

**THE DEPARTMENT OF HOMELAND SECURITY
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM**

**PHASE I PROGRAM SOLICITATION FY 10.2
Science and Technology (S&T) Directorate**

Closing Date: June 24, 2010, 2:00 PM Eastern Daylight Saving Time (EDST)

Important:

- **Solicitation Number: DHS SBIR-2010.2**
- **April 26, 2010:** Pre-release issued
- **May 11, 2010:** Full Solicitation issued
- **May 11, 2010 through June 24, 2010: Phase I Proposals Submitted and Accepted**
 - **June 24, 2010: Deadline for Submission of Phase I Proposals is 2:00 PM Eastern Daylight Saving Time (EDST)**
- **Contract Specialist: Patrice Coleman**
- **Contracting Officer: Cherita Thomas**
- **FAR Clauses 52.209-2 and 52.222-54 are incorporated into this Solicitation**

Classified proposals are not accepted under the DHS S&T Directorate SBIR Program.

Contact with Technical Points of Contact. Please note that contact with the Technical Points of Contact for each topic is limited to 15 days prior to issuance of the full-solicitation. No contacts are permitted after May 10, 2010.

Deadline for Receipt. *Proposals must be completely submitted and electronically date stamped no later than 2:00 PM EDT on June 24, 2010.*

Vendor Questions. Vendors may submit questions to STSBIR.PROPOSALS@dhs.gov no later than 3:00PM EDT, June 10, 2010. DHS will post replies no later than June 17, 2010 on <https://www.fbo.gov>.

No Printed Solicitation Books. Solicitations are available only in electronic format from the FedBizOpps website, www.fedbizopps.gov, in accordance with the Government Paperwork Elimination Act (GPEA). For convenience, the Solicitation will be available at <https://www.sbir.dhs.gov> after it is posted on the FedBizOpps website.

Information: If you have questions about the DHS SBIR Program, please submit your questions via email STSBIR.PROGRAM@dhs.gov. If you have questions or problems related to the electronic submission of your proposal, please contact the SBIR Help Desk at sbirhd@sainc.com or call 1-800-754-3043.

About this DHS S&T Directorate SBIR FY 10.2 Solicitation: There are nine (9) topics in this Solicitation.

Notice: For administrative purposes only, submissions to this Solicitation will be handled by a DHS Support Contractor.

Closed

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DHS S&T DIRECTORATE SOLICITATION FOR THE SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM

1.0 SBIR PROGRAM DESCRIPTION

1.1 SBIR Introduction

The Department of Homeland Security (DHS) Science & Technology (S&T) Directorate, hereafter referred to as DHS S&T, invites small business concerns to submit proposals under this Solicitation for the Small Business Innovation Research (SBIR) Program. Small business concerns with the capability to conduct research or research and development (R/R&D) in any of the homeland security-related topic areas described in Section 8.0, and to commercialize the results of that R/R&D are encouraged to participate.

Objectives of the DHS S&T SBIR Program include stimulating technological innovation, strengthening the role of small business in meeting DHS research and development needs, fostering and encouraging participation of socially and economically disadvantaged persons and women-owned small business concerns in technological innovation, and increasing the commercial application of DHS supported research or R&D results.

The Federal SBIR Program is mandated by Public Laws PL 97-219, PL 99-443, PL 102-564, PL 106-554, PL 110-235, PL 111-10, PL 111-136, and PL 111-162. The basic design of the DHS SBIR Program is in accordance with the Small Business Administration (SBA) SBIR Policy Directive, 2002. The DHS SBIR Program presented in this Solicitation encourages scientific and technical innovation in areas specifically identified by the Science and Technology (S&T) Directorate. The guidelines presented in this Solicitation incorporate and exploit the flexibility of the SBA Policy Directive to encourage proposals based on scientific and technical approaches most likely to yield results important to DHS and the private sector.

1.2 SBIR Three Phase Program

The DHS S&T FY10.2 SBIR Program Solicitation is issued pursuant to the Small Business Innovation Development Act of 1982 (PL 97-219, PL 99-443, PL 102-564, PL 106-554, PL 110-235, PL 111-10, and PL 111-136). The SBIR Policy is provided by the Small Business Administration through the SBA Policy Directive. The purpose of Phase I is to determine, insofar as possible, the scientific, technical, and commercial merit and feasibility of ideas submitted under the SBIR Program. Phase I awards are up to \$100,000 in cost and up to a six-month period of performance. Proposals must concentrate on that research or research and development (R/R&D) which will significantly contribute to proving the scientific, technical, and commercial feasibility of the proposed effort, the successful completion of which is a prerequisite for further DHS support in Phase II. Several different proposed solutions to a given topic may be funded. The measure of Phase I success includes evaluations of the extent to which Phase II results would have the potential to yield a product or process of continuing importance to DHS and/or the private sector. Proposers are encouraged to consider whether the research or research and development they are proposing to DHS also has private sector potential, either for the proposed application or as a base for other applications.

Subsequent Phase II awards will be made to small business concerns on the basis of results of their Phase I efforts and the scientific, technical, and commercial merit of the Phase II Proposal. Phase

II awards are up to \$750,000 in cost, and up to a 24-month period of performance. Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable prototype. A more comprehensive proposal will be required for Phase II. Further details are provided in Section 3.7 of this Solicitation.

SBIR Phase III refers to work that derives from, extends, or logically concludes effort(s) performed under prior SBIR funding agreements. Phase III is typically oriented towards commercialization of SBIR research or technology. SBIR awardees may seek contracts with the private sector or the Federal government (non-SBIR federal government sources) to further develop or supply goods or services related to the work performed under a concerns SBIR contract(s).

This Solicitation is for Phase I Proposals only. Only proposals submitted in response to this Solicitation will be considered for Phase I awards. Only proposals submitted in response to topics contained in this Solicitation will be accepted and considered for Phase I award. Proposers who were not awarded a contract in response to a prior SBIR solicitation may update or modify and re-submit the same or modified proposal if it is responsive to any of the topics listed in Section 8.0 of this Solicitation.

A separate solicitation will not be issued for Phase II of this SBIR FY 10/2 Program Solicitation; **Only those concerns that were awarded Phase I contracts are eligible to participate in Phases II and III.**

DHS will select and invite Phase I awardees to submit a Phase II Proposal to continue the research and maintain the momentum of the Phase I R/R&D. DHS uses the invitation process to accomplish an expeditious review leading to a Phase II award. Phase II Proposals shall be submitted online in accordance with Section 6.0 of this Solicitation.

DHS is not obligated to make any awards under either Phases I, II, or III, and all awards are subject to the availability of funds. DHS is not liable for any costs expended by the proposer before award of any contract.

1.3 SBIR Proposer Eligibility and Limitations

Each proposer must qualify as a small business for research or research and development purposes as defined in Section 2.0 of this Solicitation and must certify to this on the Cover Sheet of its Proposal. For both SBIR Phases I and II, the primary employment of the principal investigator must be with the small business concern at the time of the award and during the conduct of the proposed effort. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Primary employment with a small business concern precludes full-time employment at another organization. For both Phase I and Phase II, all research or research and development work shall be performed by the small business concern and its subcontractors in the United States. Deviations from the requirements in this paragraph must be approved in writing by the Contracting Officer (during contract negotiations).

Joint ventures and limited partnerships are permitted, provided that the entity created qualifies as a small business in accordance with the Small Business Act, 15 USC 631, and the definition included in Section 2.2 of this Solicitation.

