



Industry Guide

R&D Investment Priorities and Business Opportunities



**Homeland
Security**

Science and Technology

S&T'S CALL TO ACTION

At the Science and Technology Directorate (S&T), we know there is great power in partnerships. In our mission to deliver effective and innovative insight, methods, and solutions for homeland security, we leverage a broad network of partners to help the front line workforce of officers, agents, emergency managers, and others.

WE WANT TO GROW OUR NETWORK OF PARTNERS WHO CAN DEVELOP PRODUCTS WITH HOMELAND SECURITY REQUIREMENTS IN MIND.

As the research, development, test, and evaluation (RDT&E) arm for the Department of Homeland Security (DHS), it is our job to ensure the Department has the solutions of today and tomorrow to secure our nation in the face of natural and man-made threats. But we can't do it alone.

● OUR CUSTOMERS

U.S. Customs and Border Protection

U.S. Secret Service

U.S. Coast Guard

Transportation Security Administration

U.S. Citizenship and Immigration Services

Federal Emergency Management Agency

U.S. Immigration and Customs Enforcement

Federal Law Enforcement Training Center

National Protection and Programs Directorate

Office of Intelligence and Analysis

State, Local, Tribal, Territorial First Responders and Critical Infrastructure Operators

DHS Headquarters Elements

S&T'S CALL TO ACTION

DHS FIVE MISSION AREAS



WE NEED YOUR HELP TO DISCOVER SCIENTIFIC ADVANCEMENTS AND TECHNOLOGICAL INNOVATIONS THAT SOLVE HOMELAND SECURITY CHALLENGES.

The following pages tell you where our R&D mission is focused, where we are currently investing, and how to work with us. This guide is intended for a broad range of potential partners—technology developers, innovators developing ideas in their garages, small businesses, and large corporations.

THERE ARE MANY WAYS TO GET INVOLVED, FROM OPERATIONAL EXPERIMENTS THAT PUT YOU IN FRONT OF HOMELAND SECURITY OPERATORS, TO A WIDE VARIETY OF OPEN SOLICITATIONS.

Learn more in this guide about all the ways you can partner with S&T to make the homeland more secure. Tell us about your capabilities and what you have to offer, and help us advance the state of the art to solve challenges and meet operational needs.

S&T's Industry Liaison is your primary entry point into S&T.

Email us at SandT.Innovation@hq.dhs.gov or check out our website at www.dhs.gov/science-and-technology/business-opportunities

PARTNERING WITH S&T

S&T has three primary goals in building partnerships with industry:

