



**Part I:  
TECHNICAL  
DIVISIONAL REQUIREMENTS**

**LONG RANGE BROAD AGENCY ANNOUNCEMENT (BAA)  
BAA 09-05  
FOR  
THE DEPARTMENT OF HOMELAND SECURITY  
SCIENCE AND TECHNOLOGY DIRECTORATE**

**INTRODUCTION:**

This solicitation is a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016. A formal Request for Proposal (RFP) will not be issued.

The Department of Homeland Security (DHS) Science & Technology (S&T) Directorate will not issue paper copies of this announcement. DHS S&T reserves the right to select for award and fund all, some, or none of the Full Proposals received in response to this solicitation. No funding for direct reimbursement of proposal development costs will be allowed. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. However, depending on the markings on the proposal, DHS S&T will adhere to FAR policy on handling source selection information and proprietary proposals. It is the policy of DHS S&T to treat all proposals as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

Multiple awards are anticipated to be issued through this BAA and will be based on an assessment of the overall best value to the government. Awards will be made based upon the proposal evaluation, funds availability, and other programmatic considerations.

Awards may take the form of contracts, grants, cooperative agreements, or other transaction (OTAs) agreements. Therefore, the applicable laws and regulations governing the legal vehicle used for award will depend on the legal vehicle chosen by DHS S&T. In the event an Offeror or subcontractor is a Federally Funded Research and Development Center (FFRDC), Department of Energy National Laboratory, or other Federally funded entity, DHS S&T will work with the appropriate sponsoring agency to issue an interagency agreement pursuant to the Economy Act (31 U.S.C. 1531) or other appropriate authority.

**Part I of this BAA (this portion) contains the Technical Requirements, Divisional Points of Contact, and general interest areas. Please refer to Part I to determine if your specific area of interest is of particular interest to DHS S&T and to determine which division you should focus on. If you determine you have an idea that will be of interest, please open and print Part II, which will guide you through the requirements of the BAA submission process. It provides details on what shall be included in your White Paper or Full Proposal, explains the process and how to submit, and the evaluation criteria.**

## **I. GENERAL INFORMATION**

### **1. Agency Name -**

Department of Homeland Security  
Science and Technology Directorate  
Washington DC 20528

### **2. Research Opportunity Title -**

DHS S&T Long Range Broad Agency Announcement

### **3. Research Opportunity Number -**

BAA 09-05

### **4. Response Date -**

This announcement will remain open until December 31, 2009. White Papers and/or Full Proposals may be submitted at any time during this period.

### **5. Research Opportunity Description -**

The Homeland Security Act of 2002 (Public Law 107-296) states that DHS S&T will “support basic and applied homeland security research to promote revolutionary changes in technologies; advance the development, testing and evaluation, and deployment of

critical homeland security technologies; and accelerate the prototyping and deployment of technologies that would address homeland security vulnerabilities.”

DHS S&T is interested in receiving proposals for Long Range Science and Technology Projects and innovative prototypes which offer potential for advancement and improvement of homeland security missions and operations. Readers shall note that this is an announcement to declare S&T’s broad role in competitive funding of meritorious research across a spectrum of science and engineering disciplines. The overall mission and goal of S&T is to identify revolutionary, evolving, and maturing technologies that can be demonstrated to provide significant improvement to homeland security missions and operations through proof of concept and prototyping with potential for transition to current and future DHS acquisition processes. S&T will focus on those key areas where risk inhibits mission and operation investments and where significant capability payoffs can be expected for successful efforts. Related technologies are being pursued by other elements of the US Government, and in those cases, DHS S&T will leverage and use those technology developments wherever it is practicable and efficient to do so. S&T will also facilitate access to laboratory and operationally relevant test and evaluation facilities wherever reasonably available.

S&T is soliciting individuals or teams to conduct basic research, applied technology development, or the preparation of integrated prototypes for field investigations of the performance of new and innovative solutions. ***It cannot be emphasized too strongly that proposals in these areas must show future promise for mission and operational relevance and to the greatest extent be demonstrable in a relevant homeland security environment.***

General overarching example (for all divisions):

- Basic science ideas (e.g. biology, chemistry, physics, materials, and algorithms) which hold promise for transformative performance improvements across prevention, detection, defeat, mitigation, and destruction strategies for all homeland threats.

Topical Areas of strategic interest include:

- **Explosives Countermeasures** including the detection, mitigation, and response to explosive threats including: MANPADS, detection of explosives on aviation travelers, in checked and carry-on baggage, Home Made Explosives (HME), improvised explosive devices (IEDs) – vehicle borne (VBIED) and person borne (PBIED), and response and defeat technologies.

