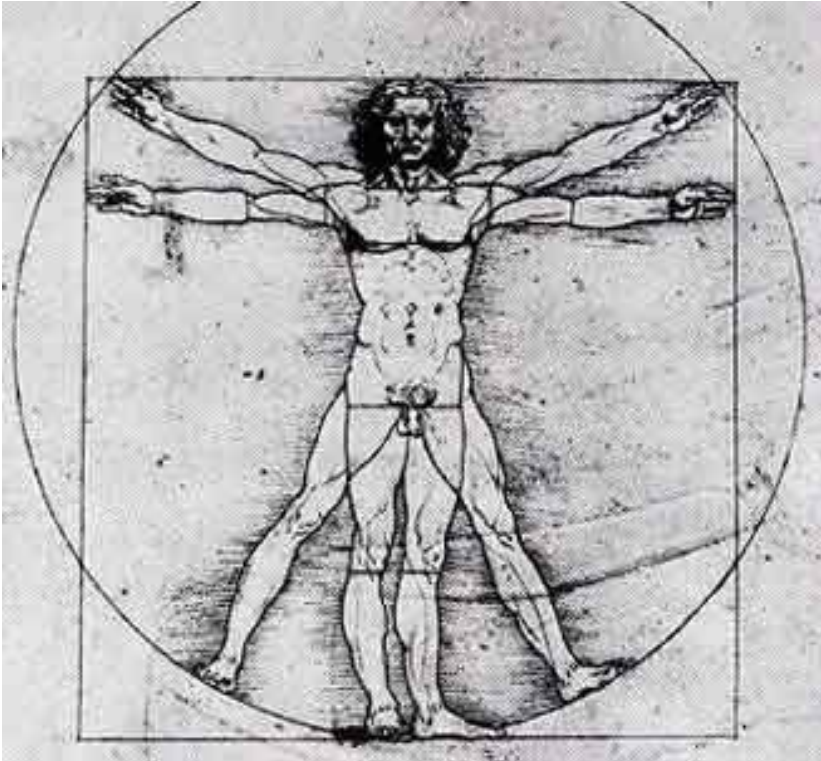


Human Factors Division



Sharla Rausch, Ph.D., Division Head
Department of Homeland Security (DHS)
Science and Technology (S&T) Directorate
Human Factors Division

From Science and Technology...Security and Trust

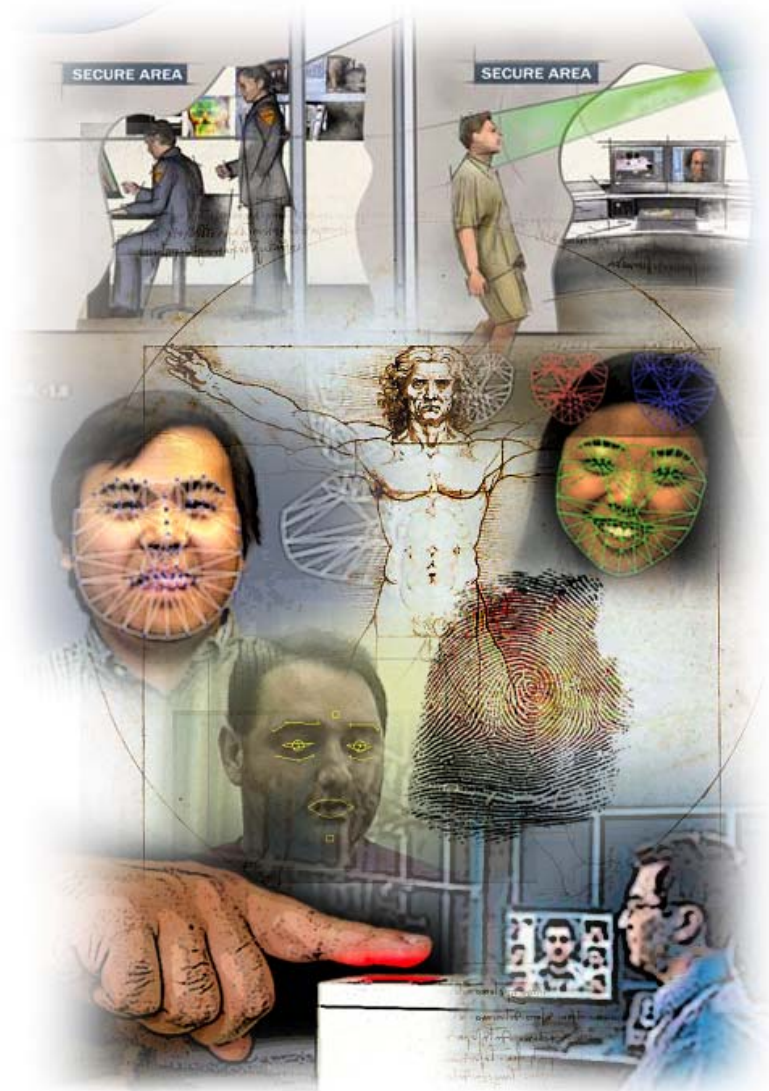


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Security

Human Factors Division Mission Statement

To apply the social and behavioral sciences to improve detection, analysis, and understanding of the threats posed by individuals, groups, and radical movements; to support the preparedness, response, and recovery of communities impacted by catastrophic events; and to advance national security by integrating human factors into homeland security technologies.

Customers: TSA, US-VISIT, USCIS, ICE, SCO, USSS, FEMA, OI&A, USCG, State & Local, S&T Divisions



Human Factors Division Goals

1. Enhance the analytical capability of the Department to understand terrorist motivation, intent and behavior.
2. Improve screening by providing a science-based capability to identify deceptive and suspicious behavior.
3. Enhance the capability to control movement of individuals into and out of the United States and its critical assets through accurate, timely, and easy-to-use biometric identification and credentialing validation tools.
4. Enhance safety, effectiveness, and usability of technology by systematically incorporating user and public input.
5. Mitigate impacts of catastrophic events by delivering capabilities that incorporate social, psychological and economic aspects of community preparedness, response and recovery.

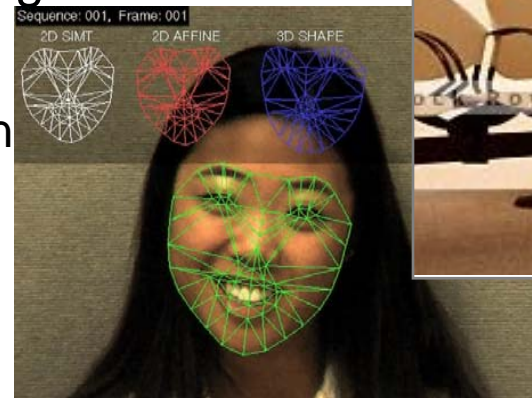
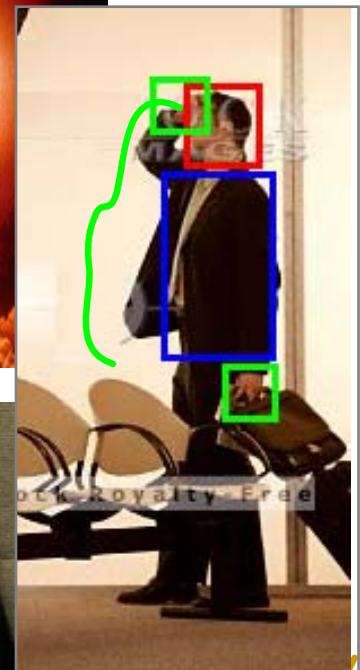
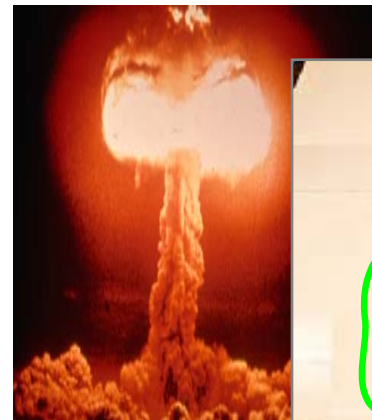
Know our enemies, understand ourselves; put the human in the equation.