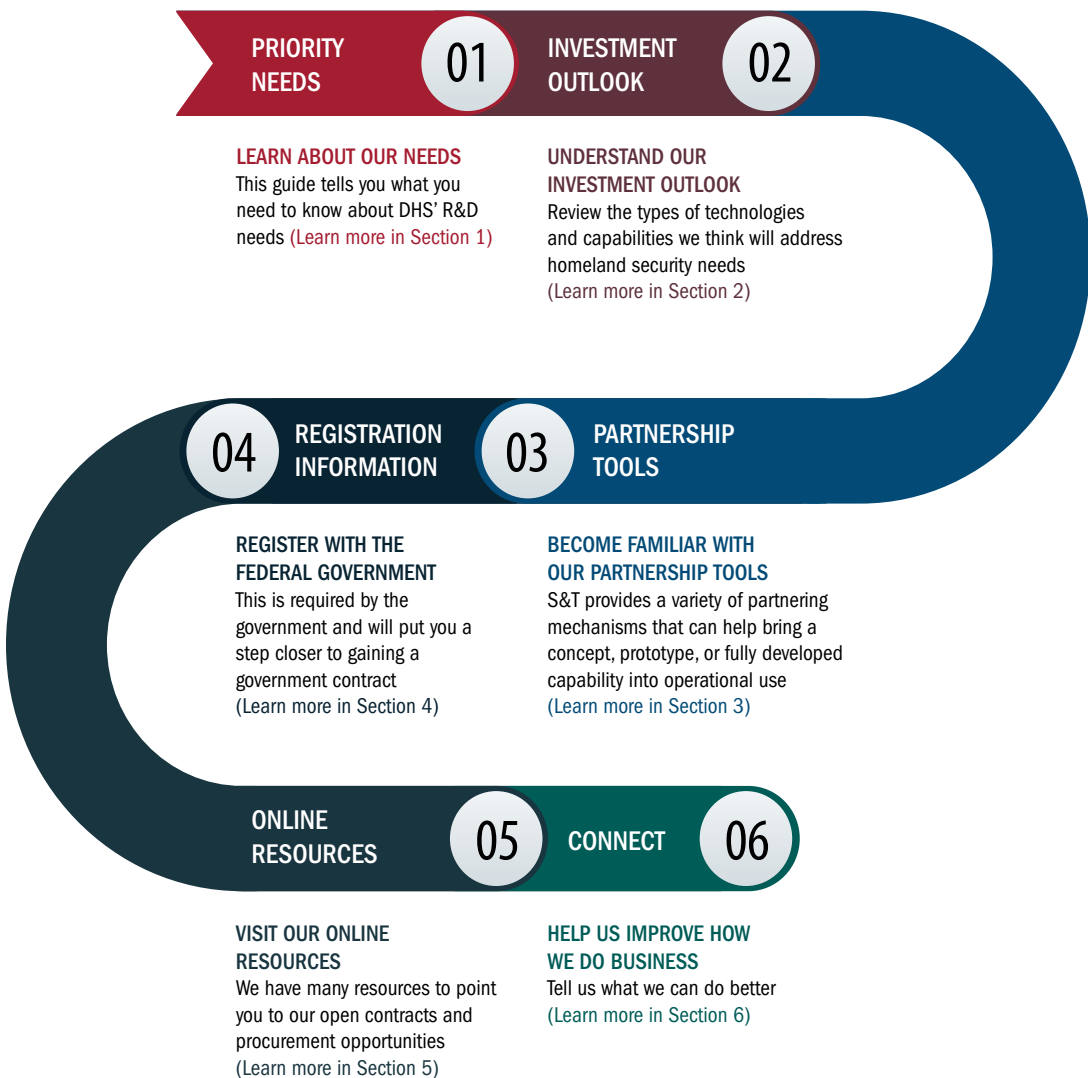
- **DISCOVERING** what is going on within industry communities. We want to discover what capabilities and technologies are out there and what might be coming. Our goal is to find and leverage industry capabilities before spending federal dollars to conduct research or develop technologies that may already exist.
- **DEVELOPING** new or adapting existing technical solutions to meet the Department's operational needs. We are always looking to leverage existing technologies and to incentivize and help shape products that are under development. Our goal is to encourage innovative industry partners to consider homeland security end users as their customers.
- **TRANSITIONING** capabilities into the commercial market. As products and prototypes near the end of the development phase, we continue to search for ways to manufacture and distribute these products through appropriate channels to reach our end users who buy through the commercial market.

For more information about S&T's work and R&D focus areas, check out our website www.dhs.gov/science-and-technology or reach out to our Industry Liaison at SandT.Innovation@hq.dhs.gov.

INDUSTRY GUIDE ROADMAP

SIX THINGS YOU CAN DO TO PARTNER WITH S&T

This guide provides R&D communities with an understanding of S&T’s technical vision, current challenges, and funding opportunities. There are many ways to get involved – here are six steps to get started:



Protecting our nation can be complex—from rapidly evolving threats to longer-term efforts that require our attention. To fully understand the needs of our operational components, we annually identify priority needs that require R&D solutions in key mission-aligned areas.

- Securing Aviation
- Securing Borders
- Preventing Terrorism
- Protecting from Terrorist Attacks
- Securing Cyberspace
- Managing Incidents

These priority needs drive S&T's R&D investments. S&T looks for the following types of solutions:

1. Over the horizon, future innovations that will transform the way homeland security operators accomplish their missions.
2. Near-term capabilities that will solve current operational challenges and meet the Department's R&D needs.
3. New applications of technologies to respond to emerging threats to the homeland.

