure identifies 94 technology needs of DHS components and their customers
- Brochure is posted online:
http://www.dhs.gov/xlibrary/assets/High_Priority_Technology_Needs.pdf



Customer Focused...Output Oriented



Maritime Security IPT: Representative Technology Needs



- Wide-area surveillance from the coast to beyond the horizon; port and inland waterways region - detect, ID, and track
- Data fusion and automated tools for command center operations
- Improve capability to continuously track contraband on ships or in containers
- Develop improved ballistic personal protective equipment for officer safety
- Vessel compliance through less-lethal compliance methods
- Detect and identify narcotics, chemical warfare agents, toxic industrial chemicals, explosives and contraband – identify multiple threats with one unit and be able to sample for and detect contraband without direct contact



S&T Lead Division: Border/Maritime



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Doing Business with DHS S&T

Broad Agency Announcements (BAA)

Current Solicitation Topics

- Long Range BAA – addresses needs of 6 S&T divisions
- Explosives Detection
- Communications and Maritime Safety
- Unified Incident Command & Decision Support, Ph. 2 – Prototype Design and Pilot Development

Examples of Past Topics

- CELL ALL – Ubiquitous chem/bio sensing
- First Responder Reliable Link (First NET)
- Cyber Security R&D
- Biometric Detector
- Home Made Explosives

Visit *FedBizOpps*: www.fbo.gov



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FROM SCIENCE...SECURITY

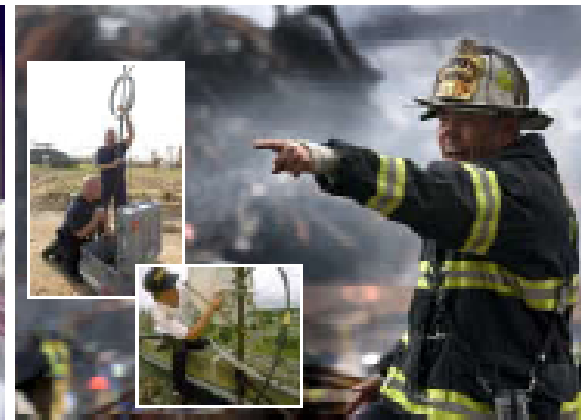
Explosives



Chemical/Biological



**Command, Control, &
Interoperability**



Borders/Maritime



Human Factors



Infrastructure/Geophysical



FROM TECHNOLOGY...TRUST

Back-Up Slides



**Homeland
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Concrete Breaching Tool



Homeland
Security

Science and Technology

CIRT

Controlled Impact Rescue Tool

Fire & Rescue Training Academy

February 20, 2008



Levee Breach Rapid Repair Demo

September 30, 2008 Stillwater, Oklahoma





1993.....2001.....20???

Get People Right
Get Books Right
Get Organization Right
Get Content Right

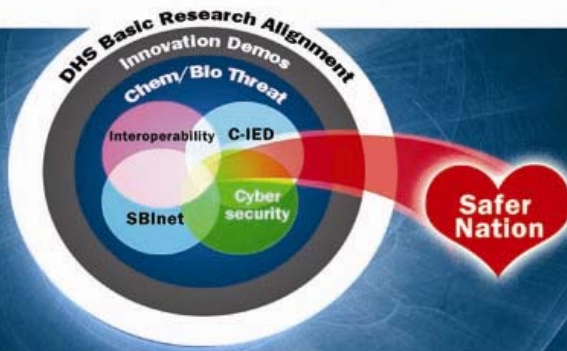
Bombs
Borders
Bugs
Business
Bodies
Buildings

People + Process + Partnerships = Product

*It's About our Relevance & Credibility!
Product vs. Overhead!?*



DHS S&T FY08 Focus...







Have we done enough??



U.S. DEPARTMENT OF
HOMELAND SECURITY
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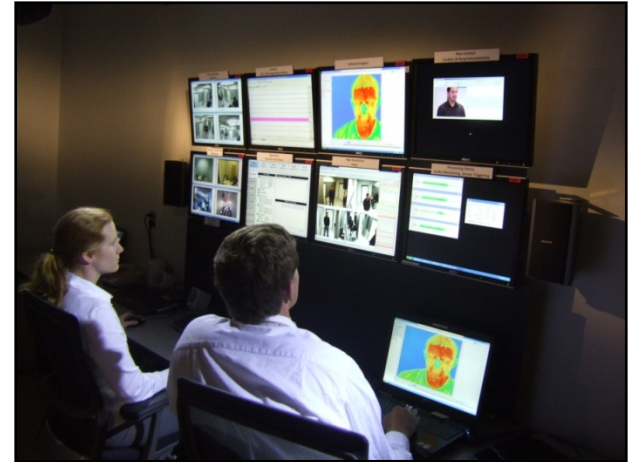
Centers of Excellence Alignment

