

Science & Technology Directorate Overview Briefing

November 2004



**Homeland
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Agenda

- Department of Homeland Security and Science & Technology
Directorate structure, missions, and objectives
- Strategic Planning Process
- DHS S&T Portfolios
 - Countermeasure
 - Support to DHS Components
 - Cross-Cutting



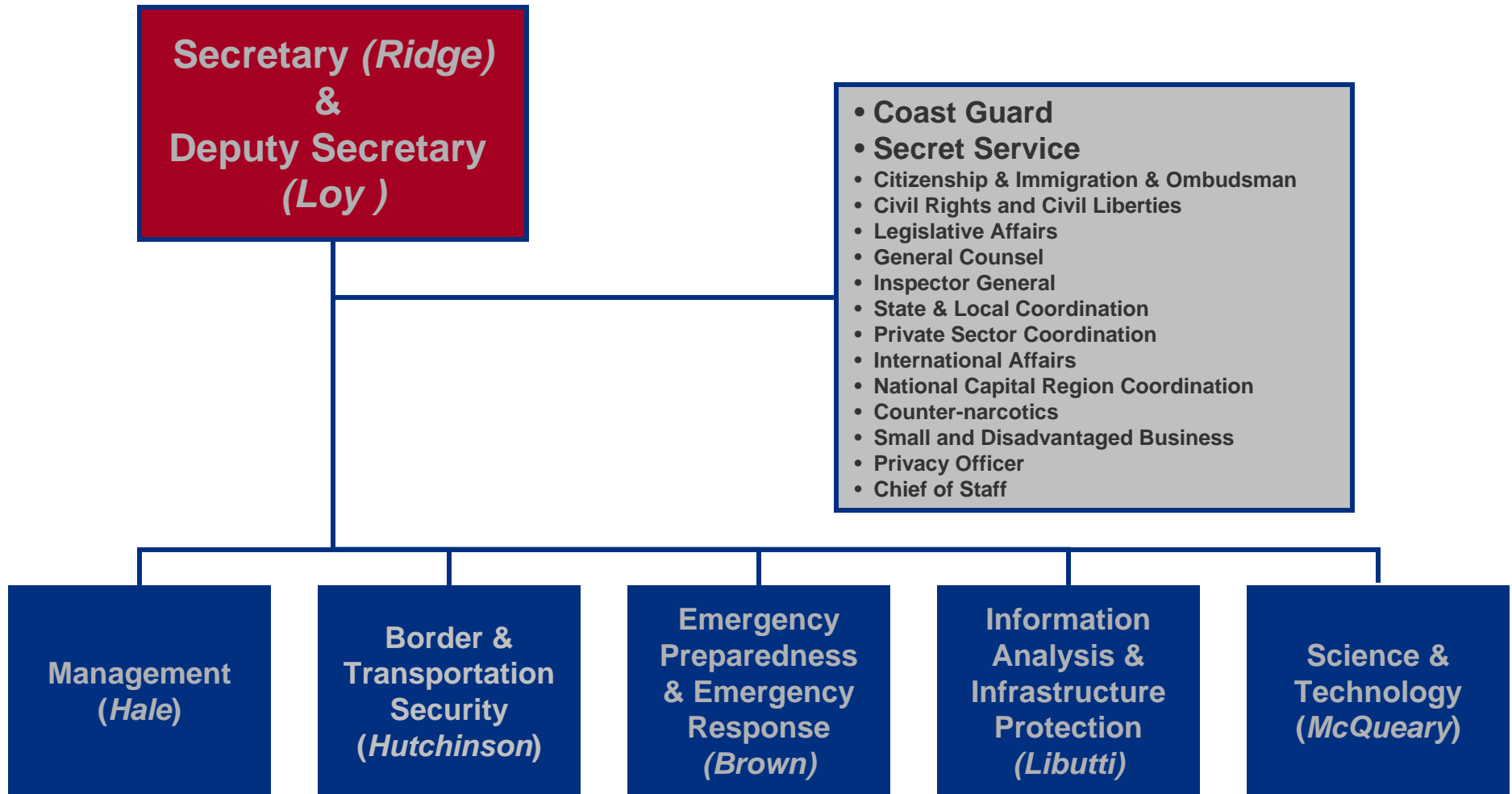
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What is Homeland Security?