HFD Thrust Areas

The DHS S&T Human Factors Division is comprised of two primary thrust areas, with programs under each:

- Social-Behavioral Threat Analysis
 - Precursors, Signatures, and Deterrence of Radicalization
 - Suspicious Behavior Detection
 - Community Preparedness, Response, and Recovery
- Human-System Research & Engineering
 - Personal Identification Systems
 - Technology Acceptance and Integration
 - Human-System Optimization



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Infrastructure Geophysical Division

Christopher Doyle

Division Head

Infrastructure Geophysical Division

Science and Technology Directorate

Department of Homeland Security

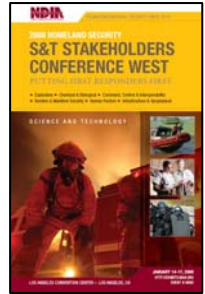
“Putting First Responders First”



**Homeland
Security**

Science & Technology

Infrastructure Geophysical Division



Mission:

- Increase the Nation's preparedness for and response to natural and man-made threats through superior situational awareness, enhanced emergency responder capabilities, and critical infrastructure protection

Customers:

- DHS Office of Infrastructure Protection (OIP)
- DHS Federal Emergency Management Agency (FEMA)

End-users:

- First responders
- S/L/Fed emergency managers
- Private sector infrastructure owners and operators



Thrust Areas/Programs

Critical Infrastructure

- Protective Technologies
- Modeling, Simulation and Analysis
- Advanced Surveillance
- Rapid Response and Recovery

Preparedness and Response

- Incident Management Enterprise
- Integrated Modeling, Mapping and Simulation for Incident Planning and Response
- Personnel Monitoring and Tracking

Geophysical

- Resilience
- Natural Disaster Recovery
- SAFE



What We Need:

Critical Infrastructure Protection

- Advanced surveillance
- Hardening technologies
- Automatic response/repair
- Rapid reconstruction
- Insights for private industry technical directions
- Critical Infrastructure Sector requirements

Incident Management

- Insight into internal R&D programs
- Systems in harsh and difficult environments
- Plug & Play, interoperable, distributed modeling & simulation
- Intelligent, easy to use, secure workflow IM engines
- Innovative System integration framework/platform
- Integrated First Responder protection systems

Geophysical

- Hurricane mitigation
- Storm surge defeat
- Long-term, sustainable solutions
- Early warning for all hazards
- Affordable protection
- Flood proofing



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EVENT # 0400

Explosives Division

Jim Tuttle

Explosives Division Head

Science and Technology Directorate

Department of Homeland Security

“Putting First Responders First”



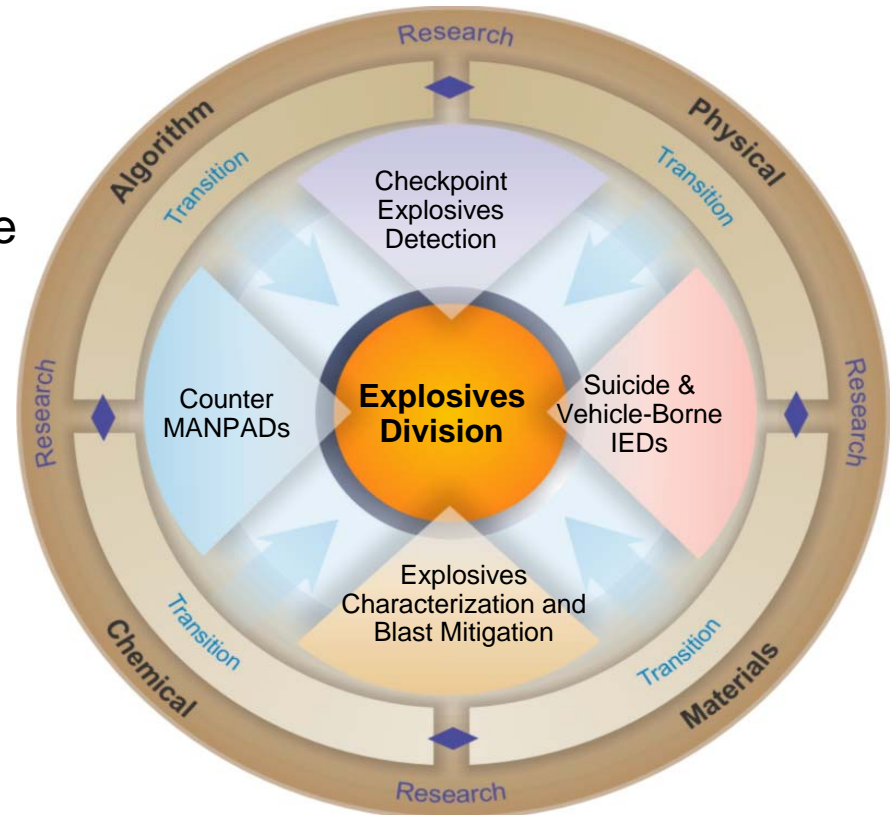
**Homeland
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Science & Technology

Explosives Division

Mission: To develop technical capabilities to detect, interdict, mitigate, and respond to the effects of non-nuclear explosives terrorism and accidents.

Customers:

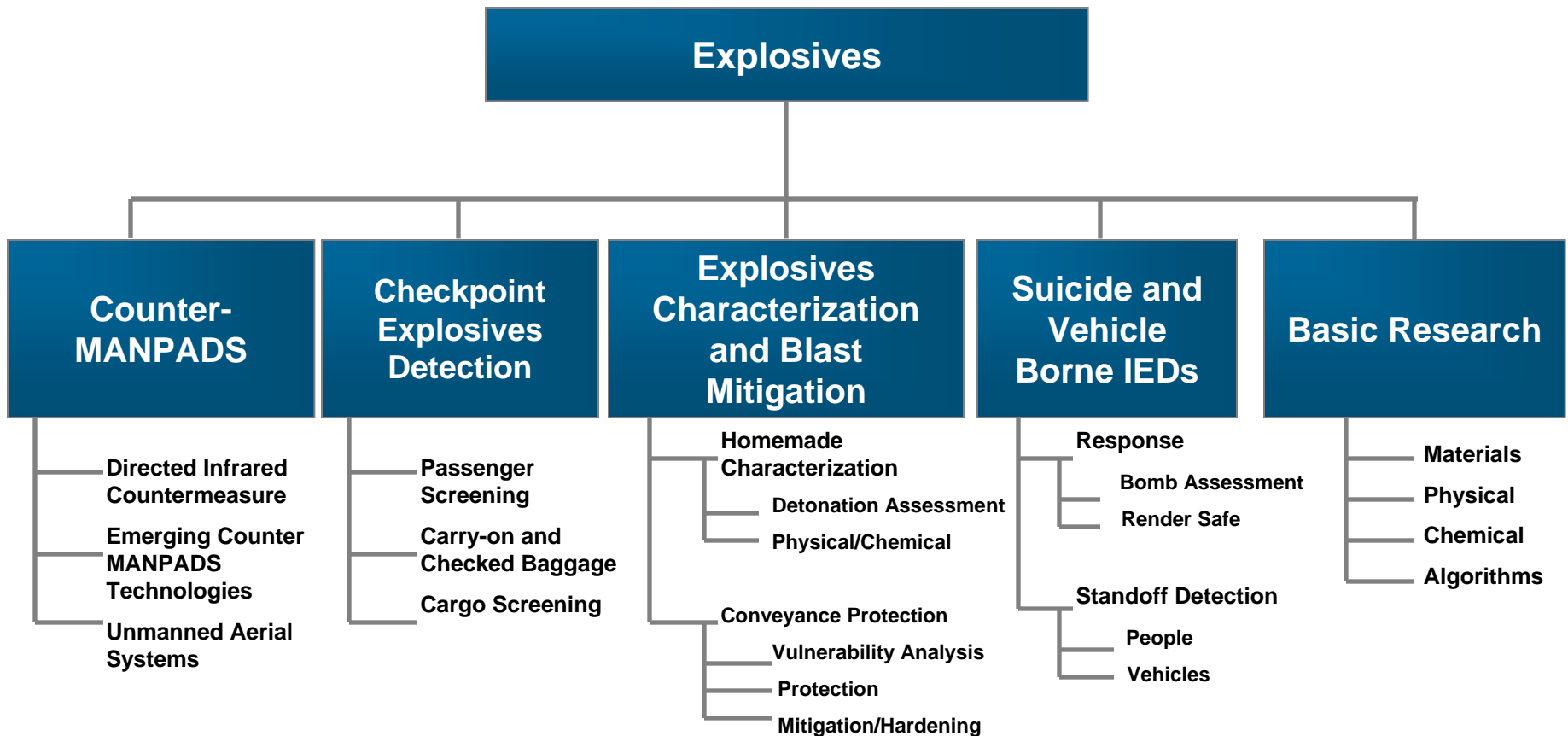
- Transportation Security Administration
- National Protection & Program Directorate
- US Secret Service
- Customs and Border Protection
- US Coast Guard
- Federal, state and local first responders



Homeland
Security

Division Organization

Managed by the DHS Science and Technology Directorate, the Explosives Division delivers on its mission through five thrust areas.



Explosives Prevention: Representative Technology Needs

- Standoff detection on persons (portable solutions)
- Screen People at checkpoints for explosives and weapons
- System solution for detection in baggage (checked & carried)
- Screen Air Cargo for Explosives
- Capability to detect VBIED / large threat mass (container, trailer, ship, vessel, car, rail)
- Capability to detect homemade or novel explosives
- Capability to assess, render safe, and neutralize explosive threats
- Optimize canine explosive detection capability



Explosives Breakout Sessions

Wednesday

- **Breakout 17: Explosives Division: Counter-IED Program and the First Responder: Response and Render Safe (2pm)**
- **Breakout 24: Response/Render Safe—Developing Future Requirements for the First Responder (3pm)**



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Chemical Biological Division

S. Elizabeth George, Ph.D.

**Chemical Biological Division Head
Science and Technology Directorate
Department of Homeland Security**

“Putting First Responders First”



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Science & Technology

Chemical and Biological Division Overview

Mission: to increase the Nation's preparedness against chemical and biological threats through improved threat awareness, advanced surveillance and detection, and protective countermeasures.

Key 5 year deliverables:

- Integrated CBRN risk assessments
- Anticipation of future & unconventional threats
- Chemical infrastructure risk assessment
- Fully automated Gen 3 BioWatch
- Integrated CBRN facility protection
- National lead for operational biological and chemical forensics
- Decision tools and veterinary countermeasures for Foreign Animal Diseases (FADs)



Current BioWatch collects air samples & analyzes them in LRN lab

IPT Co-Chairs: OHA, IP

DHS Drivers: OHA, IP, I&A, CBP, NPPD, PLCY, DNDO, Interagency Gaps

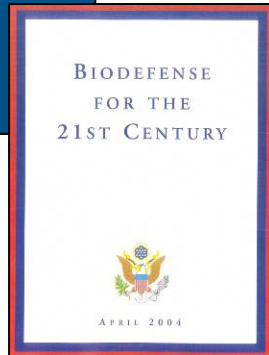
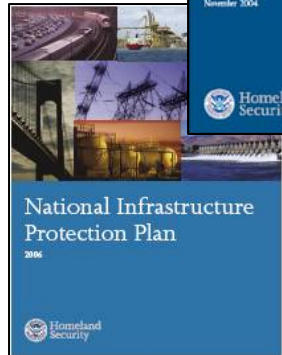
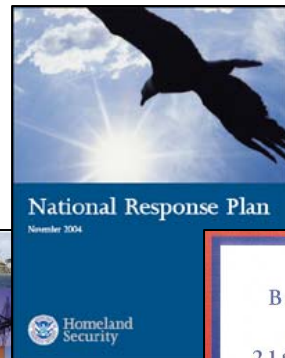
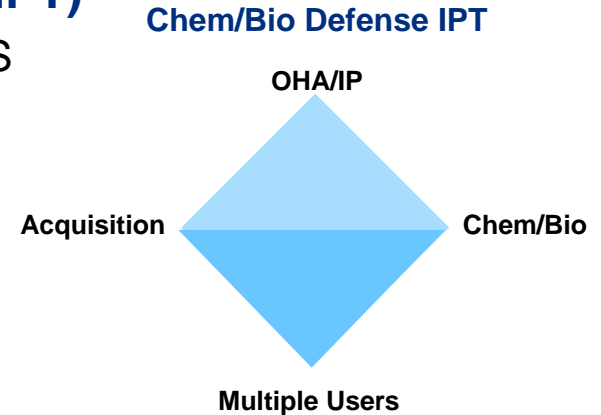
End-Users: HSC, HHS, FBI, USDA, IC, EPA, local public health, critical facilities



Where Do Our Requirements Come From?