S&T DIVISIONS					
Explosives	Chemical/Biological	Command, Control & Interoperability	Borders/Maritime	Human Factors	Infrastructure/ Geophysical
<p><i>COE for Explosives Detection, Mitigation & Response</i></p> <p><i>COE for Transportation Security</i></p>	<p>NATIONAL CENTER FOR FOOD PROTECTION AND DEFENSE A HOMELAND SECURITY CENTER OF EXCELLENCE</p>  <p>FAZD CENTER National Center for Foreign Animal and Zoonotic Disease Defense</p>  <p>CAMRA Center for Advancing Maritime Risk Assessment</p>  <p>PACER A HOMELAND SECURITY CENTER OF EXCELLENCE</p>	<p>IDS-UACs</p> <p>RVACs</p> <p><i>Consolidated CCI Center</i></p> <p><i>COE for Transportation Security</i></p>	<p><i>COE for Border Security & Immigration</i></p> <p><i>COE for Maritime, Island & Remote/Extreme Environment Security</i></p>	<p>START →</p>	 <p>PACER A HOMELAND SECURITY CENTER OF EXCELLENCE</p> <p><i>COE for Natural Disasters, Coastal Infrastructure & Emergency Management</i></p> <p><i>COE for Transportation Security</i></p>
				<p>← Risk, Economics and Operations Analysis Risk Sciences Branch & HSI Risk Determination →</p>	

FAST M²– Future Attribute Screening Technologies Mobile Module Demo



FAST Lab Protocol – Initial sensors gather signal data as Subject proceeds through Primary Screening area and responds to instructions and questions from security personnel.



A bank of monitors and sensor readouts that track Subject's physiological responses alert screeners to possible indicators of malintent

FAST technologies focus strictly on real-time physiological cues and behavior patterns in an attempt to prevent the unknown terrorist from gaining access to their target location.

Advancing CHLOE Capabilities



Homeland
Security

Science and Technology

CHLOE

Mojave, California
September 4, 2008



Project CHLOE

High Altitude Unmanned
Counter-MANPADS / Persistent Surveillance



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SAFECON – Safe Container

Office of Innovation - Homeland Innovative Prototypical Solutions

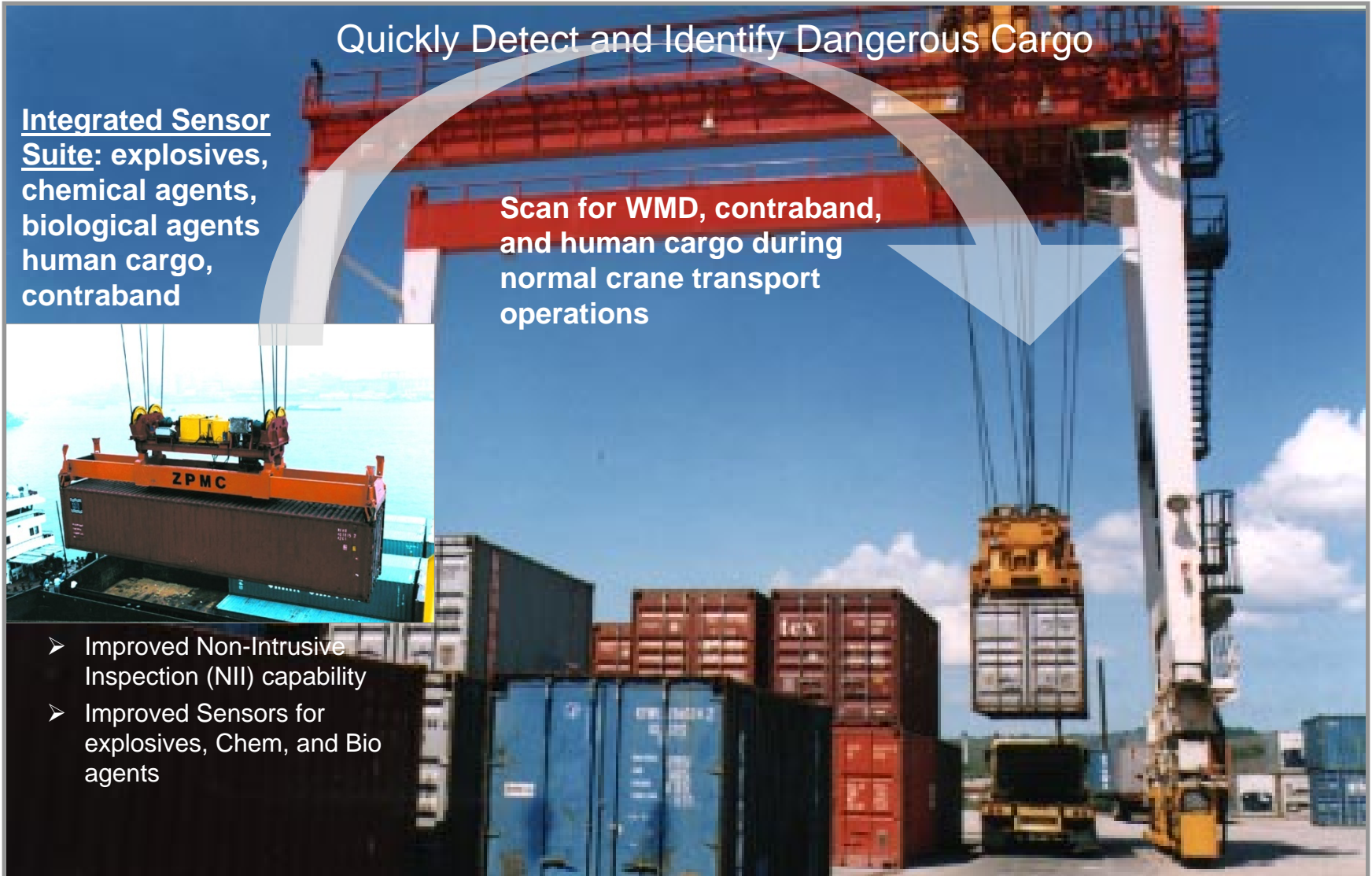
Quickly Detect and Identify Dangerous Cargo