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General DHS Organizational Structure



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DHS Vision, Mission, and Goals



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Science and Technology Mission



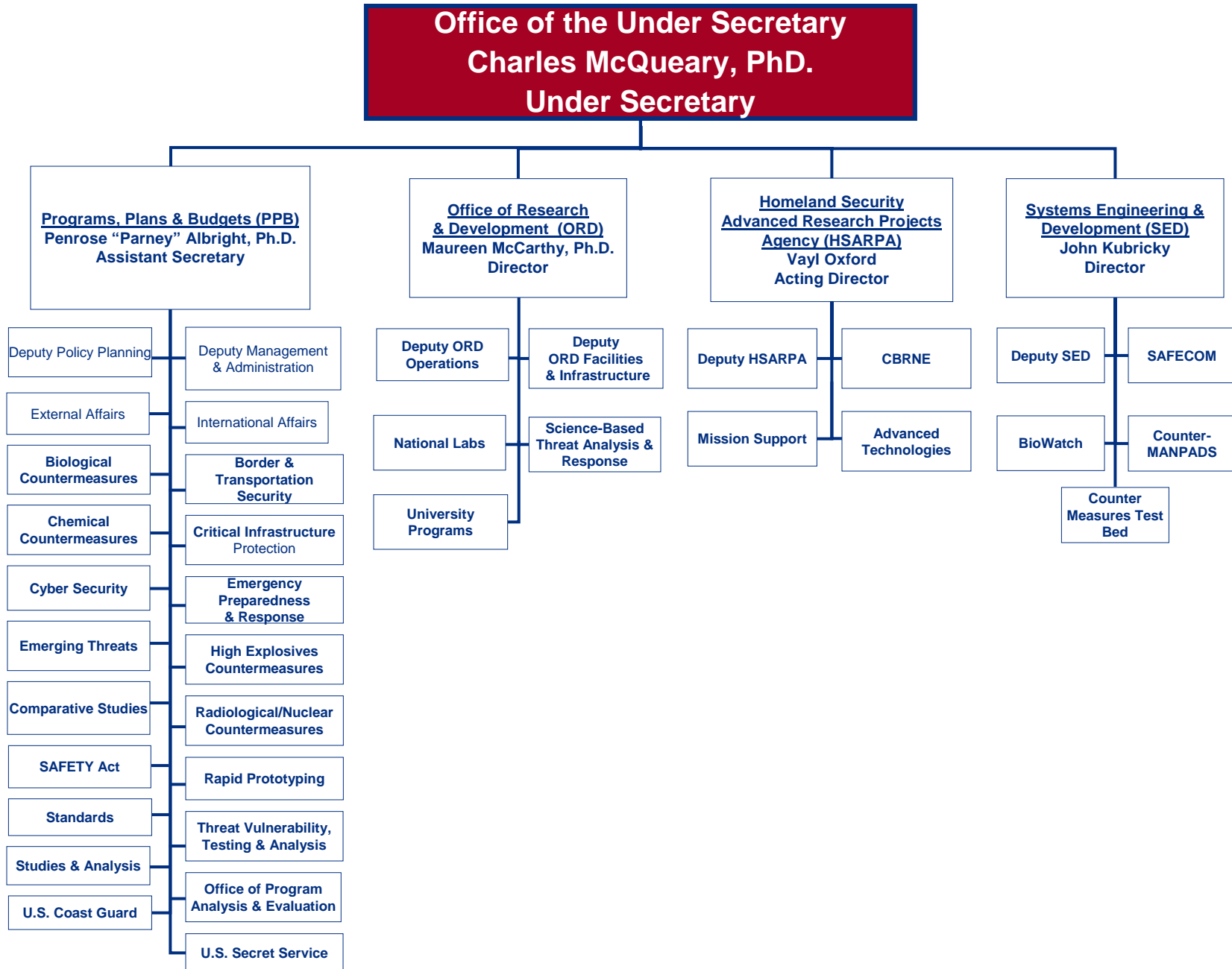
Create enduring homeland security capabilities through research, development, testing, evaluation, and transitioning of revolutionary and existing technologies to:

- Detect, prevent, and mitigate chemical, biological, radiological, nuclear, and explosive threats;
- Assess and analyze threats and vulnerabilities;
- Provide technical solutions to Federal, State, and local emergency responders in accordance with operational requirements; and
- Secure the nation's borders and critical infrastructure.