Directly from a Capstone Integrated Product Team (IPT)

- Co-chaired by DHS Office of Health Affairs (OHA) and DHS Infrastructure Protection (IP)
- Membership from other DHS operational arms
- Identified 50+ Capability Gaps in first IPT process (FY07)



And they in-turn, base their requirements on

- Homeland Security Presidential Directives – 10, 7, 9, 18
- Congressional legislation & guidance
- National planning & implementation guidance – NIPP, NRP, NIMS, and the National Planning Scenarios
- Risk, vulnerability and mitigation studies
- Private, local, state inputs



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ChemBio Division:

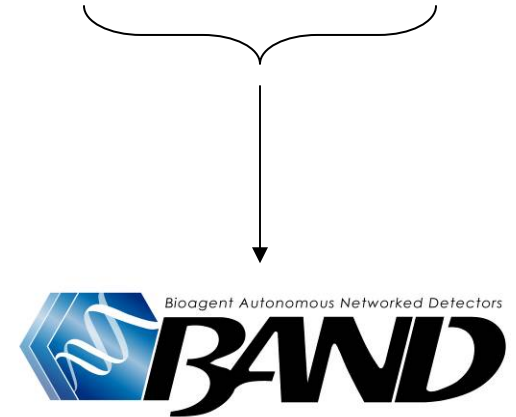
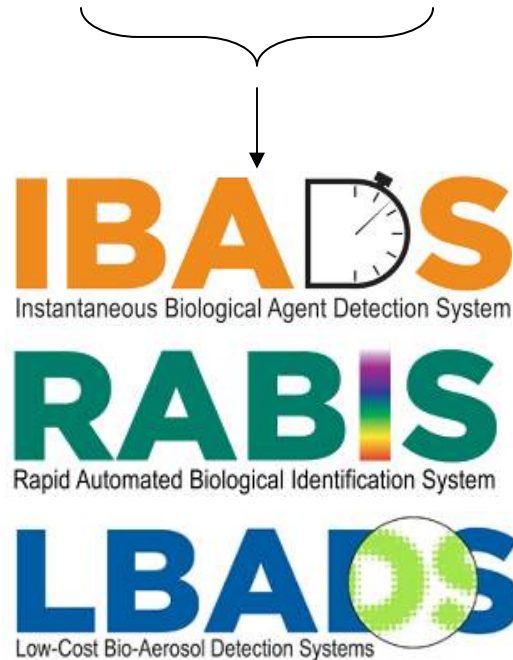
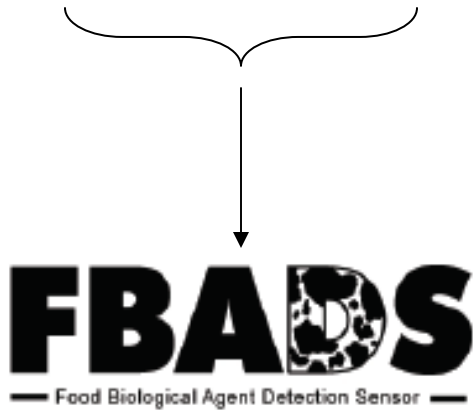
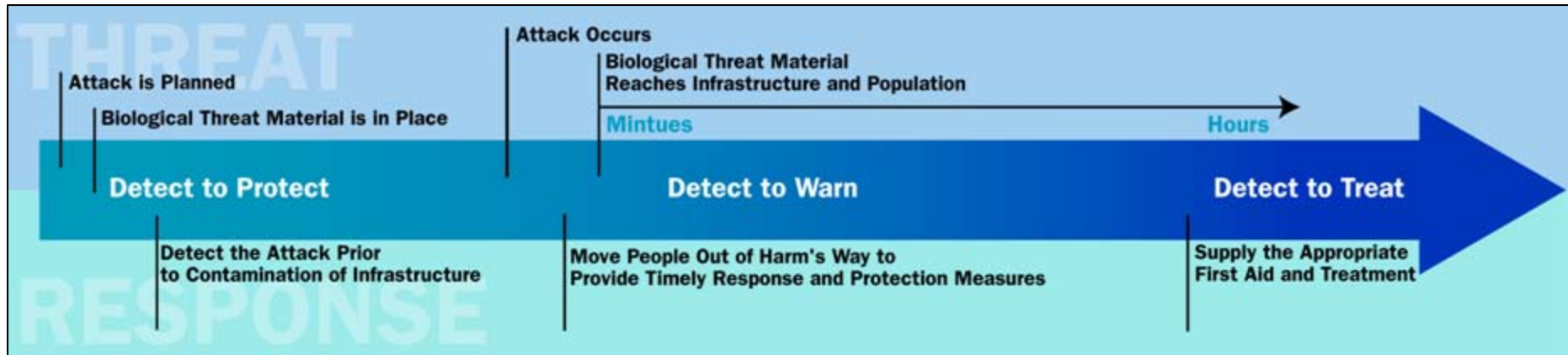
3 Thrust Areas and 9 Major Programs

The overall structure reflects our HSPD-9, HSPD-10 and HSPD-18 responsibilities

Thrust Area	Program	Major Products
Bio	Systems Studies	System tradeoffs e.g. Gen 3 BioWatch; policy net assessments
	Threat Awareness	Risk assessments; lab studies to close key gaps
	Surveillance and Detection R&D	Detection systems for air, food; supporting assays
	Forensics	Enhance and operate the National Bioforensics Analysis Center (NBFAC)
	Response and Restoration	System approaches for recovering from bio attack
Ag	Foreign Animal Diseases	Modeling, vaccines & diagnostics for FAD; JADO
Chem	Analysis	Chemical threat characterization and risk assessment; Develop and validate forensic analysis tools to enable attribution
	Detection	Chemical detection systems for facility monitoring and first responders
	Response and Recovery	Decontamination tools and systems approaches for chemical decontamination



Biological Detection Paradigms and Timeline



Successful Transition of Major Programs to Customers



Gen 1, 2 BioWatch



PROTECT: Chemical Detection System
Homeland Security

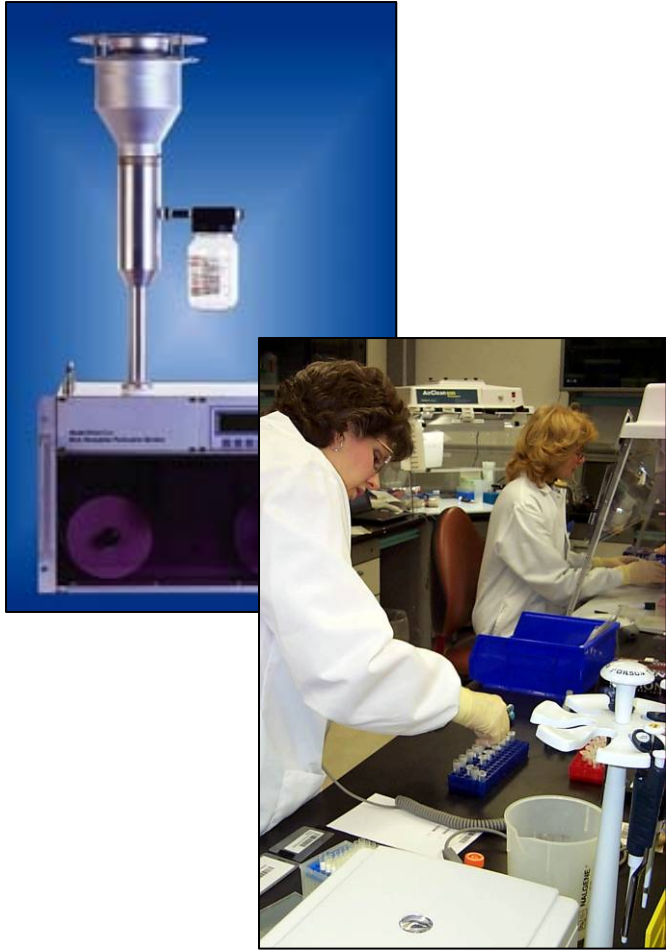


Rapidly Deployable Chem Detection System (RDCDS)