Integrated Sensor Suite: explosives, chemical agents, biological agents, human cargo, contraband

Scan for WMD, contraband, and human cargo during normal crane transport operations

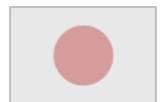
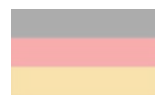
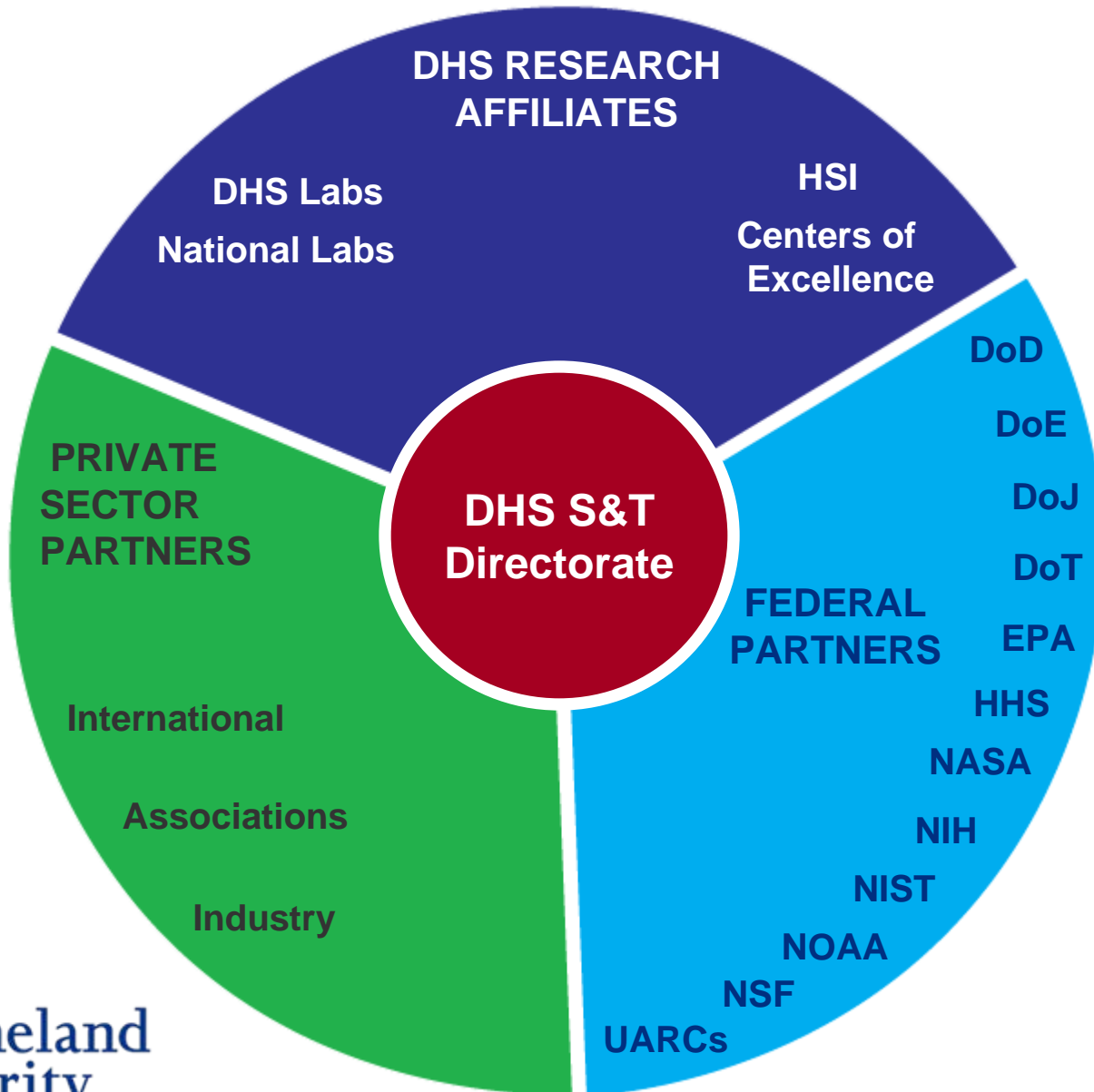