For more information about how DHS compiles these needs, visit our website at www.dhs.gov/science-and-technology/ipt and www.dhs.gov/publication/st-frg-project-responder-5-report to download our annual Integrated Product Team and Project Responder reports describing the process and priority capability needs in further detail.



SECURING AVIATION

The aviation security environment presents a constant demand to detect evolving threats while moving passengers, baggage, and cargo safely and quickly through checkpoints and promoting a positive passenger experience. The end goal is to provide non-invasive security screening at our nation's airports while preventing terrorist attacks and ensuring speedy and lawful trade and travel.

Aviation security challenges identified over fiscal years 2016 and 2017 focus on the ability to rapidly and effectively detect threats on passengers and in baggage and cargo, in addition to quickly authenticating the identity of passengers.

Priority R&D needs for securing aviation are:

- High-throughput cargo screening
- Cost-effective electronic imaging for bulk air cargo
- Passenger identification and vetting
- Rapid detection and alarming of explosives
- Distinguishing threats from non-threats on passengers
- Efficient and accurate detection of complex threat concealment on passengers and carried property



SECURING BORDERS

DHS is responsible for securing 7,000 miles of land border with Mexico and Canada; maintaining air domain awareness in the United States; and securing the nation's air, land, and sea ports of entry.

Our borders are vital economic gateways that account for trillions of dollars in trade and travel each year. Border security presents complex challenges due to geographic locations, modes of transportation, trade and travel volume, and transnational criminal organizations. DHS works to secure our borders through the deployment of personnel, infrastructure, and technology—including sensors, radar, and aerial assets—and investments to modernize the ports of entry.

Priority R&D needs for border security are:

- Cross-border tunnel detection, surveillance, and forensics
- Infrastructure tunnel surveillance
- Integrated and improved sensors, systems, and data
- Actionable intelligence gathering and sharing
- Dark aircraft and vessel detection, tracking, and interdiction
- Expedited people screening
- Maritime surveillance and communications in remote environments



SECURING CYBERSPACE

Cyber-threats can have detrimental impacts on the nation's economy and security. Integrated into our nation's critical infrastructure across the government and the private sector, cybersecurity is a top concern for DHS. The growth of the Internet of Things, cyber criminals, and a growing dependence on digital devices bring layers of complexity to cybersecurity that require technological advances.

Priority cybersecurity R&D needs are:

- Distributed cloud-based communications and monitoring
- Industrial control systems, cyber sensors, analytics, and prevention
- Metrics for cybersecurity effectiveness, severity, and comparison
- Data capture of networked devices for forensic examination

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PRIORITY NEEDS IN PREVENTING TERRORISM



PREVENTING TERRORISM

A hallmark of homeland security, the prevention of terrorist attacks runs through the mission of every component within DHS. Terrorist tactics continue to evolve and the threat of terrorism has become increasingly difficult to detect.

Priority R&D needs in preventing terrorism are:

- Organic explosive compound and homemade explosives detection
- Improvised explosive device-related anomaly detection
- Automated machine learning



PROTECTING FROM TERRORIST ATTACKS

Protecting the American people from terrorist threats and attacks is the reason DHS was created and remains our highest priority. Terrorists seek sophisticated means of attack, including chemical, biological, radiological, nuclear, and explosive (CBRNE) weapons, and cyber attacks. Biological threat security, in particular, focuses around the prevention of release as well as detection of and protection against biological threats and hazards known to pose particularly high risk to the nation.

Operators in this mission space have the following priority R&D needs:

- Personal protective equipment for all CBRNE hazards
- Modeling and predictive analytics for decision making
- Disease and biological threat detection, identification, and classification in field operational environments
- Biological attack verification



MANAGING INCIDENTS

Incident Management encompasses emergency response and critical infrastructure security and resilience, to include the preparedness, response, and recovery needs of more than 70,000 state, local, tribal, and federal agencies and 16 critical infrastructure sectors. Specific incident management needs are centered around the following priorities:

Situational Awareness

- Access, integration, sharing, and display of incident scene images and video
- Indoor and outdoor geolocation of responders
- Threat and hazard detection and identification
- Map generation of indoor and outdoor locations
- Real-time merging and synthesis of disparate data sources
- Identification of potential cascading effects that impact incident response and/or the surrounding community
- Creation and maintenance of bird's-eye views of incident scenes