1st phase of mobile chem lab (PHILIS) to EPA

Early Detection to Mitigate Consequences



Gen 1 BioWatch (FY03):

- Operating in > 30 cities
- Detect in 12-36hrs
- Over 3M assays without a false positive

Gen 2 BioWatch enhancements (FY05-07)

- 4x increase in collectors in top 10 threat cities
- Critical transportation hubs and special events

Gen 3 BioWatch (FY09-12)

- Fully autonomous, analyzes at same site it collects – 3 to 6 times daily
- Cover a major portion of US population
- Detect a smaller attack than Gen 1
- Per unit operational cost < 25% of current system

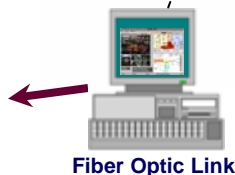
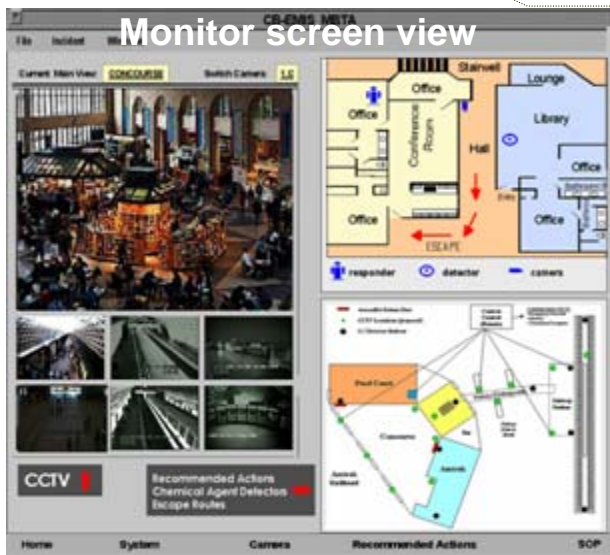
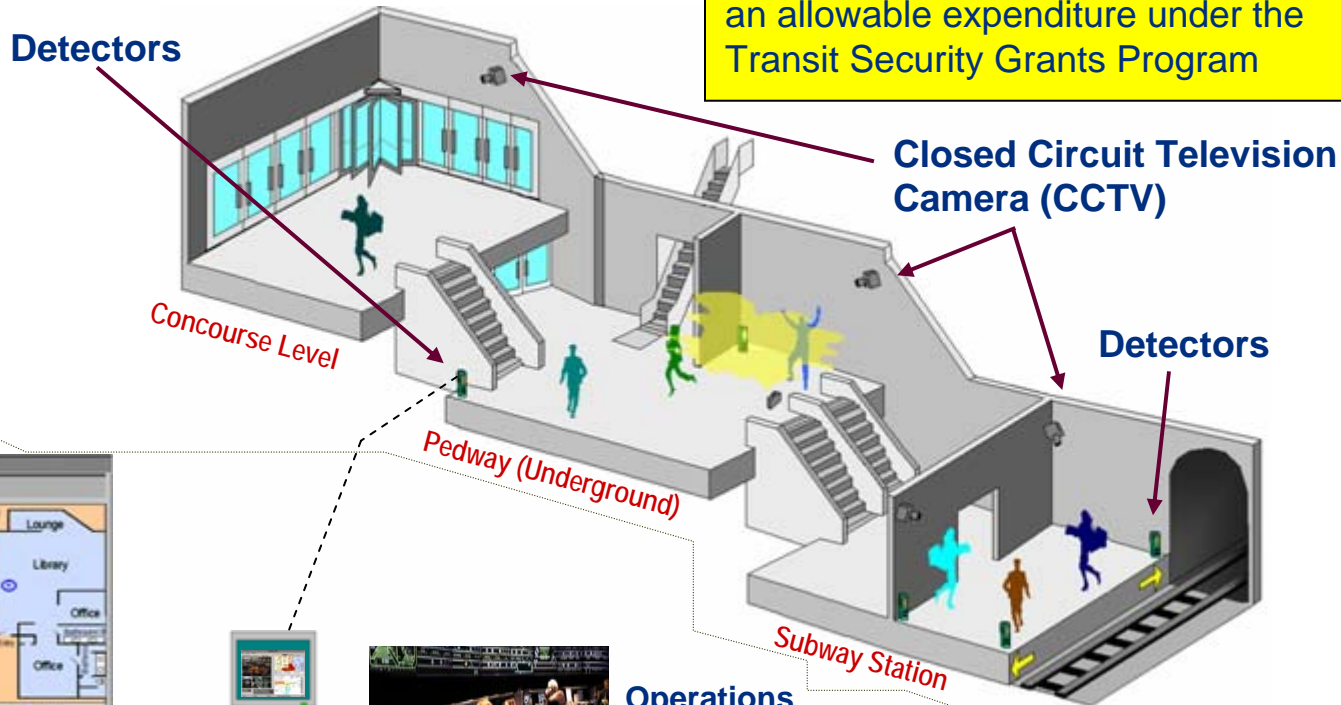


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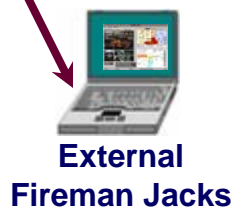
PROTECT: Chemical Early Warning System

Demonstration completed 2003

This program has transitioned and is an allowable expenditure under the Transit Security Grants Program



Operations Control Center (OCC)



Deployed in US transit systems



Homeland Security

Rapidly Deployable Chemical Detection System

Airborne Segment



Outdoor releases

Stand-off Detection capability:

- Chemical vapor
- 3 minute presumptive identification by interpreter
- 40 minute confirmed identification by interpreter
- Plume mapping

Ground Segment



Indoor/Outdoor releases

Point Detection capability:

- Chemical vapor and aerosols
- 2 minutes identification of CW agents by interpreter
- 2 minutes identification of TICs by interpreter

Interpreted results
communicated
to incident commander

Deployed in support of Special Security Events



Homeland
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In Summary

S&T Chem-Bio efforts are part of a national strategy as reflected through the requirements of the DHS operational offices

We have already made a difference with first generation systems, e.g.