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DHS S&T Organizational Structure



Programs, Plans, and Budgets

- PPB provides the strategic and technical vision for the Directorate and its RDT&E process.
- PPB's primary goals are:
 - Align research and development efforts with the mission and objectives of the Department
 - Identify user needs and formulate technology investment plans to produce solutions



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Office of Research and Development

- ORD executes the Directorate's RDT&E programs within the national and Federal laboratories; establishes the University Centers of Excellence; and maintains the nation's enduring research and development complex dedicated to homeland security.
- ORD's primary goals are:
 - Provide the nation with an enduring Research, Development, Test & Evaluation capability
 - Provide stewardship for the homeland security science and technology complex
 - Preserve and broaden U.S. leadership in science and technology



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Homeland Security Advanced Research Projects Agency

- HSARPA has an essential role in meeting the goals and objectives of the Department and the Directorate, through research and development, and technology maturation in industry and academia.
- HSARPA's primary goals are:
 - Satisfy operational needs
 - Conduct rapid prototyping and commercial adaptation
 - Research revolutionary options



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Systems Engineering and Development

- SED oversees the transition of large-scale and pilot systems to the field through program offices, which bring mature technologies from the lab to the user through a rapid, efficient, and disciplined project management process.
- SED's primary goals are:
 - Develop systems context for solutions
 - Conduct rapid full-scale development
 - Conduct acceptance testing
 - Transition mature technologies to production



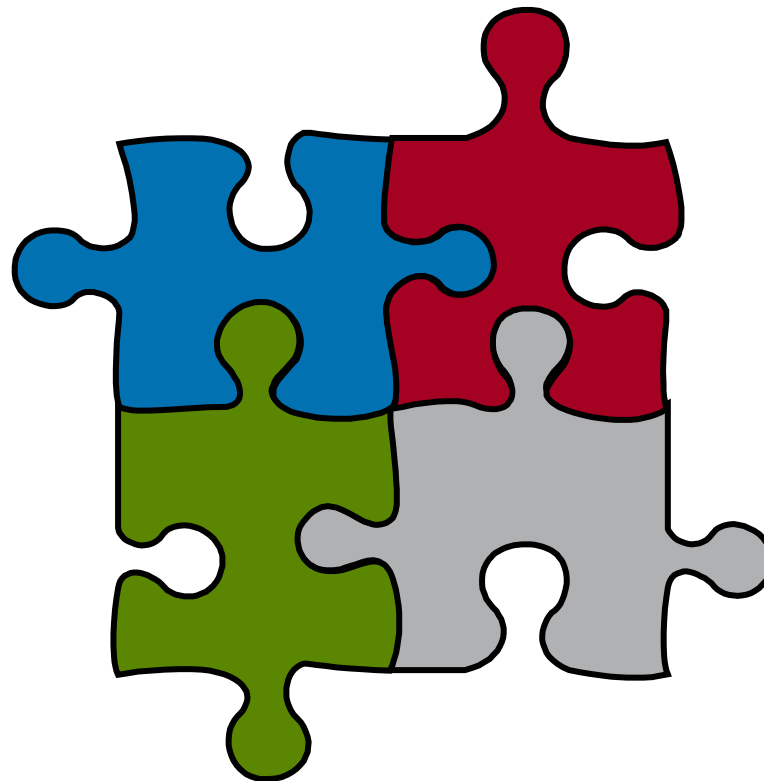
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Partnerships are Key

- Working with public and private partners is essential to S&T's ability to develop a comprehensive capability to secure the Nation.