1.4 SBIR Research and Analytical Work

a. **For Phase I**, a minimum of two-thirds of the research and/or analytical work shall be performed by the proposing firm. The percentage of work is usually measured by both direct and indirect costs for Phase I.

b. **For Phase II**, a minimum of one-half of the research and/or analytical work shall be performed by the proposing firm, unless otherwise approved in writing by the Contracting Officer. The percentage of work is usually measured by both direct and indirect costs for Phase II.

1.5 SBIR Conflicts of Interest

Awards made to concerns owned by or employing current or previous Federal Government employees could create conflicts of interest for those employees and could be in violation of federal law. Such proposers should contact the cognizant Ethics Counselor from the employee's Government agency for further guidance.

1.6 Questions about the SBIR Solicitation Topics and Proposal Submission

- a. **Where to Get Help.** All general questions about this solicitation and other program-related areas, as well as proposal preparation, should be submitted via email to STSBIR.PROPOSALS@dhs.gov. Questions about the electronic submission of proposals should be submitted to the Help Desk toll free number: 1-800-774-3043, or email to sbirhd@sainc.com. The Help Desk may be contacted from 8:30 a.m. to 5:00 p.m. EDST.
- b. **The DHS SBIR Website.** The DHS SBIR website at <https://www.sbir.dhs.gov> offers electronic access to SBIR solicitations, frequently asked questions (FAQs), answers to FAQs, abstracts of previously funded SBIR Phase I and Phase II projects, the latest updates on the SBIR Program, and hyperlinks to other useful information. Phase I award information is posted on the website generally four months after the close of the solicitation.
- c. **Electronic Proposal Submission.** All Phase I and Phase II Proposals shall be submitted via the electronic submission website at <https://www.sbir.dhs.gov>. Proposals received by any other means will not be evaluated or considered for award. In order to begin a DHS SBIR proposal submission, proposers must first register by completing the Company Registration process. After company registration, proposers must complete a four (4) step process before final submission is complete. Upon completion of the cover sheet (Step 1), technical proposal (Step 2), and cost proposal (Step 3), proposers must finalize/submit their proposal (Step 4). The proposer must choose the proposal and click the "Choose Proposal to Finalize" button to proceed. In order to complete the process, the proposer must click the "Yes, Finalize" button. Once this has been completed, an email confirmation receipt will be sent to the registered email account. Upon successful completion of the steps outlined above, the proposer's proposal will be electronically date stamped and officially received by the DHS SBIR Program Office.

- d. **General Questions about the DHS SBIR Program or the Science and Technology (S&T) Directorate.** General questions pertaining to the DHS SBIR Program or the S&T Directorate should be submitted to STSBIR.PROGRAM@dhs.gov or by calling the DHS SBIR Program contact: Ms. Elissa I. Sobolewski, DHS SBIR Program Director, 202-254-6768.
- e. **Technical Questions about Solicitation Topics.** From April 26, 2010 through May 10, 2010, this Solicitation is issued for pre-release on the Federal Business Opportunities (FedBizOpps) website (www.fedbizopps.gov) and the DHS SBIR website (<https://www.sbir.dhs.gov>) with the names of the Technical Point of Contact for each technical topic. During the period April 26, 2010 through May 10, 2010, proposers have an opportunity to contact Technical Points of Contact by telephone or by email to ask technical questions about specific technical topics contained in this Solicitation. Questions should be limited to specific information related to improving the understanding of a particular topic's requirements. If information given in response to a question is deemed necessary for the preparation of proposals, that information will be made available via an updated topic description. Proposers may not ask for advice or guidance on its solution approach, nor submit additional material to the Technical Points of Contact.
- No further direct contact between proposers and Technical Points of Contact shall occur from May 11, 2010 through **June 24, 2010** for reasons of competitive fairness. However, proposers may submit written questions to STSBIR.PROPOSALS@dhs.gov. Questions must be limited to technical information needed to improve the understanding of a particular topic's requirements; any other questions, such as those asking for advice or guidance on solution approach, will not receive a response.
- If information given in response to a question is deemed necessary for the preparation of proposals, that information will be made available to the public for general viewing on the FedBizOpps website at <http://fedbizopps.gov> and on the DHS website at <https://www.sbir.dhs.gov>. [Responses to the questions received after May 10, 2010 will be posted as an amendment to the Solicitation.](#)
- f. **All proposers are advised to monitor the <http://www.fedbizopps.gov> and <https://www.sbir.dhs.gov> websites during the solicitation period for questions and answers, and other information relevant to the topic under which they are proposing.**

1.7 Outreach Conferences and Events

The DHS S&T SBIR Program participates in the National SBIR Conferences and in many state-organized and regional conferences for small business. For information on these events, visit the website, <https://www.sbir.dhs.gov> located under "What's New," or refer to the <http://www.sbir.gov> website for upcoming SBIR outreach events. The DHS Program Office

encourages small disadvantaged, women-owned, veteran-owned, service-disabled veteran-owned, and socially and economically disadvantaged small businesses to participate.

2.0 DEFINITIONS

The following definitions apply for the purposes of this Solicitation:

2.1 Research or Research and Development

Any activity that is:

- a. **Basic Research.** Scientific study and experimentation to provide fundamental knowledge required for the solution of problems.
- b. **Exploratory Development.** A study, investigation or minor development effort directed toward specific problem areas with a view toward developing and evaluating the feasibility and practicability of proposed solutions.
- c. **Advanced Development.** Proof of design efforts directed toward projects that have moved into the development of hardware for test.
- d. **Engineering Development.** Full-scale engineering development projects for DHS or first responder use but which have not yet received approval for production.
- e. **For the purposes of Human Research Protection, "research" is defined as a systematic investigation including RDT&E, designed to develop generalizable knowledge (32 CFR 219).**

2.2 Small Business Concern

A small business concern is one that, on the date of award for both Phase I and Phase II funding agreements, meets all of the following criteria:

- a. Is organized for profit, with a place of business located in the United States, which operates primarily within the United States or which makes a significant contribution to the United States economy through payment of taxes or use of American products, materials, or labor;
- b. Is in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture, there can be no more than 49 percent participation by foreign business entities in the joint venture;
- c. Is (1) at least 51 percent owned and controlled by one or more individuals who are citizens of the United States or permanent resident aliens in the United States,(2) at least 51% owned and controlled by another business concern that is itself at least 51% owned and controlled by individuals who are citizens of, or permanent resident aliens in the United States; or (3) a joint venture in which each entity to the venture must meet the requirements of either (1) or (2) of this section; and
- d. Has, including its affiliates, not more than 500 employees.

Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in greater detail in 13 CFR 121.103. The term "number of employees" is defined in 13 CFR 121.106.

A business concern may be in the form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative. Further information may be obtained at <http://sba.gov/size>, or by contacting the Small Business Administration's Government Contracting Area Office or Office of Size Standards.

2.3 Research Institution

A Research Institution is any organization located in the United States that is:

- a. A university;
- b. A nonprofit institution as defined in section 4(5) of the Stevenson-Wydler Technology Innovation Act of 1980; or
- c. A contractor-operated federally funded research and development center (FFRDC), as identified by the National Science Foundation in accordance with the government-wide Federal Acquisition Regulation issued in accordance with section 35(c)(1) of the Office of Federal Procurement Policy Act. (See <http://www.nsf.gov/statistics/ffrdc/> for a list of eligible FFRDCs.)

2.4 Socially and Economically Disadvantaged Small Business Concern

A socially and economically disadvantaged small business concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 CFR 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian tribes (including ANCs), NHOs or CDCs, respectively.

