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
S&T Realignment: First 180 Days

Getting the People, Organization, Books & Content Right

*In Place:*

- ✓ Framework for a customer-focused, output-oriented S&T management organization
- ✓ Senior leadership team and key organizational components
- ✓ 6 Divisions and their Directors
- ✓ 3 Portfolio Directors: Research, Innovation and Transition
- ✓ Directors of Test, Evaluation & Standards and Special Programs
- ✓ S&T liaisons embedded in Europe, the Americas and Pacific/Asia
- ✓ Corporate Communications Department
- ✓ 340 employees re-located to new working groups
OFFICE OF THE UNDER SECRETARY FOR SCIENCE AND TECHNOLOGY

UNDER SECRETARY

Chief of Staff

STRATEGY, POLICY & BUDGET
CORPORATE COMMUNICATIONS
ASSOCIATE GENERAL COUNSEL
OPERATIONS ANALYSIS
HOMELAND SECURITY INSTITUTE

INTERAGENCY PROGRAMS
INTERNATIONAL PROGRAMS
SPECIAL PROGRAMS
TEST & EVALUATION AND STANDARDS
BUSINESS OPERATIONS, SERVICES & HUMAN CAPITAL

RESEARCH Director

TRANSITION Director

INNOVATION / HOMELAND SECURITY ADVANCED RESEARCH PROJECTS AGENCY Director

Office of National Labs
University Programs

Tech Clearinghouse
Safety Act Office

Small Business Innovation Research
Homeworks

EXPLOSIVES Division Head
CHEMICAL / BIOLOGICAL Division Head
COMMAND, CONTROL & INTEROPERABILITY Division Head
BORDERS & MARITIME SECURITY Division Head
HUMAN FACTORS Division Head
INFRASTRUCTURE PROTECTION & GEOPHYSICAL Division Head

Approved: January 29, 2007
## DHS S&T Investment Portfolio

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

<table>
<thead>
<tr>
<th>Product Transition (0-3 yrs)</th>
<th>Innovative Capabilities (1-5 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Focused on delivering near-term products/enhancements to acquisition</td>
<td>- High-risk/High payoff</td>
</tr>
<tr>
<td>- Customer IPT controlled</td>
<td>- “Game changer/Leap ahead”</td>
</tr>
<tr>
<td>- Cost, schedule, capability metrics</td>
<td>- Prototype, Test and Deploy</td>
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<tr>
<td></td>
<td>- HSARPA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic Research (&gt;8 yrs)</th>
<th>Mandated Spending (0-8+ yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Enables future paradigm changes</td>
<td>- Required by Administration (HSPDs)</td>
</tr>
<tr>
<td>- University fundamental research</td>
<td>- Congressional direction/law</td>
</tr>
<tr>
<td>- Gov’t lab discovery and invention</td>
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</tbody>
</table>

**Customer Focused, Output Oriented**
Basic Research

- Addresses long-term R&D needs in support of DHS mission areas
- Has potential to lead to paradigm shifts in homeland security capabilities
- Enables fundamental research at universities
- Facilitates discovery and invention at National Laboratories
Basic Research

Advanced CTX Algorithm Research

- Enhanced performance of deployed CTX equipment for checked bag screening
- Advanced algorithms for the enhanced interpretation of CTX images aims to:
  - increase the probability of detection
  - reduce the false alarm rate
  - enhance throughput
  - increase screener effectiveness

- Supports new requirement for integrated next generation checked baggage systems & technologies
- Improved detection/throughput of checked baggage to meet TSA policy requirements
Product Transition

Integrated Product Teams (IPTs)

- Function in mission-critical areas to identify customers’ needs and enable and transition near-term capabilities for addressing them.
- Engage DHS customers, acquisition partners, S&T Division leaders, and end users in product R&D, transition and acquisition
- Enable customers to identify operational capability gaps and requirements and make informed decisions about technology investments
- IPT Outcome - Enabling Homeland Capabilities – S&T identifies potential technology solutions that can be delivered to customers within 3 years
DHS Requirements/Capability Capstone IPTs
DHS S&T Product – “Enabling Homeland Capabilities” (EHCs)

Information Sharing/Mgmt
- OIA
- Acquisition
- C2I
- OOC/HITRAC

Border Security
- CBP/ICE
- Acquisition
- Borders/Maritime
- SBI

Chem/Bio Defense
- CMO/IP
- Acquisition
- Policy
- Chem/Bio

Maritime Security
- USCG
- Acquisition
- Borders/Maritime
- Guardsmen

Cyber Security
- Customer
- Acquisition
- End Users

Explosive Prevention
- TSA/USSS
- Acquisition
- Explosives
- Agents

Cargo Security
- CBP
- Acquisition
- Policy
- Borders/Maritime
- Officers/Industry

People Screening
- SCO/CIS
- Acquisition
- Human Factors
- US VISIT/TSA

Infrastructure Protection
- IP
- Acquisition
- Infrastructure/Geophysical
- End Users

Incident Management
- FEMA
- Acquisition
- Infrastructure/Geophysical
- First Responders
- Cyber