Communications

- Effective communication in the presence of loud ambient noise
- Multiple jurisdiction and agency coordination of dispatch
- Multi-disciplinary communication channel and frequency facilitation and management
- Information sharing among agencies and disciplines

Command, Control, Coordination

- Decision-support templates and prompts
- Electronic documentation and tracking of command decisions, actions and assignments
- Joint command establishment between jurisdictions and agencies

Training and Exercises

- Multi-modal, multi-agency, multi-jurisdictional training and exercises across wide spectrum of incidents
- Proficiency in disaster management training

Responder Health, Safety, Performance

- Enhanced threat protection without specialized garments or compromised comfort and maneuverability
- Individually appropriate mental health services
- Hazard exposure type and level
- Physiological monitoring

Logistics and Resource Management

- Holistic picture of resources available on scene
- Geolocation of non-personnel resources
- Real-time on-duty, off-duty, and self-reporting personnel accounting and management
- Credential verification of all on-scene responders
- Centralized management of incident-specific logistics information
- Identification of resource needs for rescue and shelter of citizens with access and functional needs
- Digital resource request and tracking from field

Casualty Management

- Estimation or ascertainment of the number of persons in affected areas
- Location of injured, trapped and deceased casualties
- Status tracking of known and potential casualties
- Large number fatality management and tracking

Risk Assessment & Planning

- Local and regional threat, risk, and consequence identification and modeling
- Impact evaluation of evolving man-made incidents or natural disasters

Intelligence & Investigation

- Capture, processing, integration, management of raw and digital information
- Creation of actionable intelligence based on multi-source data and information
- Monitoring of social media and other non-traditional intelligence sources for warnings and indications of planned activities or violence
- Isolation and extraction of critical information from social media feeds and electronic communications

As S&T works with homeland security operators to identify and fully understand their R&D needs, we also plan for ways to address those needs. We do this by continuously scouting for potential solutions across industry, other federal agencies, academia, our international partners, and our laboratory networks. We build on those findings to prioritize our investment outlook.

- For fully operational products, we direct those solutions to operators with the need and the funds to procure the product.
- For potential solutions in the near-market, prototype, or concept stages, we use the best-fit partnering mechanism and invest our funds to fully develop and transition those capabilities into operational use.
- For those needs where a solution is not readily apparent, we sponsor and incentivize further research and innovation.

The tables in this section provide an overview of our R&D investment outlook – the types of technologies and capabilities we think will address current homeland security needs. S&T will invest portions of its Research, Development, and Innovation funds during fiscal years 2018-2021 in the following technical categories to advance R&D in these areas:

S&T FY18-21 R&D Investments

- Sensors, Detection Devices, & Screening Systems
- Data Exploitation, Pattern Recognition, & Analysis
- Communication Systems & Networks
- Information Sharing & Display Environments
- Cyber & IT Monitoring, Vetting, Security Assurance
- Robotics & Autonomous Systems
- Modeling & Simulation
- Biometrics Collection & Utilization

The following tables provide context for these categories by describing the applications, environments, and other characteristics that will enable us to meet operational needs and accomplish our mission.

SENSORS, DETECTION DEVICES, AND SCREENING SYSTEMS

DETECTING:

Explosives | Chemical Agents | Biological Agents | Gases |
Other Hazardous Materials | Voids | Movement and Activity | Small Vehicles |
Dark Vehicles | Signs of Life | Casualties

APPLICATION TO PRIORITY NEEDS:

Passenger Screening | Baggage Screening | Cargo Screening |
Incident and Disaster Response | Border Patrol | Maritime Patrol |
Urban Transportation Monitoring

ENVIRONMENTS:

Land Surface | Land Subsurface | Air | Sea Surface | Sea Subsurface | Urban Zones |
Building Interior and Exterior | Transportation Hubs | Ports of Entry | Airports

OTHER POTENTIAL CHARACTERISTICS:

Handheld | Portable | Wearable | Rugged | Real-Time

BIOMETRICS COLLECTION AND UTILIZATION**MODES:**

Fingerprint | Palm | Facial | Iris | Retina | DNA

APPLICATION TO PRIORITY NEEDS:

Identity Verification | Familial Establishment | Forensics |
Network Credentialing and Access Management

ENVIRONMENTS:

Incidents and Disasters | Ports of Entry | Airports | Citizenship Interviews |
Border Detention Centers | Maritime

OTHER POTENTIAL CHARACTERISTICS:

Handheld | Portable | Rugged | Real-Time

ROBOTICS AND AUTONOMOUS SYSTEMS**CONDUCTING:**

Surveillance | Explosives Disposal | Site Investigation | Search and Rescue

APPLICATION TO PRIORITY NEEDS:

Incident and Disaster Response | Border Patrol | Maritime Patrol

ENVIRONMENTS:

Land Surface | Land Subsurface | Air | Sea Surface | Sea Subsurface | Urban Zones |
Building Interior and Exterior

COMMUNICATION SYSTEMS AND NETWORKS

INCLUDING:

Integrated Sensors | Mobile Devices | Multiband Radios | IP Backbone | Identity Credentialing and Access Management | Protocols and Standards

APPLICATION TO PRIORITY NEEDS:

Incident and Disaster Response | Border Patrol | Maritime Patrol

ENVIRONMENTS:

Surface | Land Subsurface | Sea Surface | Sea Subsurface | Urban Zones | Building Interior and Exterior

OTHER POTENTIAL CHARACTERISTICS:

Multi-Sensory | Integrated with Protective Equipment | Wireless

CYBER AND IT THREAT MONITORING, VETTING, SECURITY ASSURANCE

SECURING:

Communications Systems and Networks | Mobile Devices | Internet Infrastructures | Software

APPLICATION TO PRIORITY NEEDS:

Cyber Security Operations | Critical Infrastructure Operations | Law Enforcement | Incident and Disaster Response | Day-To-Day Business

OTHER POTENTIAL CHARACTERISTICS:

Automated Vetting | Strong Authentication | Standards-Compliant

INFORMATION SHARING AND DISPLAY ENVIRONMENTS**USES:**

Situational Awareness and Common Operating Pictures | Workflow |
Logistics Management | Information Analysis | Quality Assurance

APPLICATION TO PRIORITY NEEDS:

Incident and Disaster Response | Border Patrol | Maritime Patrol | Ports of Entry |
Airports | Urban Transportation Monitoring

ENVIRONMENTS:

Land Surface | Sea Surface | Air | Urban Zones | Building Interior and Exterior

OTHER POTENTIAL CHARACTERISTICS:

Real-Time | Rugged Platforms | Portable Platforms | Multi-User

MODELING AND SIMULATION TOOLS**FOR:**

Predicting Threats | Predicting Disasters | Predicting Casualties | Training

APPLICATION TO PRIORITY NEEDS:

Incident and Disaster Response | Law Enforcement

OTHER POTENTIAL CHARACTERISTICS:

Accessible | High Fidelity | Multi-User | Virtual

DATA EXPLOITATION, PATTERN RECOGNITION, AND ANALYSIS

TYPES OF DATA:

People Counts | Communication Signals | Sensor Data | Social Media

IDENTIFYING AND DETERMINING:

Risks | Vulnerabilities | Threat Identification and Characterization | Incident Indicators | Incident and Disaster Effects

APPLICATION TO PRIORITY NEEDS:

Mission Planning | Decision Support | Incident and Disaster Response

OTHER POTENTIAL CHARACTERISTICS:

Real-Time

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S&T'S INDUSTRY PARTNERSHIP TOOLS

The partnership tools described here directly support S&T's goals in partnering with industry—to further the Discovery, Development, or Transition of technological capabilities. If you have products in the near-market or prototype stage that directly relate to the technical categories in Section 2, if you have a great idea or concept that will address our R&D needs, or if you have the capability to manufacture and produce our prototype solutions...we are looking to partner with you!