- Bio risk assessments to help prioritize national investments
- Developed and transitioned to operation bio and chem detection systems (BioWatch, BWIC, PROTECT, RDCDS, PHILIS)
- Operational forensic capabilities
- Improved protocols and tools for protecting transportation facilities

We are currently developing the next generation tools & systems to meet DHS and National requirements

S&T-ChemBio@dhs.gov



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EVENT # 0400

Borders & Maritime Security

Captain David Newton, USCG

Borders & Maritime Security Division Head

Science and Technology Directorate

Department of Homeland Security

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Homeland Security

Science & Technology

Borders and Maritime Security Division

Mission Statement:

Develop and Transition Capabilities that Improve the Security of our Nation's Borders without Impeding the Flow of Commerce and Travelers

Stop Bad Things and Bad People from Entering the Country

AND

In the Maritime- Protect the Public, the Environment, and U.S. Economic and Security Interests

Borders are all land and maritime borders including U.S. ports-of-entry, vast stretches of remote terrain and inland waterways

Customers:

Customs and Border Protection (CBP), United States Coast Guard (USCG), Immigration and Customs Enforcement (ICE), Transportation Security Administration (TSA), and Citizenship and Immigration Services (CIS)

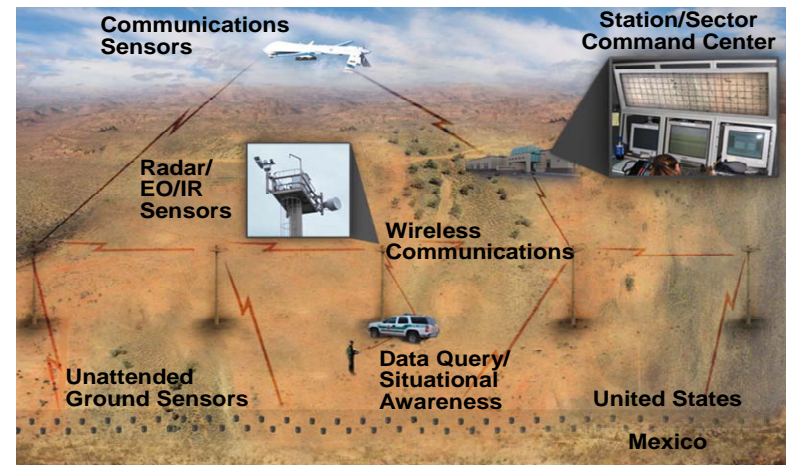
Representative Technology Needs

Border Security

- Improved ballistic protection via personal protective equipment
- Improve detection, tracking, and identification of all threats along the terrestrial and maritime border
- Non-lethal compliance measures for vehicles, vessels, or aircraft allowing for safe interdiction by law enforcement personnel

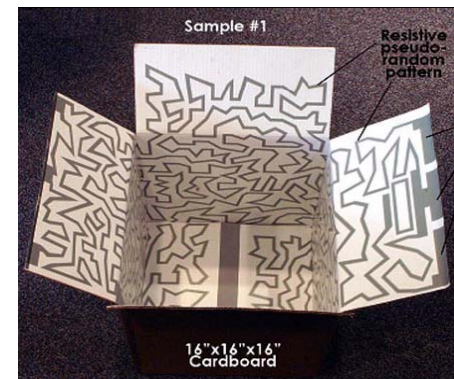
Maritime Security

- 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
- Vessel compliance through non-lethal compliance methods



Cargo Security

- Enhanced screening and examination by non-intrusive inspection
- Increased information fusion, anomaly detection, Automatic Target Recognition capability
- Detect and identify WMD materials and contraband

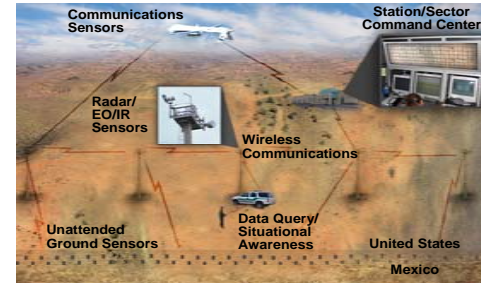


Border Watch

Border/Maritime Technologies



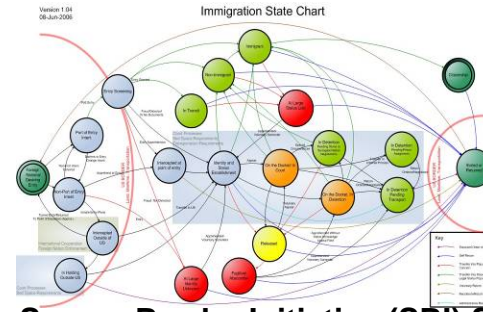
Border Detection Grid



BorderNet

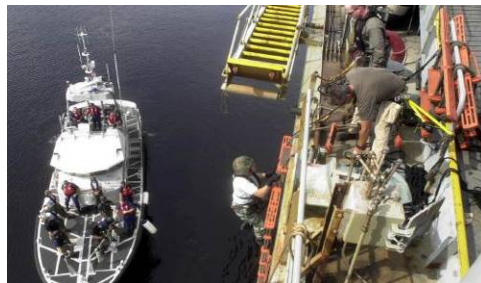


Sensor/Data Fusion,
and Decision Aids

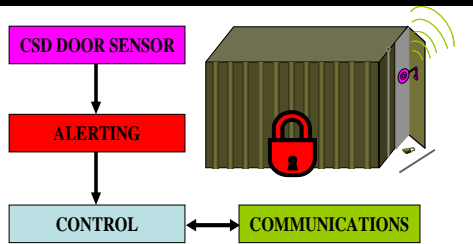


Secure Border Initiative (SBI) Systems
Engineering and Modeling & Simulation

Border Officer Tools and Safety



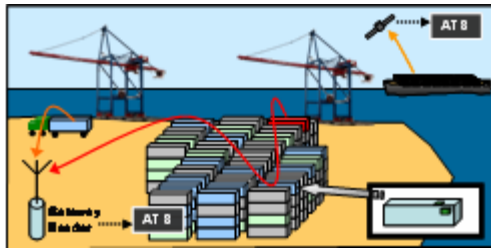
Cargo and Conveyance Security



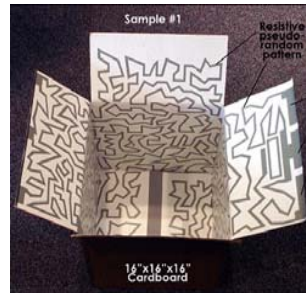
Container Security Device



Advanced Container Security Device (ACSD)



Marine Asset Tag Tracking System (MATTs)



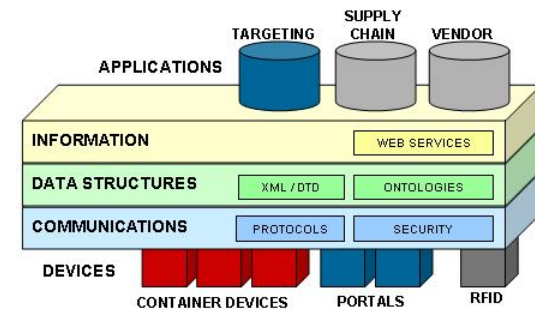
Secure Carton



Advanced Screening and Targeting (ASAT)



Hybrid Composite Container



Supply Chain Security Architecture

Command, Control and Interoperability

Dr. David Boyd

Division Head

Command, Control and Interoperability

Science and Technology Directorate

Department of Homeland Security

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Command, Control and Interoperability

Mission

Through a practitioner-driven approach, CCI creates and deploys information resources to enable seamless and secure interactions among homeland security stakeholders.

- A practitioner-driven approach is defined as a process where the needs of end-users drive the creation of information resources.
- Information resources include standards, frameworks, tools, and technologies.
- Enabling seamless and secure interactions means enhancing the ability to communicate, share, visualize, analyze, and protect information.
- Stakeholders include all local, state, tribal, Federal, international, and private entities engaged in homeland security.