Cyber
- Customers
- Acquisition
- Infrastructure/Geophysical/C2I
- End Users

Explosive Prevention
- Agents
- Acquisition
- Explosives
- Policy

Security
- Guardsmen
- Acquisition
- Borders/Maritime
- Policy

Chem/Bio Defense
- CMO/IP
- Acquisition
- Policy
- Chem/Bio

Border Security
- CBP/ICE
- Acquisition
- Borders/Maritime
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Security
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- Acquisition
- Borders/Maritime
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People Screening
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- Human Factors
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Infrastructure Protection
- IP
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- Infrastructure/Geophysical
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Explosive Prevention
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- Policy

Security
- Guardsmen
- Acquisition
- Borders/Maritime
- Policy

Chem/Bio Defense
- CMO/IP
- Acquisition
- Policy
- Chem/Bio
Product Transition

Border Detection Grid

Provides:
- Advanced sensors (radar, EO/IR cameras, unattended ground sensors and fiber optic tripwires)
- Advanced signal processing and communications systems
- State-of-the-art power sources for persistent border surveillance
- Technology transition into SBInet acquisition

- Force multiplier - improved effectiveness, fewer required personnel, and low cost sensors while reducing overall operational, acquisition, and maintenance costs
- Increases detection, tracking and apprehension rate

Homeland Security
Innovation/HSARPA

- High risk/High payoff
- “Game changer/Leap ahead”
- Prototype, Test and Deploy capabilities
- Homeland Innovative Prototypical Solutions
- High Impact Technology Solutions

Suicide bomber detection

Vehicle borne IED detection
Homeland Innovative Prototypical Solutions (HIPS) are designed to deliver *prototype-level demonstrations* of game-changing technologies in two to five years. Projects are moderate to high risk, with high payoff.

High Impact Technology Solutions (HITS) are designed to provide *proof-of-concept* answers within one to three years that could result in high-payoff technology breakthroughs. While these projects are at considerable risk for failure, they offer the potential for significant gains in capability.
# Homeland Innovative Prototypical Solutions (HIPS)

<table>
<thead>
<tr>
<th>Explosives</th>
<th>Chem/Bio</th>
<th>Command, Control &amp; Interoperability</th>
<th>Borders/ Maritime</th>
<th>Human Factors</th>
<th>Infrastructure/ Geophysical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Chloe- High altitude aerial platform existing above civil aviation Counter-MANPADS SENSIT – System to identify numerous liquids in baggage IED Defeat / APE VBIED Defeat – Detection/prevention and mitigation technologies to counter IEDs</td>
<td>SCOPE (Scaleable Common Operational Picture Experiment) – Wide-area surveillance sensors capable of providing a COP Secondary program for Project Chloe-</td>
<td>Scalable Composite Patrol Craft Demonstrator – Lightweight, composite material with high speed hull</td>
<td>SAFECON – 30 second container screening device</td>
<td>FAST (Future Attribute Screening Technologies) – Relocatable Lab capable of testing for behavioral/ physiological cues of “hostile intent”</td>
<td>Resilient Electric Grid – System that will prevent cascading effects of power surge on electrical grids.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Double or triple wide trailer tested at various sits around the country</td>
<td>Levee Strengthening and damage mitigation.</td>
</tr>
</tbody>
</table>

# High Impact Technology Solutions (HITS)

<table>
<thead>
<tr>
<th>High Impact Technology Solutions (HITS)</th>
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</thead>
<tbody>
<tr>
<td>Real time bio agent field detection and identify.</td>
<td>“First Net” First Responder Reliable Relay Link</td>
</tr>
<tr>
<td>“Cell-All” Ubiquitous chem/Bio/agent detector</td>
<td>Tunnel Detect – ability to detect underground tunnels</td>
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<tr>
<td></td>
<td>Document Validator – High proficiency scanner that can identity fraudulent docs Leverage USSS system Biometric Detector – High proficiency small biometric scanner</td>
</tr>
<tr>
<td></td>
<td>Critical infrastructure Change Detect Resilient Tunnel– Tunnel Protection/Blast Mitigation –</td>
</tr>
</tbody>
</table>
Homeland Innovative Prototype Solutions
Counter-MANPADS / Persistent Surveillance

Counter-MANPADS Functions
1. MWS Detect & Declare
2. Slew and Hand-off
3. Track
4. Jam

Unmanned Aircraft Systems (UASs)
- High-Altitude Stand-Off Counter-MANPADS
- High Altitude – Wide-Area Coverage
- Long Endurance – Persistent Surveillance
- Large Payload – Multi-Sensor

Operational Characteristics
- Real-time sensor fusion/dissemination
- Multi-user / border surveillance requirements
- Commercial Aircraft MANPADS protection
- Automatic target detection/recognition
- Persistence (24/7, all-weather coverage)
HIPS – Prototype Development Example