	Discovery Tools		Development Tools					Transition Tools		
	Operational Experimentation	Scouting and Scanning	Traditional Acquisition Contracts	Small Business Innovation Research	Prize Competitions	Broad Agency Announcements	Silicon Valley Innovation Program	Accelerator Networks	Technology Transfer & Commercialization	SAFETY Act Program
Concepts & Ideas			●	●	●	●	●			
Prototypes	●	●	●	●	●	●	●	●		
Near-Market Tech & Systems	●	●	●			●	●	●		
Commercial Products	●	●								●
Manufacturing & Distribution Capabilities									●	

DISCOVERY PARTNERSHIP TOOLS

Operational Experimentation (OpEx) gives technology developers the opportunity to connect their capabilities with homeland security end users in realistic, operational settings and gain first-hand feedback on their technology's operational relevance.

S&T publishes OpEx opportunities via a Request for Information (RFI) on FedBizOpps at www.fbo.gov/. Stay up-to-date on upcoming events at www.dhs.gov/science-and-technology/operational-experimentation

Technology Scouting and Scanning aims to maintain awareness of the state-of-technology and consider how it can be applied to homeland security operational challenges. Our programs in these areas also work closely with S&T scientists and engineers to search for available solutions to particular R&D needs.

Make us aware of your products and capabilities by emailing our Industry Liaison at SandT.Innovation@hq.dhs.gov.

DEVELOPMENT PARTNERSHIP TOOLS	TOPICS ANNOUNCED
<p>Traditional Acquisition Contracts lists the Department's currently open and active contract opportunities. www.fbo.gov/</p>	Continually
<p>Small Business Innovation Research Program (SBIR) challenges U.S. small businesses in to bring innovative and creative homeland security solutions to reality. sbir2.st.dhs.gov/portal/SBIR/</p>	Annually (December)
<p>Prize Competitions seek to inspire all citizens to find creative solutions to tough problems that require a variety of perspectives. www.challenge.gov/list/ and scitech.dhs.gov/prize-competitions</p>	Continually
<p>Broad Agency Announcements (BAA) <i>Targeted BAA</i> seeks time-sensitive white papers and proposals on topics important to homeland security.</p> <p><i>Long Range BAA</i> provides a standing, open invitation on topics seeking white papers and proposals on technological capabilities to solve homeland security problems. baa2.st.dhs.gov/portal/BAA/</p>	Continually Continually (open for 3-5 years)
<p>Silicon Valley Innovation Program (SVIP) provides a fast-track process for prototype development, and is aimed at non-traditional DHS performers, such as technology startups, that can offer innovative solutions to homeland security challenges. scitech.dhs.gov/svip</p>	Continually (open for 12 months)
<p>Accelerator Networks expand S&T's reach to non-traditional partners. S&T engages early-stage companies to find promising technologies and foster their adaptation for homeland security through a network of accelerators and incubators. Read more at scitech.dhs.gov/accelerator.</p>	Annually

TRANSITION PARTNERSHIP TOOLS

Technology Transfer and Commercialization is the central point to manage technology transition throughout DHS and the DHS laboratory network. Technologies developed and evaluated within the Department can have tremendous potential for commercial applications throughout the nation, enhance the competitiveness of individual small businesses, and expand areas of exploration and cooperation for all non-federal partners. We leverage Cooperative Research and Development Agreements, Memoranda of Agreement/ Understanding, and Partnership Intermediary Agreements to support technology transition.

Read more at scitech.dhs.gov/technology-transfer-program or contact us to learn about DHS technologies that are available for licensing.

SAFETY Act Program creates systems of risk and litigation management to incentivize the development and deployment of anti-terrorism technologies. The Under Secretary for Science and Technology is the deciding official for SAFETY Act applications for qualified anti-terrorism technology certifications and designations.

For more information, visit www.SAFETYAct.gov.

FEDERAL PROCUREMENT

Registration

The federal government has recently centralized business information in a one-stop platform called business.usa.gov, aimed at making it easier for businesses to access services to help them grow and hire. If you want to do business with the federal government, there are rules and procedures to follow in order to qualify. This starts with registration, which requires you to obtain a Dun & Bradstreet D-U-N-S® Number and select a North American Industry Classification System (NAICS) code for administrative, contracting and tax purposes. If you plan to apply to be on the GSA Schedule, you should also seek a past performance evaluation through the designated resource. For further help, see www.usa.gov/business

FedBizOpps

[FedBizOpps.gov](https://www.fbo.gov) is the single government point-of-entry for federal government procurement opportunities over \$25,000. Through one portal— www.fbo.gov—government buyers directly publicize their business opportunities, and commercial vendors seeking federal markets for their products and services can search, monitor, and retrieve opportunities solicited by the entire federal contracting community.