2.5 Women-Owned Small Business Concern

A women-owned small business is one that is at least 51 percent owned and controlled by one or more women, or in the case of a publicly owned business, at least 51 percent of the stock of which is owned by women, and who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management of the business.

2.6 Funding Agreement

Any contract, or grant, or cooperative agreement entered into between any Federal Agency and any small business concern for the performance of experimental, developmental, or research work funded in whole or in part by the Federal Government.

2.7 Subcontract

A subcontract is any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement calling for supplies or services for the performance of the original funding agreement. This includes consultants. See Section 3.5.b (9) of this Solicitation.

2.8 Commercialization

Commercialization is the process of developing marketable products or services and delivering products or services for sale (whether by the originating party or by others) to Government or commercial markets.

2.9 Essentially Equivalent Work

This occurs when (1) substantially the same research is proposed for funding in more than one contract proposal or grant application submitted to the same Federal agency; (2) substantially the same research is submitted to two or more different Federal agencies for review and funding consideration; or (3) a specific research objective and the research design for accomplishing an objective are the same or closely related in two or more proposals or awards, regardless of the funding source.

2.10 Historically Black Colleges and Universities/Minority Institutions (HBCU/MI)

Listings for the Historically Black Colleges and Universities (HBCU) and Minority Institutions (MI) are available through the Department of Education website.

<http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.htm>

2.11 Historically Underutilized Business Zone (HUBZone) small Business Concern

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration. See <https://eweb1.sba.gov/hubzone/internet/general/qualified-firms.cfm> for more details.

2.12 Service-Disabled Veteran

A veteran with a disability that is service connected as defined in Section 101 (16) of Title 38, United States Code.

2.13 Small Business Concern Owned and Controlled by Service-Disabled Veterans

A small business concern that:

- a. not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and
- b. the management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such a veteran.

2.14 Small Business Concern Owned and Controlled by Veterans

A small business concern that:

- a. not less than 51 percent of which is owned by one or more veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more; and
- b. the management and daily business operations of which are controlled by one or more veterans.

2.15 United States

"United States" means the fifty states, the territories and possessions of the Federal Government, the Commonwealth of Puerto Rico, the Republic of the Marshall Islands, the Federated States of Micronesia, the Republic of Palau, and the District of Columbia.

2.16 Manufacturing-related R&D as a Result of Executive Order 13329

Manufacturing-related R&D as a result of Executive Order 13329 relates to: (i) manufacturing processes, equipment and systems; or (ii) manufacturing workforce skills and protection.

2.17 Energy Independence and Security Act of 2007

On December 19, 2007, the President signed into Law the "Energy Independence and Security Act of 2007" which allows preference to be given to proposals that address research for renewable energy or energy efficiency.

2.18 Foreign National (Foreign Person) means any person who is not:

- a. a citizen or national of the United States; or
- b. a lawful permanent resident; or
- c. a protected individual as defined by 8 U.S.C.1324b(a)(3).

"Lawful permanent resident" is a person having the status of having been lawfully accorded the privilege of residing permanently in the United States as an immigrant in accordance with the immigration laws and such status not having changed.

"Protected individual" is an alien who is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under 8 U.S.C.1160(a) or 8 U.S.C.1255a(a)(1), is admitted as a refugee under 8 U.S.C.1157, or is granted asylum under section 8 U.S.C.1158; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and (ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within two (2) years after the date of the application, unless the alien can establish that the alien is actively pursuing naturalization, except that time consumed in the Service's processing the application shall not be counted toward the 2-year period.

2.19 Research Involving Human Subjects

DHS has adopted Department of Health and Human Services (HHS) policies governing human subjects research, as set forth in 45 C.F.R. Part 46 (Subparts A-D). Subpart A of 45 C.F.R. part 46 is HHS' codification of the Federal Policy for the Protection of Human Subjects (also known as The Common Rule) which represents the basic foundation for the protection of human subjects in most research conduct or supported by U.S. Federal departments and agencies. All research involving human subjects shall be conducted in accordance with DHS Management Directive Number 10300.

2.20 Research Involving Animal Subjects

DHS has adopted the principles of the U.S. Department of Agriculture (USDA) implementation of the Animal Welfare Act, the Public Health Service (PHS) implementation of the Health Care extension Act, and the other related federal principles and guidelines as they represent the ethical foundation for the care and use of animals in research. All research involving the care and use of animals in research shall be conducted in accordance with DHS Management Directive Number 10200.1.

3.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

3.1 Proposal Requirements

A proposal to any topic under the DHS S&T SBIR Program must provide sufficient information to persuade the Science and Technology Directorate that the proposed work represents an innovative approach to the investigation of an important scientific or engineering problem and is worthy of support under the stated criteria. The proposed research or research and development must be responsive to the chosen topic, although need not use the exact approach specified in the topic (see Section 4.1 of this Solicitation). Any small business contemplating a proposal for work on any specific topic shall determine that (a) the technical approach has a reasonable chance of meeting the topic objective, (b) this approach is innovative, not routine, with commercial application, and (c) the company has the capability to implement the technical approach, i.e., has or can obtain people and equipment suitable to the task.

Classified proposals are not accepted under the DHS SBIR Program. Classified proposals will not be accepted under this DHS S&T SBIR Solicitation and will be appropriately destroyed upon receipt.

3.2 Administrative and Technical Checklist

Read and follow all instructions contained in this Solicitation.

- a. Submit your proposal electronically via the website (<https://www.sbir.dhs.gov>) and prepare your SBIR Proposal as instructed on the website. A complete Proposal consists of the Proposal Cover Sheets, Technical Proposal and Cost Proposal. Your Proposal is not a complete submission unless it has been finalized within the electronic submission system. You will receive email confirmation that your proposal has been submitted. If you do not receive an email, contact the Help Desk or the SBIR Program as instructed in Section 1.6 of this Solicitation.
- b. The Technical proposal adheres to the topic criteria and the Cost proposal adheres to the funding thresholds specified in this Solicitation. The cost on the cover sheets matches the cost on the Cost Proposal.
- c. The Project Summary on the cover sheets contains NO proprietary information. In the event of an award, this project summary will be posted at <https://www.sbir.dhs.gov>. Mark

proprietary information within the Technical Proposal as instructed in Section 5.6 of this Solicitation.

- d. The content in the Technical Proposal, including supporting data (if applicable), must include all of the items in Section 3.5(b) of this Solicitation in the order specified.
- e. The header on each page of your Technical Proposal must contain your company name, topic number, and proposal number. (The header may be included in the one-inch margins.)
- f. Limit your proposal to the page limitations established for Phase I and/or Phase II proposals.
- g. Use a type size no smaller than a 12-point font on standard 8 1/2 " X 11" paper with one (1) inch margins
- h. The Technical Proposal must not be in two-column or more format. The Technical Proposal must be submitted in Portable Document Format (PDF) format.

Note: Public access to the internet is available at most public libraries, local schools or a Small Business Development Center (SBDC) in your area.

3.3 Proprietary Information

If information is provided that the proposer believes constitutes a trade secret, proprietary commercial or financial information, or personal information or data, it will be treated in confidence to the extent permitted by law, provided that it is clearly marked in accordance with Section 5.6 of this Solicitation.