Interagency and
International

State and
Local



Private
Sector

Universities and
Research Institutes



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DHS S&T Portfolios

- **Countermeasure Portfolios**
 - Biological
 - Chemical
 - Radiological and Nuclear
 - High Explosives
- **Support to DHS Component Portfolios**
 - Border and Transportation Security
 - Emergency Preparedness and Response
 - Threat and Vulnerability, Testing and Assessment
 - Critical Infrastructure Protection
 - Cyber Security
 - U.S. Coast Guard
 - U.S. Secret Service
- **Cross-Cutting**
 - Emerging Threats
 - Rapid Prototyping
 - Standards
 - University and Fellowship Programs



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Biological Countermeasures



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Portfolio Mission

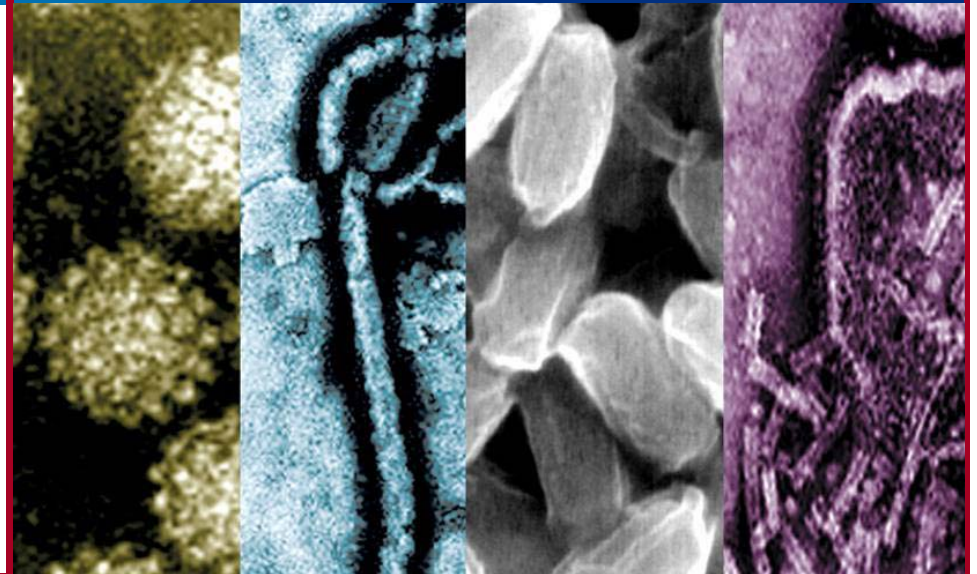
- To provide the understanding, technologies, and systems needed to anticipate, deter, protect against, detect, mitigate, and recover from possible biological attacks on this Nation's population, agriculture or infrastructure.

Strategic Objectives

- Develop an integrated national biodefense architecture against all biological threats with emphasis on high consequence events.
- Provide decision makers and responders with knowledge and decision support tools needed to anticipate, prevent, prepare for and respond to events.
- Develop and transition to deployment needed technologies and systems for threat assessment, protection, early detection, attack assessment, forensic analysis, agricultural security, and response and recovery.
- Support our partnering agencies, with their leads in public health (HHS), agriculture (USDA), food (HHS and USDA), water security (EPA), decontamination (EPA), and criminal investigations (DOJ).
- Coordinate with partnering agencies in the intelligence and defense communities.
- Where appropriate, incorporate bio-defense as part of an integrated CBRNE defense across civil and military sectors.

Homeland Security Impact

- BioAssays and detection technologies
- Biological threat assessment, characterization, forensics, and attribution
- Food and water protection
- National agro-bioterrorism strategy
- Urban Monitoring including BioWatch
- Decontamination and restoration



Chemical Countermeasures



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Portfolio Mission

- Enhance and coordinate the Nation's capability to anticipate, prevent, protect, respond to and recover from chemical threat attacks through innovative research, development, and transition of capabilities.

Strategic Objectives

- Develop national chemical defense architecture.
- Enhance rapid recovery from chemical attacks.
- Develop pre-event assessment, discovery, and interdiction capabilities for chemical threats.
- Minimize loss of life and economic impact from chemical attack.
- Enhance the capability to identify chemical attack sources.