Additional Resources

DHS provides additional online resources where businesses can find contract opportunities at www.dhs.gov/how-do-i/do-business-dhs.

PURSUING INNOVATIONS IN PROCUREMENT AT DHS

The Department sponsors a series of initiatives focused on improving procurement processes and timelines. DHS launched Acquisition Innovations in Motion (AliM), which includes industry engagement activities to improve how DHS does business.

Procurement Innovation Lab

As part of AliM, DHS established the Procurement Innovation Lab (PIL), a virtual lab that invites contracting officials to tell us how we can improve business processes. The PIL experiments with innovative techniques to increase efficiencies and institutionalize best practices in the procurement process. In addition to saving the Department time and money, the PIL helps to create a learning culture that enhances support to the DHS mission while simplifying contracting procedures for our partners.

Learn more at www.dhs.gov/publication/alim-publications

DHS has a number of online resources to keep you up-to-date on open opportunities.

Forecast of Contract Opportunities

Forecast of Contract Opportunities is a searchable database geared toward small businesses. It projects all anticipated contract actions above \$150,000 that small businesses may be able to perform, either through a direct contract with DHS or through a subcontract arrangement with a prime contractor. Procurements valued under \$150,000 are not listed; businesses are urged to contact the appropriate DHS Small Business Specialist for each Component for information on those opportunities. <http://apfs.dhs.gov/>

Sub-contracting with Prime Contractors

Large business prime contractors at DHS may be interested in subcontracting with small, minority, women-owned, HUBZone-certified, 8(a), veteran-owned, and service-disabled, veteran-owned businesses. The DHS list of prime contractors provides visibility to pursue this avenue toward contracting work. www.dhs.gov/prime-contractors

Teaming and Subcontracting Opportunities with IT Contracts

DHS is establishing department-wide contracts for information technology (IT) services and commodities. For the latest on IT task orders and teaming and subcontracting opportunities, see www.dhs.gov/information-technology-acquisitions.

SUMMARY OF PARTNERING OPPORTUNITIES

Operational Experimentation (OpEx): S&T publishes OpEx opportunities via a Request for Information (RFI) on FedBizOps at www.fbo.gov/.

Technology Scouting: Tell us about your products and capabilities by emailing our Industry Liaison at SandT.Innovation@hq.dhs.gov.

Small Business Innovation Research (SBIR) Program releases one solicitation annually in December. Review SBIR topics and opportunities at sbir2.st.dhs.gov/portal/SBIR/.

Prize Competitions: Learn about current competitions and past prize winners at www.challenge.gov/list/ and scitech.dhs.gov/prize-competitions.

Broad Agency Announcements: View topics and opportunities for both the standing Long-Range Broad Agency Announcement (LRBAA) and targeted BAAs at baa2.st.dhs.gov/portal/BAA/.

Silicon Valley Innovation Program (SVIP) posts new topics continually at scitech.dhs.gov/svip.

Accelerator Networks: S&T engages early-stage companies to find promising technologies that can be adapted for homeland security. Read more at scitech.dhs.gov/accelerator.

Technology Transfer and Commercialization Program manages the transition of technology solutions across DHS. Learn more at scitech.dhs.gov/technology-transfer-program.

SAFETY Act provides liability protections for providers of qualified anti-terrorism technologies. For more information, visit SAFETYAct.gov.

DHS and Other Federal Government Contracts: View all open and active federal contracting opportunities at www.fbo.gov/.

More Information: Additional resources to assist you in working with DHS are available at www.dhs.gov/how-do-i/do-business-dhs.

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CONNECT WITH US

Connect with us! Help us improve how we do business.



VISIT US ONLINE AT

www.dhs.gov/science-and-technology/business-opportunities



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