3.4 Limitations on Length of Proposal

This Solicitation is designed to reduce the investment of time and cost to small business concerns in preparing a formal proposal. Those who wish to respond must submit a direct, concise, and informative research or research and development proposal of no more than the page limitations established for Phase I and/or Phase II Proposals, including proposal cover sheets and cost proposal. Promotional and non-project related discussion is discouraged. The space allocated to each section will depend on the problem chosen and the principal investigator's approach. In the interest of fairness, pages in excess of the Phase I, 25-page limitation (and Phase II, 50-page limitation) (including attachments, appendices, or references) will not be considered for review or award.

3.5 Phase I Proposal Format

The Phase I Proposal length is limited to 25 pages.

- a. **Proposal Cover Sheets.** Prepare the Proposal Cover Sheets (as provided on the electronic submission website <https://www.sbir.dhs.gov>), including a brief technical abstract of the proposed R&D project and a discussion of anticipated benefits and potential commercial applications. Once you save the cover sheets, the system will assign a proposal number. You may edit the cover sheets as often as necessary until the Solicitation closes. Your cover sheets will count as the first two pages of your proposal no matter how they print out. If your proposal is selected for award, the technical abstract and discussion of anticipated

benefits will be publicly released on the DHS S&T SBIR website; therefore, do not include proprietary or classified information in these sections.

- b. **Technical Proposal.** Create a single file that covers the following items in the order given below. Begin your Technical Proposal on Page 3 (since the cover sheets are pages 1 and 2) and put your company name, topic number, and proposal number in the header of each page. (The header may be included in the one-inch margins.) The Technical Proposal must not be longer than 22 pages, since the Cover Sheet counts as two pages and the Cost Proposal counts as one page (no matter how they print out. The Technical Proposal file must be in Portable Document Format (PDF) for evaluation purposes. You cannot upload the Technical Proposal to the DHS S&T submission website until you have created the cover sheets and have been assigned a proposal number. Perform a virus check before uploading the Technical Proposal file. If a virus is detected, it may cause rejection of the proposal. The Technical Proposal must be a single file, including graphics and attachments. **Do not lock, password protect, or encrypt the file you upload.**
- (1) **Identification and Significance of the Problem or Opportunity.** Define the specific technical problem or opportunity addressed and its importance. (Begin on Page 3 of your Proposal.)
 - (2) **Phase I Technical Objectives.** Enumerate the specific objectives of the Phase I work, including the questions it will try to answer to determine the feasibility of the proposed approach.
 - (3) **Phase I Work Plan.** Provide an explicit, detailed description of the Phase I approach. The Plan must indicate what is planned, how, when, and where the work will be carried out, a schedule of major events, the final product to be delivered, and the completion date of the effort. The Phase I effort must determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task must be discussed explicitly and in detail. This section must be a substantial portion of the total proposal.
 - (4) **Related Work.** Describe significant activities directly related to the proposed effort, including any conducted by the principal investigator, the proposing firm, consultants, or others. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The proposal must persuade reviewers of the proposer's awareness of the state-of-the-art in the specific topic. Describe previous work not directly related to the proposed effort but similar. Provide the following: (a) short description, (b) client for which work was performed (including individual to be contacted and phone number), and (c) date of completion.
 - (5) **Relationship with Future Research or Research and Development.** (a) State the anticipated results of the proposed approach, assuming project success. (b) Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort.
 - (6) **Commercialization Strategy.** Describe, in approximately two (2) pages, your company's strategy for commercializing this technology in the DHS, other Federal Agencies, and/or private sector markets. Provide specific information on the market need the technology will address and the size of the market. Also, include a schedule

showing the quantitative commercialization results from this SBIR project that your company expects to achieve and when (i.e., amount of additional investment, sales revenue, etc.).

- (7) **Key Personnel.** Identify key personnel who will be involved in the Phase I effort including information on directly related education and experience. A concise resume of the principal investigator, including a list of relevant publications (if any), must be included. All resumes will count toward the 25-page limitation. In addition to Key Personnel, identify any non-U.S. citizen(s) that you expect to be involved on this project (including subcontractors and consultants), their country of origin, and level of involvement.
- (8) **Facilities/Equipment.** Describe available instrumentation and physical facilities necessary to carry out the Phase I effort. Items of equipment to be purchased (as detailed in the Cost Proposal) must be justified under this section. Also state whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state (name), and local governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.
- (9) **Subcontractors/Consultants.** Involvement of a university or other subcontractors or consultants in the project may be appropriate (see Section 2.3 of this Solicitation). If such involvement is intended, it must be described in detail and identified in the Cost Proposal. A minimum of two-thirds of the research and/or analytical work in Phase I, as measured by direct and indirect costs, must be carried out by the proposing small business concern. No portion of an SBIR award may be subcontracted back to any Federal Government Agency or Federally Funded Research and Development Center (FFRDC). SBA may issue a case-by-case waiver to this provision after review of the DHS written justification that includes the following information: (a) an explanation of why the SBIR research project requires the use of the Federal/FFRDC facility or personnel, including data that verifies the absence of non-federal facilities or personnel capable of supporting the research effort; (b) why the Agency will not and cannot fund the use of the Federal/FFRDC facility or personnel for the SBIR Project with non-SBIR money; and (c) the concurrence of the small business concern's chief business official to use the Federal/FFRDC facility or personnel. Award is contingent on the Sponsoring Agency obtaining a waiver.
- (10) **Prior, Current, or Pending Support of Similar Proposals or Awards.** *Warning --* While it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see Section 2.9 of this Solicitation) for consideration under numerous federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

If a proposal submitted in response to this Solicitation is substantially the same as another proposal that has been funded, is now being funded, or is pending with

another Federal Agency, the proposer must so indicate on the Proposal Cover Sheet and provide the following information:

- (a) Name and address of the Federal Agency(s) to which a proposal was submitted, will be submitted, or from which an award is expected or has been received.
- (b) Date of proposal submission or date of award.
- (c) Title of proposal.
- (d) Name and title of principal investigator for each proposal submitted or award received.
- (e) Title, number, and date of Solicitation(s) under which the proposal was submitted, will be submitted, or under which award is expected or has been received.
- (f) If award was received, state contract number.
- (g) Specify the applicable topics for each SBIR Proposal submitted or award received.

Note: If Section 3.5.b (10) of this Solicitation does not apply, state in the Proposal "No prior, current, or pending support for proposed work."

c. **Cost Proposal.** Complete the Cost Proposal in the format shown in the Cost Breakdown Guidance, using the online Cost Proposal Form on the electronic submission website. Some items in the Cost Breakdown Guidance at <https://www.sbir.dhs.gov/reference/DHS%20SBIRSTTR%20COST%20PROPOSAL%20BREAKDOWN%20ITEMS%20GUIDANCE.pdf> may not apply to the proposed project. If such is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to allow DHS to understand how the proposer plans to use the requested funds if the contract is awarded. Note: there is a 20-minute timeout limit for entering cost proposal data via the electronic submission system. You may want to peruse the Cost Breakdown Guidance prior to initiating your Cost Proposal to become familiar with the information that you must provide.

- (1) List all key personnel by name as well as by number of hours dedicated to the project as direct labor.
- (2) Special tooling and test equipment and material cost may be included under Phases I and II. The inclusion of equipment and material will be carefully reviewed relative to need and appropriateness for the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation and/or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with DHS unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by DHS.