- **Standoff Detection of Explosives:** Technologies for the standoff detection of explosives and explosive devices related to Person and Vehicle Borne Improvised Explosive Devices. Explosives of interest include commercially available explosives (i.e. Ammonium Nitrate based), conventional military explosives (i.e. Composition C-4 and Semtex A/H) and improvised explosives (peroxide base). Standoff Detection implies that both the detection equipment and operator be located at some distance (>1 m) away from the subject or object under interrogation. Subtopics include:
  - 1) Integration of both multimodal and multispectral technologies for improved detection and/or imaging metrics.
  - 2) Development of automated detection and/or identification capabilities associated with both imaging and spectroscopy based technologies.
  
- **Defeat of Improvised Explosive Devices:** Develop a disruptor that is repeatable and uses no explosives. The developed system will generate and utilize compressed air or other suitable gas to expel water and/or solid shot to neutralize an IED. The disruptor will be portable, capable of remote firing and generate the same or greater force than conventional disruptors.
  
- **Data Fusion and Automated Detection** for aviation cargo, checked baggage, carry-on baggage and personal check points. Algorithms and techniques for detection fusion and automated alerting that combines a variety of detection modalities, including X-Ray, trace chemical detection, computed tomography (CT) and video.
  
- **Chemical and Biological** analyses and countermeasures, including improved characterization and prioritization of threats, development and detection systems for early attack warning that minimize exposure and speed treatment of victims, new forensic methods to support attribution, and novel concepts for decontamination and restoration, agrodefense, and food security.
  - Development, prototyping, and improvement of products and systems that are capable of detecting chemical/biological agents and/or their delivery systems
  - Research and development for next generation or novel technologies or prototypes for the detection and mitigation of the consequences of chemical and biological weapons, agents, and/or toxic industrial chemicals.

- Research and development for next generation or novel technologies that lead to the development of equipment, tactics, techniques, and procedures for mitigating the effects of chemical/biological attacks and incidents.
- Novel technologies to counter threats to food and agriculture production.
- **Border and Maritime Security** tools and technologies that improve the security of our nation's borders and waterways without impeding the flow of commerce and travelers. Concepts and prototypes for pilot testing surveillance, monitoring, and response capabilities that cover vast expanses of remote border and the development and evaluation of security devices and new inspection methods to secure the large volume of cargo entering U.S. ports daily.
  - there are 3 subdivisions

a. Border Security

- Detection of, tracking of, classifying of, and responding to all threats along the terrestrial and maritime border - in particular, technologies that can classify humans verses animals in rugged terrain, concealing foliage, water obstacles, mountains, and other environmental constraints.
  - Enhanced concepts and systems to detect, exploit, interrogate, and remediate subterranean border tunnels.
- Improved ballistic protection via personal protective equipment - in particular, a focus on increased effectiveness against a wider-range of projectile types, plus lighter weight and integrated helmet protection.
- Ability to use hand held non-intrusive inspection (NII) tools that allow the inspection of hidden or closed compartments, specifically to find contraband and security threats (people) at checkpoints or during ship boardings.
- Ability for law enforcement officers to assure compliance of lawful orders using non-lethal means - in particular, the ability to disable vehicles, vessels, aircraft, and temporarily incapacitate persons to prevent the infliction of damage or harm.
- Ability for law enforcement personnel to quickly identify the origin of gunfire and classify the type of weapon fired.
- Improved analysis and decision-making tools that aid DHS watchstanders in evaluating information and making more timely and accurate decisions.

- Enabling technology for securing the Nation's borders.

b. Maritime Security

- Provide wide-area surveillance from the coast to beyond the horizon, as well as port and inland waterways, for detection, classification, tracking, and response.
- Improved persistent, wide-area surveillance capabilities for guarding the U.S. coastal approaches from 12 to 120 miles offshore.
- Improved situational awareness by tracking small boat activity, detecting anomalous and/or illegal behavior, and providing timely and actionable information in support of law enforcement and port security efforts.
- Improved sensor performance to enable improved detection and tracking of small and large vessels by overcoming environmental clutter issues within the port/harbor as well as in coastal environments.
- Advanced law enforcement capabilities, enhanced ability to protect critical infrastructure and key resources, and improved incident response and recovery management along the inland waterways, port/harbor, and coastal regions.
- Concepts, methodologies, and/or technologies to more effectively track dangerous cargo being transported on inland rivers and waterways.
- Improved data fusion and automated tools for command center operations - in particular, the improved ability for agencies to share information and collaborate when not co-located.
- Ability for law-enforcement personnel to detect and identify narcotics, chemical warfare agents, toxic industrial chemicals, explosives, and contraband materials - in particular, the ability to identify multiple threats with one unit/one setup; operate on portable power; be wearable and self contained; and be able to sample for and detect contraband without direct contact.