- Improved Non-Intrusive Inspection (NII) capability
- Improved Sensors for explosives, Chem, and Bio agents





Homeland Security S&T Enterprise



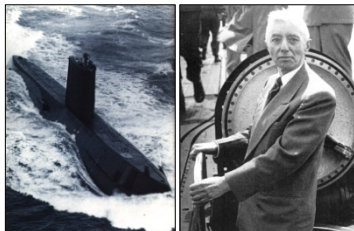
Homeland Security



Why Federal R&D Investment?

ONLY the Federal Government can take “game-changing” risks that benefit society, create leading-edge AMERICAN technology, AMERICAN JOBS and assure AMERICAN security!

Nautilus
SSN 571
~ 1954



Navy Nuclear
Submarine

Hyman G.
Rickover



Civilian Nuclear Power

~ 1955



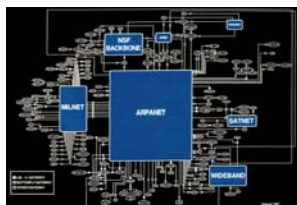
KC-135

Curtis LeMay



Boeing 707

1960's



ARPANET

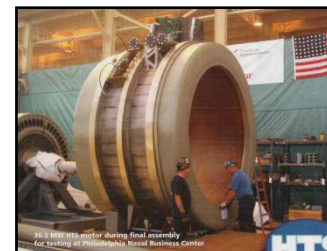


World Wide Web

> 2000



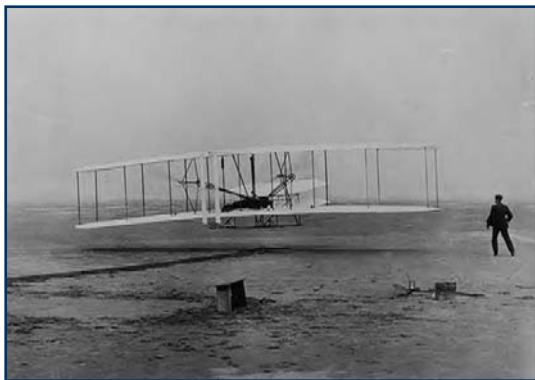
DDG 1000
“Electric Navy”



AMSC - 50,000 SHP (36.5MW)
HTS AC Synchronous Motor

KNOW Risk

KNOW Reward



The Wright Brothers First Flight



Boeing 787 Dreamliner



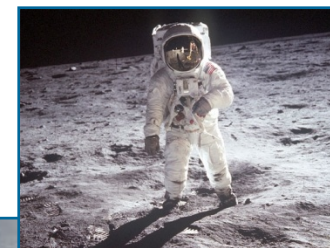
A380 Airbus



Robert Goddard & First Liquid-Fueled Rocket



First Man on Moon



International Space Station



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S&T Outreach

2008 Schedule

- ***S&T Stakeholders West***, Los Angeles, January 14-17
- ***ChemBio Conference***, January 28-February 2
- ***Second Annual DHS University Network Summit***, Washington, DC, March 19-21
- ***S&T Stakeholders East***, Washington, DC, June 2-5
- ***S&T Stakeholders PacAsia***, Hawaii, October 7-10

2009 Plans

- ***S&T Stakeholders West***, Bellevue, WA, February 23-26
- ***Global Security Asia***, Singapore, March 17-19
- ***S&T Stakeholders East***, Washington, DC, May
- ***S&T Stakeholders Eurasia***, Sweden, Fall



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