Homeland Security Impact

- National chemical defense architecture
- Chemical characterization, detection, and interdiction
- Rapid recovery and decontamination
- Chemical source attribution and forensics
- Minimize effects of chemical attacks



Radiological and Nuclear Countermeasures



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Portfolio Mission

- Counter the threat of radiological and nuclear terrorism by developing and transitioning advanced, integrated systems and capabilities to operational end users.

Strategic Objectives

- Understand and characterize nuclear and radiological threats and terrorist events.
- Prevent the importation, transport and delivery to target of illicit radiological and nuclear devices and materials without impeding commerce and the legitimate flow of people.
- Severely minimize the attractiveness and potential illicit use of nuclear and radiological materials and devices.
- Safeguard the public and critical infrastructure against the use of nuclear and radiological threats.
- Provide scalable and robust radiological and nuclear federal, state, and local incident response and recovery capabilities.
- Provide leadership in national RDT&E efforts in radiological and nuclear countermeasures.

Homeland Security Impact

- Assess and characterize radiological and nuclear threats
- Response, recovery, and decontamination capabilities
- Prevent import and use of illicit nuclear materials and devices
- Advanced detectors (active and passive) and sensor architectures
- Radiological forensics and attribution



High Explosives Countermeasures



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Portfolio Mission

- Develop technical capabilities to detect, interdict and mitigate the consequences of the use of explosives and other conventional means (non-CBRN) in terrorist attacks against the population, mass transit, civil aviation and critical infrastructure without impeding flow of commerce.

Strategic Objectives

- Reduce the risk of a successful attack on critical infrastructure, including all forms of transportation, from explosives and other conventional means.
- Reduce the risk to the population from explosive devices.
- Detect and interdict the illicit movement and use of explosives and explosive devices within or inbound to the United States.

Homeland Security Impact

- Suicide bombers and leave behind bombs
- Truck and car bombs
- Passenger screening
- Transportation security
- Facility blast mitigation
- Stand-off explosive detection



Border and Transportation Security R&D



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Portfolio Mission

- Develop and transition capabilities to improve the security of our nation's borders and transportation systems without impeding the flow of commerce and travelers.

Strategic Objectives

- Prevent entry of terrorists, criminals and illegal aliens.
- Interdict terrorist instruments and contraband at the earliest opportunity.
- Improve the security of U.S. transportation systems.
- Facilitate flow of commerce and travelers - identify, disrupt & dismantle entities that threaten the United States.

Homeland Security Impact

- Illegal alien, criminal, and terrorist entry interdiction
- Facilitate flow of safe commerce and travelers
- U.S. transportation system security enhancement
- Secure borders between major points of entry



Emergency Preparedness and Response R&D



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Portfolio Mission

- Improve the ability of the Nation to prepare for, respond to and recover from all-hazards emergencies through development and deployment of enabling technologies.

Strategic Objectives

- Identify and develop relevant technology systems solutions through partnerships with operational end-users (Federal, state and local).
- Integrate advanced “all hazard” technology into Federal, state, and local emergency response infrastructures.
- Provide scientific underpinnings for public and responder readiness through Federal, state, and local programs.

Homeland Security Impact

- Personal Protective Equipment
- Hazardous Material Dispersion Modeling
- Regional Technology Integration (RTI) initiative incident response development
- Emergency responder location and health monitoring
- Decontamination and restoration technologies
- Training and education for the responder community