c. Cargo Security

- Improved screening and examination by non-intrusive inspection - in particular, the ability to detect or identify contraband items (for example, drugs, money, illegal firearms), threat materials, or stowaways; improve penetration, resolution, throughput, contrast sensitivity, reliability, mobility, and interoperability; and integrate with future Automated Target Recognition capability.
  - Increased information fusion, anomaly detection, Automatic Target Recognition, and response capability - in particular, automated imagery detection capability for anomalous content (e.g., stowaways, hidden compartments, contraband), and the ability to detect anomalous patterns in shipping data.
  - Improved detection, and identification of WMD materials and contraband—In particular, the ability to detect chemical and biological threats, explosives, and contraband.
  - Capability to screen 100 percent of air cargo.
  - Track domestic high-threat cargo - in particular, the ability to track DHS-designated Toxic Inhalation Hazardous (TIH) cargos in domestic transit.
  - Detect intrusion or unauthorized access, positively identify cargo, and provide timely response - in particular, in containerized, palletized, parcel, or bulk/break-bulk maritime and air cargo.
- **Command, Control, & Interoperability** research and development that creates and deploys information resources – standards, frameworks, tools, and technologies – to enable seamless and secure interactions among homeland security stakeholders. Concepts, prototypes and other technologies that strengthen capabilities to communicate, share, visualize, analyze, and protect information.
    - Research into the development of interoperable devices and systems to improve voice and data communications; information sharing; and collaboration between emergency response personnel at the federal, state, and local level.
    - Research for advanced information assurance and other cyber security technologies to secure the Nation’s current and future cyber infrastructure.
    - Innovative forensic technologies to increase the operational efficiency and create new capabilities for criminal and terrorist investigations.

- Research for advanced reconnaissance and surveillance technologies for law enforcement personnel.
- **Human Factors/Behavior Sciences** analyses, methods, tools, technologies and techniques to: improve detection, analysis, and understanding of threats posed by individuals, groups, and radical movements; improve the recognition of individuals; improve the resilience of American society and of individual communities against hazards and threats to social and economic vitality, including increasing understanding of cognitive and behavioral processes influencing decision making and communication relating to catastrophic events; improve the preparedness, response and recovery of communities impacted by catastrophic events, including mitigating the effects of those events; and to improve overall effectiveness and applicability of homeland security technologies and processes through the collection and use of human performance and public perception data to increase usability, application, and acceptance.
  - Methods and techniques for characterizing public perceptions of risk in an all-hazards environment and raising public awareness and preparedness through a program of public education and training, hazard and risk warnings, public service announcements, and multi-organizational collaboration.
  - Methods and techniques for training and educating public officials, community leaders and first responders in framing effective hazard and risk warnings and emergency communications to the public prior to and during local or regional disasters or civil emergencies.
  - Methodologies for identifying, establishing and validating metrics and measures of effectiveness for societal and community resilience across physical, economic, social, psychological and cultural dimensions.
  - Methods for identifying and strengthening social networks within communities to achieve better awareness of local strengths, vulnerabilities, resources and relationships to enhance community resilience and social cohesion.
  - Research into methods for defining and quantifying the psychosocial impact of large-scale disasters and catastrophes on populations and communities within populations, in order to improve social, economic and psychological resilience and to understand long-term implications for recovery from catastrophic events.
  - Methods for identifying non-invasive deceptive and suspicious behavior within a time constrained, low-base rate, screening environment.

- Non-invasive methods for identifying non-invasive deceptive and suspicious behavior within a time constrained, high-base rate, interview environment.
- Non-invasive methods for identifying optimal interactive strategies to elicit non-invasive indicators of deceptive and suspicious behavior.
- Technologies to automatically identify deceptive and suspicious behaviors.
- Methods for identifying insider threat behavior.
- **Infrastructure and Geophysical - technologies** for identifying and mitigating all hazard vulnerabilities of the 18 critical infrastructure/key assets, and technologies for improving the preparedness and response for Federal, State, Local, Tribal governments, first responders and the private sector, to all-hazards events impacting the U.S. population and critical infrastructure.
  - Offshore wide area persistent surveillance for cueing incoming threats to enable pre-emptive response. (*Also has a Borders and Maritime element*)
  - Integrated incident management components and systems to improve public and first responder safety. (*Also has a Command, Control and Interoperability element*)
  - Concepts, methodologies, and/or technologies to anticipate, prepare for and/or mitigate the impact of catastrophic geophysical phenomena.
  - Concepts, methodologies, and/or technologies for enhancing security, resilience, and recovery of the 18 critical infrastructure sectors for new and retrofit applications. (*Also has Borders and Maritime Security element*)
  - Concepts, methodologies, and/or technologies to improve protection of or enhance performance of responders as they carry out life-saving tasks.
  - Geospatial technologies that enhance protection of critical infrastructure and improve management of incidents at federal, state and local levels. This includes concepts and technologies for protecting and mitigating vulnerabilities to the critical Civil Infrastructure of human operators, maintainers, and developers responsible for the reliable functioning of the nation's physical infrastructure (*Also has a Human Factors element*)