- (3) Cost for travel funds must be justified and related to the needs of the project. DHS requests that you budget, as a minimum, travel to attend a one day meeting with Science & Technology Directorate program management personnel. Reasonable travel costs may include this one day meeting. This meeting may consist of a Phase I Kick-Off meeting or a presentation of your project findings to your Phase I Program Manager. Travel will typically be performed at the beginning of your Phase I award or at the conclusion of the Phase I effort; depending on the Science & Technology Directorate Program Manager's determination.
- (4) Cost sharing is permitted for proposals under this Solicitation; however, cost sharing will not be considered nor will it be an evaluation factor in the consideration of a Phase I proposal.
- (5) The Cost Proposal template on the electronic submission website is required to complete the Cost Proposal. If additional Cost Proposal information is required, it may be placed at the end of your Technical Proposal (and included in the page count limitation).

If applicable, a brief explanation of cost estimates for equipment, materials, and consultants or subcontractors can be included in the Cost Proposal. However, when a proposal is selected for award, the proposer must be prepared to submit further documentation to the Contracting Officer to substantiate costs (e.g., a detailed explanation of cost estimates for equipment, materials, and consultants or subcontractors).

The Cost Proposal will count as one page of your proposal no matter how it prints out. For more information about cost proposals and accounting standards, see the DCAA publication called "Information for Contractors" available at <http://www.dcaa.mil>.

3.6 Page Numbering

Number all pages of your proposal consecutively. The cover sheets are pages 1 and 2. The Technical Proposal begins on page 3 and continues through not more than page 22.

3.7 Phase II Proposal Invitation

This Solicitation is for Phase I only. A Phase II Proposal can be submitted only by a Phase I awardee and only in response to a request from the Contracting Officer. DHS S&T Program Managers for the applicable topic may recommend that Phase I participants be invited to submit Phase II Proposals based upon site visits, the monthly and/or final reports, and progress made towards the accomplishment of Phase I technical objectives and plans for Phase II. Not all Phase I participants will be invited to submit a Phase II Proposal. The number of Phase II Proposal invitations will depend upon the number of Phase I awards made in the topic, the availability of funding, and the quality of the Phase I research. DHS reserves the right to invite all, some, or none of the Phase I awardees in a topic to submit Phase II proposals.

The DHS S&T SBIR Program may recommend to a Contracting Officer that a Phase I contractor be invited to submit a Phase II Proposal, beginning no earlier than two thirds (2/3) into the Phase I period of performance (DHS S&T's SBIR Jump Start feature). (*Example: four months into a six month period of performance.*) While some Phase II invitations will be made prior to

completion of the Phase I period of performance, other Phase II invitations will be extended at the end of the period of performance. DHS will evaluate each Phase II Proposal when received, and if the proposal is deemed to be highly rated, will enter into negotiations for award. The goal is to accelerate the technology development and reduce, or eliminate, the gap between the Phase I and Phase II efforts.

An invitation to submit a Phase II proposal is the onset of the Phase II review process and is not a commitment for award. An invitation to submit a Phase II proposal does not qualify as a Phase II award; each Phase II Proposal must meet the SBIR Phase II criteria in this Solicitation, as well as undergo the DHS evaluation and source selection process. Phase II Proposals must be received no later than the date specified in the Phase II invitation status notification.

Phase I awardees that do not receive an invitation to submit a Phase II proposal may submit a Phase II proposal. However, non-invited Phase I awardees may conclude that DHS assessed the accomplishments of the Phase I effort and determined it did not demonstrate further consideration beyond the Phase I funding level.

All Phase I awardees not invited under the Jump Start feature will be notified of Phase II invitation status after the Phase I period of performance has been completed.

3.8 Phase II Proposal Format

As stated previously, a separate solicitation will not be issued for Phase II. These proposals instructions are provided as information only for those organizations who may receive a Phase I award and may be invited to submit a Phase II proposal. Phase II proposal is limited to 50 pages, using a type size no smaller than 12-point font on standard 8 ½ X 11” paper with one (1) inch margins. Two-column or more format is not allowed.

- a. **Each Phase II** proposal must contain Proposal Cover Sheets, a Technical Proposal, a Cost Proposal and a Company Commercialization report, if applicable. See Section 3.8 (d) of this Solicitation. In addition, each Phase II proposal must contain approximately two pages of a Commercialization Strategy in the Technical Proposal.
- b. **Commercialization Strategy. The Commercialization Strategy must address the following questions:**
 1. What is the first product that this technology will go into?
 2. Who will be your customers, and what is your estimate of the market size?
 3. How much money will you need to bring the technology to market, and how will you raise that money?
 4. Does your company contain marketing expertise and, if not, how do you intend to bring that expertise into the company?
 5. Who are your competitors, and what is your price and/or quality advantage over your competitors?

The Commercialization Strategy must also include a schedule showing the quantitative results from the Phase II project that your company expects to report in its Company Commercialization Report Updates one year after the start of the Phase II, at the completion of Phase II, and after the

completion of Phase II (i.e., amount of additional investment, sales revenue, etc. – see Sections 4.4 and 5.4 of this Solicitation).

- c. **Cost Match.** Proposers that request Phase II Cost Match funds have an opportunity in the Commercialization Strategy to present the compelling value of the proposed Phase II project. The Commercialization Strategy should provide qualitative and quantitative information directly related to the Cost Matching; explaining the improved time interval or acceleration between the completion of Phase II work and the of launching of the innovative products, processes, or services into the marketplace. Additional Phase II Cost Match guidance can be found in Section 3.10 of this Solicitation

d. Company Commercialization Report

For those concerns that have received prior SBIR Phase II funding, a succinct Commercialization Report must be included with the Proposal. The Company Commercialization Report is submitted online in accordance with Section 3.8 (a) of this Solicitation. The following are examples of company commercialization data expected in the Commercialization Report. Additional Commercialization Reporting requirements and Commercialization Update requirements can be found in Sections 4.4 and 5.4 of this Solicitation.

1. Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR award is made.
2. Revenue from the sale of new products or services resulting from the research conducted under each Phase II award;
3. Additional investment from any source, other than Phase I or Phase II awards, to further the research and development and/or commercialization conducted under each Phase II award
4. Whether the Phase II technology has been used in a fielded DHS system or acquisition program, and, if so, which system or program.
5. The number of patents resulting from the contractor's participation in the SBIR Program.
6. Whether the company has completed an initial public offering (IPO) of stock resulting, in part, from the Phase II Project.

Update the information in the Company Commercialization Report for any prior Phase II award received by the company. The company may apportion sales or additional investment information relating to more than one Phase II award among those awards, if it notes the apportionment for each award.

3.9 False Statements

Knowingly and willfully making any false, fictitious, or fraudulent statements or representations, may be a felony under the False Statement Act (18 U.S.C. §1001), punishable by a fine of up to \$10,000, up to five years in prison, or both.

3.10 SBIR Phase II Cost Match

- a. **General Provisions of the DHS SBIR Cost Match Feature.** The DHS SBIR Program includes a Cost Match feature for SBIR projects that attract matching cash from an outside investor for the Phase II SBIR effort. The purpose is to focus SBIR funding on those projects that are most likely to be developed into viable new products that DHS and others will buy and that will thereby make a major contribution to homeland security and/or economic capabilities. The cost match can occur at the time of award, or during the Phase II period of performance.

Outside investors may include such entities as another company, a venture capital firm, an individual investor, or a non-SBIR government program; they do not include the owners of the small business, their family members, and/or affiliates of the small business. In order to be considered for DHS S&T SBIR cost match, the outside investors must commit a minimum of \$100,000 up to a maximum of \$500,000. DHS will, at its option, match up to 50% of funds received. The SBIR Phase II basic awards will be made for a maximum of \$750,000 and the cost match award will be made for a maximum of \$250,000. The total cumulative SBIR funding for the Phase II award plus DHS cost match cannot exceed \$1,000,000. Outside investors may contribute funding above the \$500,000 cost match ceiling, however, DHS SBIR will only match 50% up to the \$250,000 maximum.