Threat and Vulnerability, Testing and Assessment



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Portfolio Mission

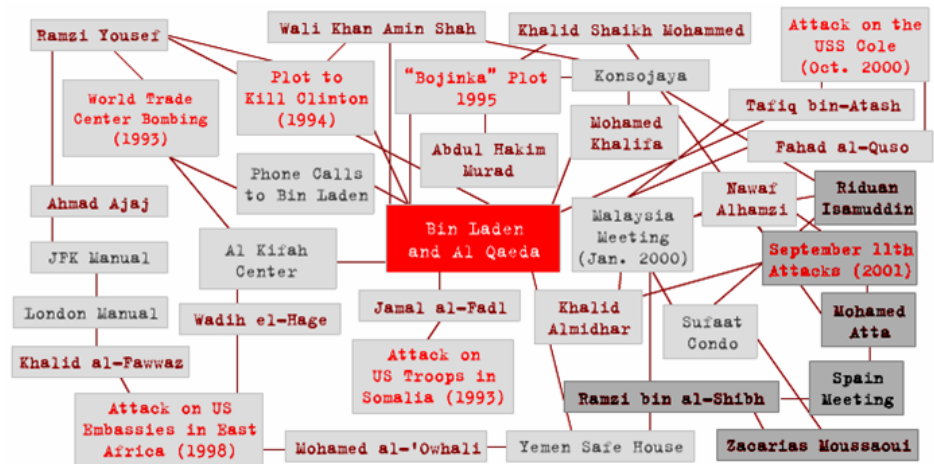
- Through science and technology, develop capabilities that enable the creation, application and dissemination of knowledge to prepare for, anticipate, detect, and prevent terrorist activities and restore the Nation's operational capabilities.

Strategic Objectives

- Tactical and Strategic Assessment of Terrorist use of CBRNE.
- Capabilities to understand and exploit terrorist intentions, motives, and behaviors.
- Federal, state, local and International - level knowledge services capabilities for data and information sharing.
- Federal, state and local-level incident planning support through management of knowledge services.

Homeland Security Impact

- Biometrics and determination of intent
- Knowledge management for threat and capability assessments
- Understand terrorist intentions, motives and behaviors
- Federal, state and local knowledge sharing and collaboration
- International data and information sharing



Critical Infrastructure Protection



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Portfolio Mission

- To protect the Nation's critical infrastructure and key resources from acts of terrorism, natural disasters, or other emergencies by developing and deploying tools to anticipate, identify, and analyze risks, and systems to reduce those risks and the consequences of an event.

Strategic Objectives

- Support the scientific prioritization of components of critical infrastructure and key resources/assets.
- Reduce critical infrastructure vulnerabilities and consequences of events.
- Anticipate the threat/event and predict the consequences.
- Meet CIP technical and operational requirements from DHS elements (including real-time support during an event).
- Partner with other portfolios, agencies, industry, and international entities to catalyze development of CIP technologies.

Homeland Security Impact

- Prioritization of critical infrastructure and key assets
- Anticipate threats and events and predict consequences
- Reduce critical infrastructure vulnerabilities and consequences of events
- Incident decision support system for attacks on infrastructure





Portfolio Mission

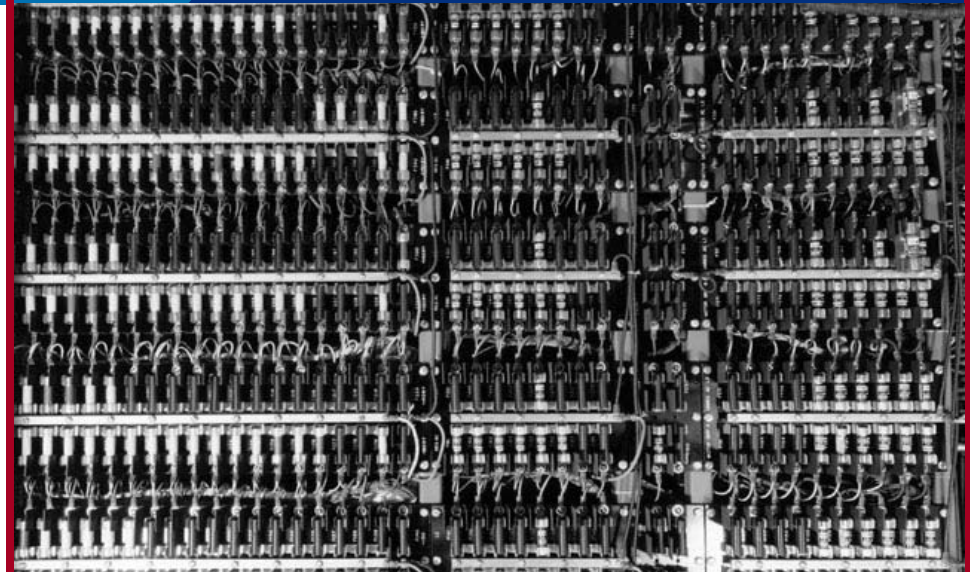
- Lead cyber security research, development, testing and evaluation endeavors to secure the Nation's critical information infrastructure, through coordinated efforts that will improve the security of the existing cyber infrastructure, and provide a foundation for a more secure infrastructure.