- Concepts, methodologies, and/or technologies to improve protection of or enhance performance of responders as they carry out life-saving tasks.
- Concepts, techniques, methodologies, algorithms, and cost effective sensors to mitigate multipath effects and to improve the performance of wireless mesh networks in challenging environments such as underground and GPS denied facilities.
- Concepts, techniques, methodologies, and decision support algorithms for real time fusion of multi-source sensor measurements in order to produce actionable alarms for location/health monitoring and surveillance purposes.
- Concepts, techniques, methodologies, algorithms, and innovative tools/applications to significantly enhance the quality of system analysis and to reduce the time/cost of conducting system analyses by ten fold.

In addition to the example areas listed above, efforts that propose basic research or advanced research and technology demonstration may be proposed to address technology gaps that are described in the document entitled “High Priority Technology Needs”, DHS S&T, dated June 2008, as amended. This document may be obtained by accessing <https://baa.st.dhs.gov> and by following the “*Representative High Priority Technology Needs*” link.

### **Pre-submission inquiries:**

Prior to preparing and submitting White Papers and Full Proposals, potential Offerors are strongly encouraged to contact the S&T Point of Contact (POC) whose Division best matches the Offeror’s field of interest. Ideas may cross divisional boundaries so each division of interest shall be copied on the same correspondence/e-mail box, rather than submitting individual e-mails to each division. Offerors shall review the list of strategic topics of interest provided on pages 3 through 5 then forward an email to the appropriate S&T Division provided on pages 5 and 6. In this e-mail, the Offeror shall briefly describe the technology itself, the research being conducted/needed to continue, and its proposed applications. Fully developed products are not normally considered as a solution under this effort unless the Offeror is proposing a totally different application for the product or a modification is needed and some research is required to determine if it will be successful. White Papers and Full Proposals shall not be sent to these addresses and are not considered as submissions to the Long Range BAA. These boxes are monitored regularly, and someone will contact the Offeror(s) shortly about the information it has have provided. A Subject Matter Expert (SME) will respond within 14 – 21 calendar days providing notification as to whether or not there is interest and to submit a white paper.

*DHS S&T reserves the right to select for award and fund all, some, or none of the Full Proposals received in response to this solicitation. If an award decision is made, understand that a negotiation process will determine how much of the selected proposal is actually funded. A division may select a Full Proposal but only be interested in specific portions.*

**6. Point(s) of Contact – Emails forwarded to the contacts listed below shall indicate in the subject line: Long Range BAA.** When submitting a White Paper or Full Proposal resulting from Divisional conversations, please indicate specifically who you contacted within the Division(s) to ensure they are notified when an Offeror's White Paper or Full Proposal arrives.

Science and Technology Points of Contact:

Homeland Security Advanced Research Projects Agency (HSARPA/Innovation)  
[sandt.innovation@dhs.gov](mailto:sandt.innovation@dhs.gov)

Research  
[sandt.research@dhs.gov](mailto:sandt.research@dhs.gov)

Transition  
[Sandt.transition@dhs.gov](mailto:Sandt.transition@dhs.gov)

Explosives  
[sandt.explosives@dhs.gov](mailto:sandt.explosives@dhs.gov)

Chemical/Biological  
[sandt.chembio@dhs.gov](mailto:sandt.chembio@dhs.gov)

Borders and Maritime  
[sandt.bordersmaritime@dhs.gov](mailto:sandt.bordersmaritime@dhs.gov)

Command, Control, and Interoperability  
[sandt.cci@dhs.gov](mailto:sandt.cci@dhs.gov)

Human Factors  
[sandt.hfd@dhs.gov](mailto:sandt.hfd@dhs.gov)

Infrastructure and Geophysical  
[sandt.igd@dhs.gov](mailto:sandt.igd@dhs.gov)

PEO-IED  
[sandt.cied@dhs.gov](mailto:sandt.cied@dhs.gov)

Each Point of Contact can be reached at the following address:

Department of Homeland Security  
Science and Technology Directorate  
Mail Stop 3150  
Washington, DC 20528

The email addresses listed above are monitored by support personnel (contractors) within the divisions who will route the inquiry to the appropriate subject matter experts within each S&T Division. All support personnel have signed NDAs that apply to the Long Range BAA.

**Please refer to BAA 09-05 Solicitation, PART II, Para. IV APPLICATION AND SUBMISSION INFORMATION for instructions on submitting a White Paper or Full Proposal.**