Vision

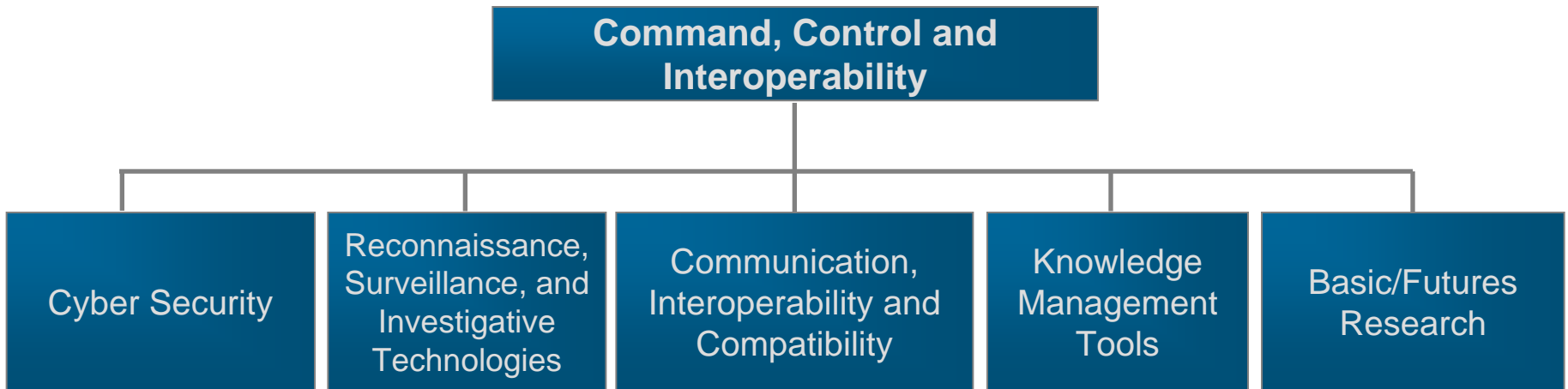
Stakeholders have comprehensive, real-time, and relevant information to create and maintain a secure and safe Nation.



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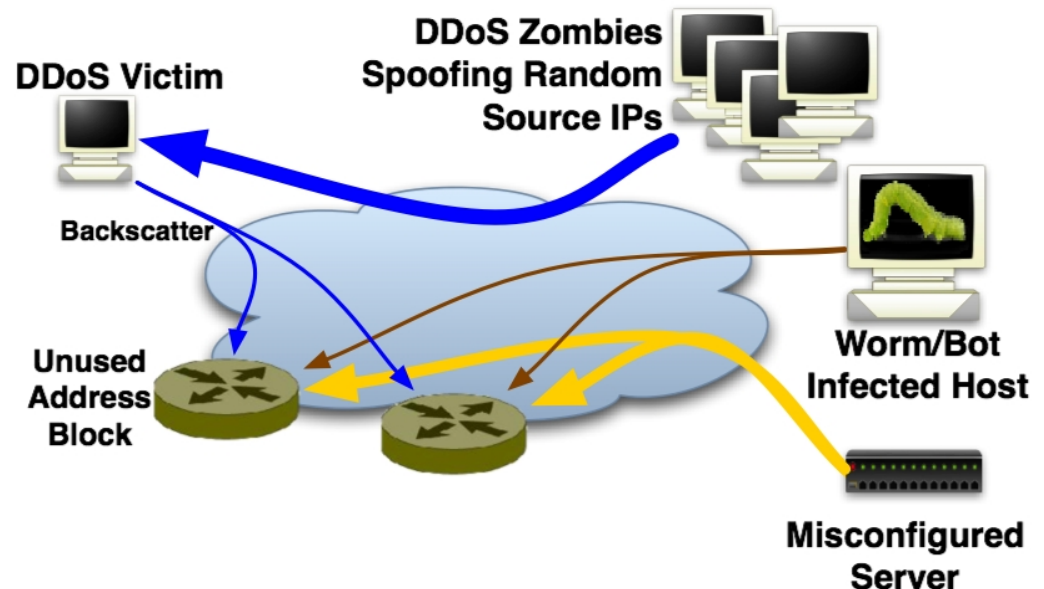
CCI Division Organization

Managed by the Department of Homeland Security's (DHS) Science and Technology Directorate, the Command, Control and Interoperability (CCI) Division delivers on its mission through five thrust areas.



Cyber Security

- Secures the Nation's critical infrastructure, and coordinates efforts to improve the security of the existing cyber infrastructure
- Focuses on priorities established in the President's *National Strategy to Secure Cyberspace*, as well as needs identified by external stakeholders with emphasis on critical infrastructure
- Addresses cyber security requirements from internal Department customers in support of DHS operational missions in critical infrastructure protection



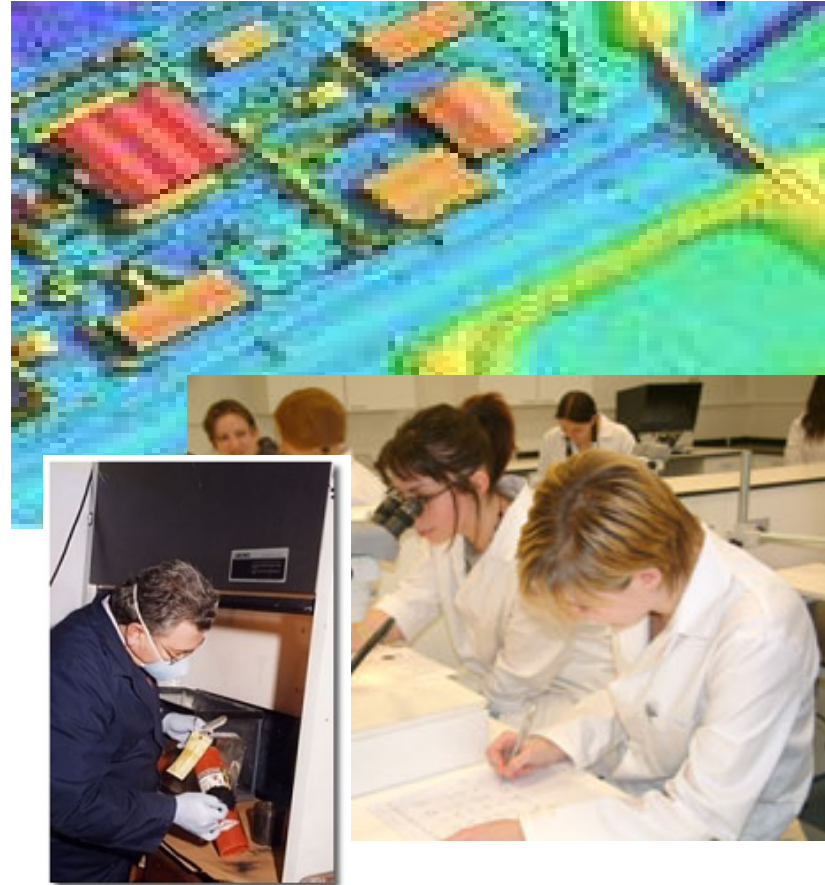
* Distributed Denial-of-Service



Homeland
Security

Reconnaissance, Surveillance, and Investigative Technologies

- Develops and evaluates individual sensor technologies, fusion of multiple sensors, and examination of new sensor technologies
- Develops integrated technology platforms to collect, share, and disseminate information
- Develops advanced investigative and crime scene forensic tools
- Supports the technical rationale for policies and privacy issues associated with these applications
- Initiates R&D activities with intelligence and defense organizations