Strategic Objectives

- Conduct RDT&E of cyber security technology aimed at preventing, protecting against, detecting, responding to, and recovering from large-scale, high-impact cyber attacks.
- Enable the creation of and migration to a more secure critical information infrastructure, through the development and use of more secure communication protocols.
- Address cyber security R&D needs that are unique to critical infrastructure sectors, particularly those that rely on the Internet to a great extent (Information and Telecommunications, Banking and Finance, and in coordination with the CIP Portfolio, address the cross-cutting issue of securing process control systems).
- Provide a foundation for the long-term goal of economically-informed, risk-based cyber security decision making.
- Provide novel and next-generation secure information technology concepts and architectures through long-term research efforts.

Homeland Security Impact

- Security for:
 - data networks and information
 - data flow and communications
 - software applications
 - Hardware components and machines
- Insider access detection and prevention
- Robust process control and SCADA systems





Portfolio Mission

- Develop technology and systems to provide the capability to safeguard lives, property and environment from intentional and accidental maritime threats and protect maritime mobility through the free flow of goods and people while maximizing the recreational use of the Nation's waterways.

Strategic Objectives

- Identify Maritime Threats
- Prevent the Unauthorized Entry of Illegal Aliens and Contraband, including WMD, over Maritime Borders
- Reduce Critical Maritime Infrastructure Vulnerability
- Enhance Maritime Safety and Mobility
- Prevent and Mitigate Accidental and Intentional Maritime Environmental Incidents
- Enforce Maritime Laws including Fisheries & Environmental

Homeland Security Impact

- Maritime threat characterization
- Safety and mobility enhancement for the Nation's waterways
- Illegal alien and contraband interdiction
- Environmental threats and incident mitigation
- Critical maritime infrastructure protection





Portfolio Mission

- Support the unique USSS missions by development and deployment of advanced technologies to enhance protective and investigative capabilities.

Strategic Objectives

- Protect our Nation's leaders, visiting world leaders, and other protectees as well as reduce threats posed by global terrorists and other adversaries.
- Reduce crimes against our Nation's financial infrastructure, to include currency and financial payment systems.
- Identify, prioritize, and develop programs in concert with the USSS S&T vetting process, strategic plan, emerging threats, and technical program managers.

Homeland Security Impact

- National Special Security Events
- Protectees and Facilities
- Hardening Targets
- Investigation and Apprehension



Emerging Threats



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Portfolio Mission

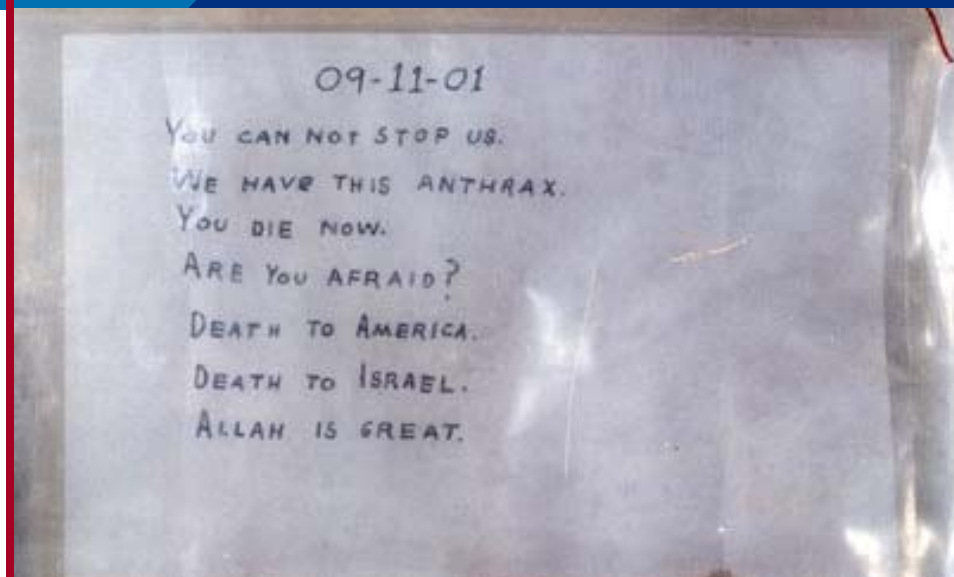
- Anticipate and define potential threats arising from new scientific and technological advances, terrorist use of existing capabilities in new or unexpected manners, and self assessments of S&T research activities and jump-start countermeasures capability development.