The additional work proposed should be an extension of the technical work being performed in the Phase II project and must fall within the general scope of the present Phase II project.

- b. **How to Qualify for the SBIR Phase II Cost Match.** To qualify for the SBIR Cost Match feature, a company must be a Phase I awardee submitting a Phase II proposal or a Phase II awardee. The company is encouraged to discuss the application with their SBIR Program Manager and the DHS SBIR Program Director. The awardee is to follow Phase II Proposal instructions and guidance, and also provide the cost match documentation and request for matched funding.
 1. A Phase II Proposal must be submitted electronically on the DHS Electronic Submission website (<https://www.sbir.dhs.gov>).
 2. The proposing company must:
 - a. State that the outside investor will match funding in the SBIR Phase II proposal, in cash, and state the amount of the outside investment, contingent on the company's selection for Phase II award.
 - b. Certify that the outside funding proposed in the application qualifies as a Cost Match investment, and the investor qualifies as an "outside investor," as defined above.

- c. Provide a brief statement (less than one page) describing that portion of the effort that the investor will fund. The investor's funds may pay for additional research and development on the company's SBIR project or, alternatively, they may pay for other activities not included in the Phase II Statement of Work, provided these activities further the development and/or commercialization of the technology (e.g., marketing).
 - d. Provide qualitative and quantitative information reflecting any additional Period of Performance to complete the new or expanded effort. Provide a concise Statement of Work for the Cost Match effort (less than four pages) and detailed Cost Proposal (less than one page).
3. The outside investor must provide:
- a. A brief statement describing the investor's experience in evaluating companies' abilities to successfully commercialize technology, the investor's assessment of the market for this particular SBIR technology, and of the ability of the company to bring this technology to market.
 - b. A letter of commitment, signed by the investor(s), containing a commitment to provide a minimum of \$100,000 or up to \$500,000 Phase II Cost Match funding, in cash, contingent on the company's selection or performance of the Phase II award. An investor may contribute above the \$500,000 Phase II Cost Match; however Government matching funds will not exceed 50% up to the \$250,000 maximum.
4. The Transfer of Investor Funds:

The company shall certify within 60 days that the entire amount of the matching funds from the outside investor has been transferred to the company. The Certification consists of a letter, signed by both the company and its outside investor, stating that "\$_____ in cash has been transferred to our company from our outside investor in accord with the SBIR Cost Match procedures." The letter must be sent to a DHS appointed Contracting Officer, along with a copy of the company's bank statement showing the funds have been deposited. The transfer of investor funds from another Government agency will be coordinated with the DHS SBIR designated Contracting Officer. **IMPORTANT:** If the Contracting Officer does not receive this certification showing the transfer of funds within 60 days, the company will be ineligible to compete for Phase II Cost Match funding, unless a specific written exception is granted by the DHS SBIR Program Director.

Failure to meet these conditions in their entirety and within the time frames indicated may disqualify a company from participation in the SBIR Cost Match. DHS maintains the right to award some, all, or none of the Phase II Cost Match requests. Phase II Cost Match funding is contingent upon the number of applications, availability of funds, and proper certification of investor funds.

c. **Additional Reporting Requirement.**

In the company's final Phase II Progress Report, a brief accounting must be included (in the company's own format or format that has been provided by the DHS PM) of how the investor's funds were expended to support the project.

4.0 METHOD OF SELECTION AND EVALUATION CRITERIA

4.1 Introduction

SBIR Proposals will be processed and made available to the appropriate technical program manager within DHS for evaluation and action. DHS Program Managers may seek technical advice from Federal Government employees and/or from technical and business experts who may be non-Federal Government employees. In all cases, evaluators and advisors will be required to sign Certificates of Non-Disclosure and Statements of Financial Interest and will receive training regarding Procurement Integrity and Conduct required during the Source Selection process. Non-Government personnel may be used to handle the administrative functions for the SBIR Program. The support contractors will be bound by appropriate non-disclosure agreements to protect proprietary and source-selection information. They will not be permitted to release any source selection information to third parties, including others in their organization. DHS will select proposals for funding based on technical merit and the evaluation criteria contained in this Solicitation document.

Phase I SBIR proposals will be evaluated on a competitive basis and will be considered to be binding for six (6) months from the date of closing of this Solicitation unless the proposer states otherwise. If selection has not been made prior to the proposal's expiration date, proposers may be asked to extend their proposal for an additional period of time. Proposals meeting stated Solicitation requirements will be evaluated by scientists and/or engineers knowledgeable in the topic area. A proposal that meets the goals of a solicitation topic but does not use the exact approach specified in the topic will be considered relevant. (Prospective proposers should contact the DHS SBIR Program as described in Section 1.6 of this Solicitation to determine whether submission of such a proposal would be useful.)

Proposals will be evaluated using the criteria listed in Section 4.2 of this Solicitation (and Section 4.3 of this Solicitation for Phase II). Final decisions will be made based upon these criteria and consideration of other factors including possible duplication of other work and program balance. In the evaluation and handling of proposals, every effort will be made to protect the confidentiality of the proposal and any evaluations. There is no commitment by DHS to make any awards on any topic, to make a specific number of awards, or, to be liable for any costs expended by the proposer prior to award of any contract.

For proposals that have been selected for contract award, a Contracting Officer will prepare a contract to be signed by both parties before work begins. Any negotiations that may be necessary will be conducted between the proposer and the Contracting Officer. It should be noted that only a duly appointed Contracting Officer has the authority to enter into a contract on behalf of the U.S. Government.

Prior to receiving a contract award, the proposer must be registered in the Central Contractor Registration (CCR) database. For information regarding registration, call 1-888-227-2423 or visit <http://www.ccr.gov>.

Phase II proposals will be subject to a technical review process similar to Phase I. Final decisions will be made by DHS based upon the scientific and technical evaluations and other factors, including a commitment for Phase III follow-on funding, the possible duplication with other research or research and development, program balance, budget limitations, and the potential of a successful Phase II effort leading to a product of continuing interest to DHS. DHS is not obligated to make any awards under Phase II, and all awards are subject to the availability of funds. DHS is not liable for any costs expended by the proposer prior to award of a contract.

Upon written request and after final award decisions have been announced, evaluation results (in the form of the consensus review) will be provided to unsuccessful proposers on their Phase I and Phase II Proposals (see Section 6.4 of this Solicitation).

Restrictive notices notwithstanding, Phase I and Phase II proposals may be handled, for administrative purposes only, by support contractors. All support contractors will be subject to the terms of their signed non-disclosure agreements.

Phase I and Phase II proposals will be evaluated for strengths, weaknesses, and deficiencies using the following definitions:

- a. Strength - An aspect of a proposal that benefits the Government in terms of the quality of the Proposer's performance, cost effectiveness, or reduced risk and is expected to contribute to successful contract performance.
- b. Weakness - A flaw in the proposal that increases the risk of unsuccessful contract performance. A "significant weakness" in the proposal is a flaw that appreciably increases the risk of unsuccessful contract performance.
- c. Deficiency - A material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

The following adjectival ratings will be used in the evaluation of Phase I and Phase II proposals:

Excellent: A convincing demonstration that all SBIR FY 10.2 requirements are met or exceeded by the proposer's display of the highest levels of innovation, technical competence, personnel expertise, and potential for commercialization. The proposal fully and completely meets the expectations and sets forth plans and approaches that show a high probability of meeting DHS' S&T Directorate requirements. Proposals in this category are strongly recommended for funding. Has strengths that will significantly benefit the Government.