Enhancing the Common Operating Picture

Scalable COP Environment-SCOPE

- Long-term, high-resolution, wide-area surveillance provides continuous situational awareness for federal, state and local homeland security officials
- Lightweight, multi-sensor Unmanned Aerial Vehicle (UAV) platform enables simultaneous collection of imagery, video and other data
- Features small, high-altitude, remotely powered UAVs capable of unattended operation for up to 3 months
- Knowledge management and visual analytics system enables real-time interaction with multiple information streams
HITS - High Impact Technology Solutions

Improvised Explosive Devices Defeat

- **Puffers** for explosives trace material detection on people, bags/parcels, and vehicles
- Walk-through/whole-body imaging (e.g., backscatter)
- Advanced Protection Explosive (APE): cancellation methods for explosive shock waves
- Drive-through imaging technology (x-ray, neutron)

Masonry Walls

Explosive Resistant Coating

Uncoated Steel  →  ERC Coated Steel

Reactive & Shaping Walls

APE Project

Active Armor

Predict, Detect, Defeat and Destroy IED/VBIED at range (100 yards) to change the calculus of the bomber versus the defender
Innovation/HSARPA Broad Agency Announcements

BAAs Released February 1:

- **Tunnel Detection Technologies** - develop and demonstrate a capability for rapidly detecting tunnels
- **SAFE Container (SAFECON)** – develop the capability to detect and identify WMD, explosives and contraband cargo and to detect humans in shipping containers
- **Future Attribute Screening Technology (FAST) Demonstration Laboratory** – provide efficient, rapid and accurate security screening of people and their credentials and belongings

DHS SBIR Program

- Increases participation of innovative and creative small businesses in Federal research and development programs
- Challenges small businesses to bring innovative homeland security solutions to reality
- Focuses on near-term commercialization and delivery of operational prototypes
- Over 324 contracts awarded
- Funded by S&T Directorate and DNDO
- Implemented Cost Match to motivate commercialization

Visit [www.dhssbir.com](http://www.dhssbir.com) (soon to be .gov)
Homeland Security Centers of Excellence

- Seven university-based research centers established to date, each focused on a specific homeland security challenge
- Planning for four new Centers underway to address:
  - explosives detection, mitigation, and response
  - border security and immigration
  - maritime, island, and extreme/remote environment security
  - natural disasters, coastal infrastructure and emergency management
- **Broad Agency Announcements Released Feb. 5**
  Visit [www.grants.gov](http://www.grants.gov) for more information
## S&T Points of Contact

<table>
<thead>
<tr>
<th>Division</th>
<th>Email</th>
</tr>
</thead>
<tbody>
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Business Opportunities with S&T

The S&T Directorate posts announcements and information about competitive solicitations open to industry participation at:

portal for Federal government contracting opportunities

www.Hsarpabaa.com
S&T Broad Agency Announcements about competitive opportunities

www.dhssbir.com
The DHS Small Business Innovation Research program issues two large solicitations annually that cover multiple technical topic areas on behalf of S&T and the Domestic Nuclear Detection Office
Upcoming Events

Science and Technology Industry Day
March 13, 2007, Alexandria, VA

A forum to address business opportunities with Innovation/HSARPA and S&T.
Focus will be on the new Broad Agency Announcements seeking new solutions to capability gaps

Homeland Security
Upcoming Events

2007 Homeland Security S&T Stakeholders Conference

May 21-24, 2007
Ronald Reagan Building
Washington, D.C.

Presented by:
National Defense Industrial Association

A World in Change

FROM SCIENCE...SECURITY - FROM TECHNOLOGY...TRUST

The National Defense Industrial Association has a long history of sponsoring events designed to facilitate the exchange of information between government and industry, upholding strict ethical guidelines in full compliance with standards of conduct and ethical guidelines established by U.S. Government departments, offices, and agencies. The 2007 Homeland Security S&T Stakeholders Conference is being jointly produced by NDIA, with technical support in the form of developing programs and identifying appropriate speakers provided by the Department of Homeland Security's S&T Directorate.
Back-Up Slides
High Impact Technology Solutions
Tunnel Detection

- Two Part Plan
  Silver Fox UAV for fast detection of suspect sites

- Ground based system for slow but extremely sensitive validation of potential tunnels and simple long term deterrence
Homeland Innovative Prototype: SAFECON

- A multi-sensor supply chain security system that scans a container for CBRNE, contraband and human cargo during the crane transport operations

- Improved Active/Passive Non-Intrusive Inspection (NII) capability

Triggered CANARY System (Lincoln Lab) Detects and identifies: Anthrax, Plague, …
Homeland Innovative Prototype Solutions
Future Attribute Screening Technology (FAST)

Mobile FAST Laboratory

Systems
- Queue management
- Behavioral recognition
- Rapid risk assessment
- Screening methodologies

Functions
- Attribute measurement
- Risk determination
- Behavior focused screening

Operational Characteristics
- Discover screening methods for intent
- Privacy protection for all participants
- Simple to operate and use
High Impact Technology Solutions
First Net

Airborne or other scalable communications suites to provide first responders with voice, data, streaming video and other advanced communications technologies in the event of catastrophic loss of communications from natural disasters, major incidents or other acts.