Strategic Objectives

- Identify and prioritize emerging threats for S&T: implications of the state of scientific advancement, and S&T countermeasures.
- Identify and sponsor high risk, high pay-off basic technology research.

Homeland Security Impact

- Advanced technology development to address long term needs
- Future potential threat implications and countermeasure development based on state-of-the-art and cutting edge technologies



Rapid Prototyping



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Portfolio Mission

- Through rapid prototyping, accelerate deployment of advanced technologies to address urgent user requirements.

Strategic Objectives

- Define and apply a structured approach for rapid prototyping to adapt existing technologies for new homeland security applications or incorporate new technologies in homeland security applications.
- Implement a mechanism for selecting candidate prototyping projects.
- Ensure transition planning for technology prototypes.
- Provide coordination of prototype programs.

Homeland Security Impact

- Accelerated development of mature technologies for rapid transition to the field
- Re-engineering existing technologies to serve new functions
- Deployment of prototypes to address immediate security needs



Standards



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Portfolio Mission

- Develop and coordinate the adoption of National standards and appropriate evaluation methods to meet homeland security mission needs.

Strategic Objectives

- Identify requirements and prioritize needs for HLS standards.
- Develop, adopt and recommend standards and guidance necessary for homeland security mission needs.
- Develop metrics and protocols for component and system test and evaluation.
- Coordinate standards development with other USG and international partners

Homeland Security Impact

- Requirements for homeland security standards
- Standards and guidance for DHS mission areas
- Metrics for testing and evaluation protocols
- International standards compliance

QUARANTINE CONTAGIOUS DISEASE

NO ONE SHALL ENTER OR LEAVE THIS HOUSE WITHOUT WRITTEN PERMISSION
OF THE LOCAL HEALTH AUTHORITY. (Art. 4477 - V.A.C.S.)

NO PERSON EXCEPT AN AUTHORIZED EMPLOYEE OF THE HEALTH DISTRICT SHALL
ALTER, DESTROY OR REMOVE THIS CARD. (Art. 4477 - V.A.C.S.)

ANYONE VIOLATING THIS REGULATION WILL BE FINED NOT LESS
THAN \$10.00 NOR MORE THAN \$1,000.00 FOR EACH VIOLATION. (ART.
770 Texas-Penal Code)

University and Fellowship Programs



Homeland Security

Portfolio Mission

- Stimulate, coordinate, leverage and utilize the unique intellectual capital in the academic community to address current and future homeland security challenges, and educate and inspire the next generation homeland security workforce.

Strategic Objectives

- Foster a homeland security culture within the academic community through research and educational programs.
- Strengthen U.S. scientific leadership in homeland security research; generate and disseminate knowledge and technical advances to advance the homeland security mission.
- Integrate homeland security activities across agencies engaged in relevant academic research.
- Create and leverage intellectual capital and nurture a homeland security science and engineering workforce.

Homeland Security Impact

- University Centers of Excellence to study homeland security issues
- Summer Faculty
- Scholars and fellows programs
- Post-doctoral fellowships



“The most important mission for the Science and Technology Directorate is to develop and deploy cutting-edge technologies and new capabilities so that the dedicated men and women who serve to protect and secure our homeland can perform their jobs more effectively and efficiently.”

- Under Secretary Charles E. McQueary



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