Very Good: Approaches and planning considerations demonstrate that the proposer is able to interpret goals and project them clearly into concise plans. Proposer demonstrates an awareness of the subtle interactions influencing system design; technical and planning efforts show strong promise of meeting DHS' S&T Directorate requirements. Proposals in this category are recommended for funding. Has one or more strengths that will benefit the Government.

Good: Plans and approaches are provided to the extent requested, and key or pivotal points have been satisfactorily addressed in the proposal. The proposer has presented an orderly plan to meet the stated goals, but the proposal does not necessarily demonstrate any exceptional features,

innovations, or originality. The technical analyses satisfactorily meet requirements and are technically correct. Funding of proposals in this category is dependent on availability of funds. Few or no strengths.

Fair: The proposal indicates a shallow understanding of the problem. The technical analyses only marginally meets the goals, and the proposer fails to demonstrate a reasonable probability of successfully performing the desired task or commercializing the resulting product. Funding of proposals in this category is dependent on availability of funds.

Unacceptable: Does not meet the SBIR FY 10.2 criteria. Not recommended for funding.

4.2 Evaluation Criteria - Phase I

DHS plans to select for award those proposals offering the best value to the Government and the Nation considering the following factors in decreasing order of importance:

- a. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
- b. The qualifications of the proposed principal/key investigators, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.
- c. The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization as assessed utilizing the criteria in Section 4.4 of this Solicitation.
- d. The cost realism and reasonableness of the Cost Proposal. The Cost Proposal will not be adjectively graded.

Members of the evaluation team may presume that the technical approach provided by the proposer serves as a rationale for the labor mix and labor hours used.

Technical reviewers will base their conclusions only on information contained in the proposal. It cannot be assumed that reviewers are acquainted with the proposer or key individuals or any referenced experiments. Relevant supporting data such as journal articles, literature, including Government publications, etc. should be contained or referenced in the proposal and will count towards the 25-page limit.

4.3 Evaluation Criteria – Phase II

The Phase II proposal will be reviewed for overall merit based upon the criteria below in decreasing order of importance:

- a. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
- b. The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization as assessed utilizing the criteria in Section 4.4 of this Solicitation.
- c. The qualifications of the proposed principal/key investigators, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.

- d. The cost realism and reasonableness of the cost proposal. The cost proposal will not be adjectively graded.

Members of the evaluation team may presume that the technical approach provided by the proposer serves as a rationale for the labor mix and labor hours used.

Phase II Proposal evaluations may include on-site evaluations of the Phase I effort by Government personnel.

4.4 Assessing Commercial Potential of Proposals

The commercial potential of a proposal will be assessed using the following criteria:

- a. The proposer's commercialization strategy [see Section 3.5.b (6) of this Solicitation] and, as discussed in that strategy:
 - (1) any commitments of additional investment in the technology during Phase II from the private sector, prime contractors, non-SBIR program or other sources, and
 - (2) any Phase III follow-on funding commitments; and
- b. The proposer's record of commercializing its prior SBIR Projects

A Company Commercialization Report showing that the proposing company has no prior Phase II awards will not affect its ability to receive an award. Such a company's proposal will be evaluated for commercial potential based on its commercialization strategy in item 4.4(a) of this Solicitation, above.

Government transition of the proposed effort is very important. The small business shall include its transition vision in the Commercialization Strategy. The small business must demonstrate an understanding of the planned use of their effort and the needs of the DHS customer/end user.

5.0 CONTRACTUAL CONSIDERATIONS

Note: Eligibility and Limitation Requirements (Section 1.3 of this Solicitation) will be enforced.

5.1 Phase I Awards

- a. **Number of Phase I Awards.** The number of Phase I awards will be consistent with the Science and Technology Directorate's budget and the number of anticipated Phase II contracts. No Phase I contracts will be awarded until all qualified proposals (received in accordance with Section 4.2 of this Solicitation) on a specific topic have been evaluated. Proposers will be notified of selection by a DHS designated Contracting Officer. After the Phase I awards are made, proposers will be notified of non-selection, generally within four months of the close of the Solicitation.
- b. **Type of Funding Agreement.** All winning proposals will be funded under negotiated contracts and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making concerns for R/R&D work. The firm-fixed-price acquisition vehicle will be used for all Phase I awards.
- c. **Average Dollar Value of Awards.** Phase I awards to small businesses will typically cover a one-half person-year effort over a period not to exceed six months (subject to

negotiation). Public Law 102-564 allows agencies to make Phase I awards up to \$ 100,000 without justification.

- d. **Timing of Phase I Awards.** The anticipated time between the date that this Solicitation closes and the award of the Phase I contract is approximately four (4) months.

5.2 Phase II Awards

- a. **Number of Phase II Awards.** The number of Phase II awards will depend upon the results of the Phase I efforts and the availability of funds. DHS anticipates that approximately 30 percent of its Phase I awards will result in Phase II projects. This is merely an advisory estimate and DHS reserves the right and discretion not to award any or to award less than or more than this percentage for each topic area.
- b. **Type of Funding Agreements.** Each Phase II proposal selected for an award will be funded under a negotiated contract and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making concerns for R/R&D work. The firm-fixed price acquisition vehicle or the cost-plus-fixed-fee acquisition vehicle may be used for the Phase II awards.
- c. **Average Dollar Value of Awards.** Phase II awards will typically cover two (2) to five (5) person-years of effort over a period generally not to exceed 30 months. PL 102-564 states that the Phase II awards may be up to \$750,000 each without justification.
- d. **Timing of Phase II Awards.** Phase II awards will be made incrementally, as quickly as possible, to maintain the momentum of the Phase I effort. The Phase II proposal invitation process is an attempt to identify expeditiously those Phase I awardees deserving of Phase II awards. DHS reserves the right to evaluate individual Phase II proposals when received and make Phase II proposal invitations incrementally, to some, all, or none of the Phase I participants.

5.3 Phase I Report

- a. **Content.** A Final Report is required for each Phase I project. The Report must contain in detail the project objectives, work performed, results obtained, and estimates of technical feasibility. In addition, Monthly Status Reports and Progress Reports will be required by DHS. The format for these reports will be mutually agreed upon between DHS and the potential awardee prior to contract award. Please keep in mind that the Monthly Status and Progress Reports and/or Final Reports will be used as a basis to determine progress made towards the accomplishments of Phase I technical objectives when DHS is considering its invitation of contractors to submit Phase II proposals.
- b. **Preparation.**
 - 1) If desirable, language used by the company in its Phase II proposal to report Phase I progress may also be used in the Final Report.
 - 2) For each unclassified report, the company submitting the Report shall specify one of the following statements it will use:
 - a) Approved for public release; distribution unlimited.

- b) Distribution authorized to U.S. Government Agencies only; contains proprietary information (SBIR Data Rights).

Note: Data developed under SBIR contract is subject to SBIR Data Rights which allow for protection under FAR 52.227-20. DHS, after reviewing the company's recommended distribution statement, has final responsibility for assigning a distribution statement.