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Communication, Interoperability and Compatibility

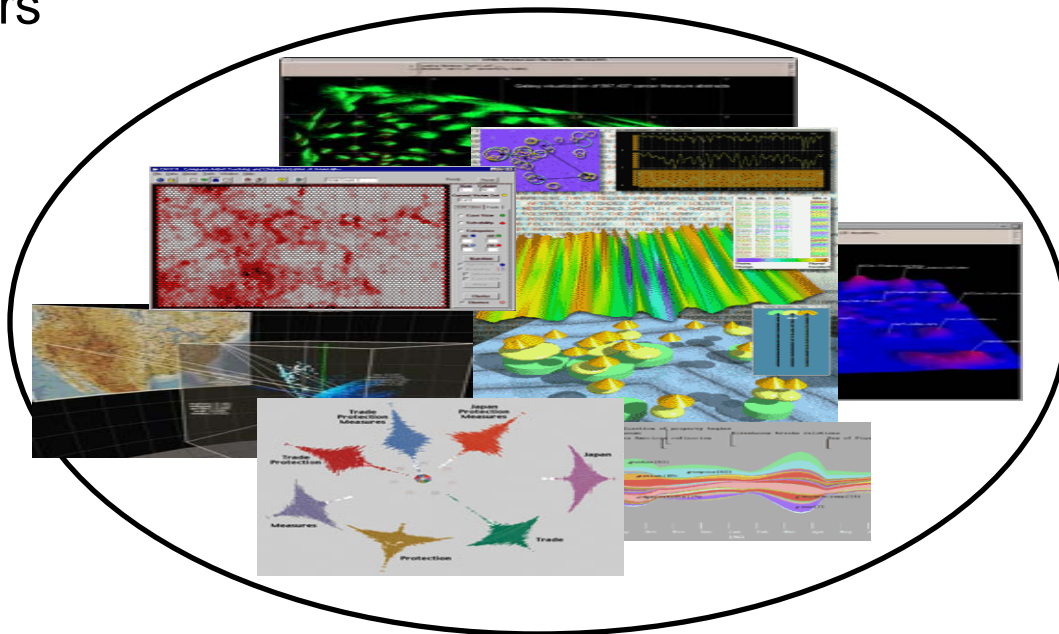
- Works to strengthen interoperable wireless communications, improve effective information sharing, and develop tools to enhance overall coordination and planning at all levels of government
- Coordinates with primary customers, including DHS Protection and Programs Directorate, Federal Emergency Management Agency, Department of Justice, National Communications System, U.S. Coast Guard, Secret Service, Immigration and Customs Enforcement, Customs and Border Protection, and Transportation Security Administration
- Directs initiatives to end users, including more than 60,000 emergency response agencies nationwide, state homeland security officials, and policy makers at the local, tribal, state, and Federal levels



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Knowledge Management Tools

- Provides knowledge management capabilities to reduce the risk of terrorist attacks and to prepare for and respond to natural and man-made disasters



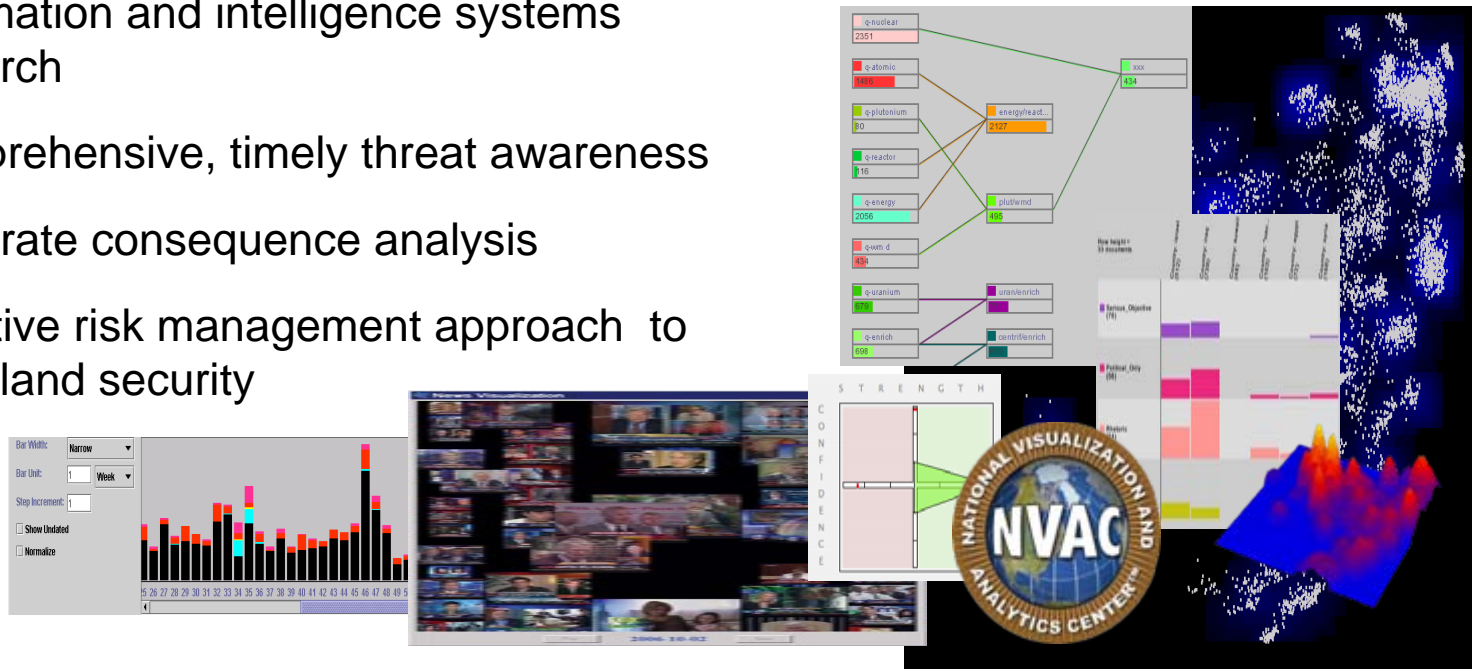
- Develops tools and methods to handle massive amounts of information that are widely dispersed in a great variety of forms
- Works collaboratively to complement efforts in the intelligence, law enforcement, and homeland security communities



Homeland
Security

Basic/Futures Research

- Information and intelligence systems research
- Comprehensive, timely threat awareness
- Accurate consequence analysis
- Effective risk management approach to homeland security



Visual Analytics and Physics-Based Simulation: Visually based mathematical methods and computational algorithms for discovering, comprehending, and manipulating diverse data, and applying the resulting knowledge to anticipate terrorist incidents and/or catastrophic events

Data-Intensive Computing, Privacy, and Forensics: Software algorithms and hardware architectures for extracting and managing data, assessing threats and consequences, ensuring information privacy, securing the cyber infrastructure, and ensuring telecommunications interoperability



Homeland Security

Science and Technology