- c. **Submission.** The company shall submit an electronic copy of the monthly reports and final report on each Phase I project in accordance with the Phase I contract and negotiated delivery schedule via the DHS website: <https://www.sbir.dhs.gov>. Submission of the monthly reports are normally every 30 days after the project start date, and the final report submission schedule will normally be within 15 days after completion of the Phase I technical effort. Contractors shall include the company name, topic number, proposal number and contract number in each report. Submission instructions will be provided in the awarded contract.

5.4 Commercialization Updates in Phase II

If, after completion of Phase I, the contractor is awarded a Phase II contract, the contractor shall be required to periodically update the following commercialization results of the Phase II project through the website at <https://www.sbir.dhs.gov>. Updates shall include the following:

- a. Sales revenue from new products and non-R&D services resulting from the Phase II technology;
- b. Additional investment from sources other than the federal SBIR Program in activities that further the development and/or commercialization of the Phase II technology;
- c. Whether the Phase II technology has been used in a fielded DHS system or acquisition program and, if so, which system or program;
- d. The number of patents resulting from the contractor's participation in the SBIR Program;
- e. Growth in number of firm employees; and
- f. Whether the firm has completed an initial public offering of stock (IPO) resulting, in part, from the Phase II project.

These updates on the project will be required one year after the start of Phase II, at the completion of Phase II, and subsequently when the contractor submits a new SBIR proposal to DHS. Contractors that do not submit a new proposal to DHS will be asked to provide updates on an annual basis for five (5) years after the completion of Phase II.

5.5 Payment Schedule

The specific payment schedule (including payment amounts) for each contract will be incorporated into the contract upon completion of negotiations between the Government and the successful Phase I or Phase II proposer. Successful proposers may be paid periodically as work progresses in accordance with the negotiated price and payment schedule. Phase I contracts are primarily firm-fixed-price R&D contracts, under which monthly payments may be made. Final payment will follow completion of contract performance and acceptance of all work required under the contract.

Phase II funding awards may be Cost Reimbursement type contracts. Interim payments will be permitted in accordance with the negotiated price and payment schedule. Provisions for payment of a fee or profit will be permitted. Final payment will follow completion of contract performance and acceptance of all work required under the contract. Milestone billing payments may be used by DHS in the Phase II contract awards.

5.6 Markings of Proprietary Proposal Information

The proposal submitted in response to this Solicitation may contain technical and other data that the proposer does not want disclosed to the public or used by the Government for any purpose other than proposal evaluation. Information contained in unsuccessful proposals will remain the property of the proposer except for the proposal cover sheet. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

If proprietary information is provided by a proposer in a proposal that constitutes a trade secret, proprietary commercial or financial information, or personal information or data affecting homeland security, it will be treated in confidence, to the extent permitted by law, provided that the "Proposal Contains Proprietary Information" checkbox on the Proposal Cover Sheet is checked and the information contained on each page is clearly marked by the proposer with the term "PROPRIETARY" (do not use "Company Confidential"), as discussed below. Note: the Cover Sheet cannot be marked as "Proprietary", as the abstract will be publicly disclosed if the proposal results in contract award. By checking the "Proposal Contains Proprietary Information" check box on the Proposal Cover Sheet, the following legend is assumed:

"This data, except the proposal cover sheet, shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal. If a contract is awarded to the proposer as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained on the pages of the proposal listed on the line below."

Use of any restrictive legend except that provided above will be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration. The Government will limit dissemination of properly marked information to within official channels.

In addition to checking the "Proposal Contains Proprietary Information" box on the Cover Sheet, each page of the proposal containing proprietary data which the proposer wishes to restrict must be marked with the following legend:

"Use or disclosure of the proposal data on lines specifically identified by asterisk (*) are subject to the restriction on the Cover Sheet of this proposal."

If all of the information on a particular page is proprietary, the proposer should so note by including the word "PROPRIETARY" (do not use "Company Confidential") in both the header and footer on that page. The Government assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

In the event properly marked data contained in a proposal in response to this Solicitation is requested pursuant to the Freedom of Information Act, 5 USC §552, the proposer will be advised of such request and prior to such release of information will be requested to expeditiously submit to DHS a detailed listing of all information in the proposal which the proposer believes to be exempt from disclosure under the Act. Such action and cooperation on the part of the proposer will ensure that any information released by DHS pursuant to the Act is properly determined.

5.7 Copyrights

With prior written permission from the Contracting Officer, the awardee may copyright and publish (consistent with appropriate homeland security considerations, if any) material developed with DHS support. DHS receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgment and disclaimer statement.

5.8 Patents and Invention Reporting

Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty-free license for its use, reserves the right to require the patent holder to license others in certain limited circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. SBIR awardees must report inventions to the awarding agency within two months of the inventor's report to the awardee. Awardees may report inventions to DHS through the Edison Invention Reporting System at www.iedison.gov. Use of the Edison System satisfies all invention reporting requirements mandated by any award.

5.9 Technical Data Rights

Rights in technical data, including software developed under the terms of any contract resulting from proposals submitted in response to this solicitation generally remain with the contractor, except that the Government obtains a royalty-free license to use such technical data only for Government purposes during the period commencing with contract award and ending four years after completion of the project under which the data were generated. Upon expiration of the four-year restrictive license, the Government has unlimited rights in the SBIR data. During the license period, the Government may not release or disclose SBIR data to any person other than its support services contractor except: a) for evaluation purposes; b) as expressly permitted by the contractor; or c) a use, release, or disclosure that is necessary for emergency repair or overhaul of items operated by the Government. Please refer to FAR clause 52.227-20, "Rights in Data -- SBIR Program."

5.10 Contractor Commitments

Upon award of a contract, the contractor shall be required to make certain legal commitments through acceptance of Government contract clauses in the Phase I Contract. The outline that follows is illustrative of the types of provisions required by the Federal Acquisition Regulations that will be included in the Phase I contract. This is not a complete list of provisions to be included in Phase I contracts, nor does it contain specific wording of these clauses. Copies of complete general clauses and provisions will be made available prior to contract award.

- a. **Standards of Work.** Work performed under the contract must conform to high professional standards.

- b. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all reasonable times.
- c. **Examination of Records.** The Comptroller General (or a fully authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.
- d. **Default.** The Government may terminate the contract if the contractor fails to perform the work contracted or fails to make progress during performance under the contract.
- e. **Termination for Convenience.** The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.
- f. **Disputes.** Any dispute concerning the contract that cannot be resolved by agreement may be decided by the Contracting Officer with a right of appeal.
- g. **Contract Work Hours.** The contractor may not require an employee to work more than eight hours a day or forty hours a week unless the employee is compensated accordingly (that is, receives overtime pay).
- h. **Equal Opportunity.** The contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
- i. **Affirmative Action for Veterans.** The contractor shall not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.
- j. **Affirmative Action for Handicapped.** The contractor shall not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
- k. **Officials Not to Benefit.** No member of, or delegate to Congress, shall benefit from the contract.
- l. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bona fide employees or commercial agencies maintained by the contractor for the purpose of securing business.
- m. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.
- n. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract.
- o. **Security Requirements.** The contractor shall safeguard any classified information associated with the contracted work in accordance with applicable regulations.
- p. **American-Made Equipment and Products.** When purchasing equipment or a product under the SBIR funding agreement, purchase only American-made items whenever possible.
- q. **Publications Approval.** Government review and approval will be required prior to any dissemination or publication, except within and between the contractor and any

subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract.

5.11 Contractor Registration

Before a contract can be awarded to a successful proposer under this Solicitation, the proposer must be registered in the Central Contractor Registration (CCR) database and the Online Representations and Certifications Application (ORCA). The CCR allows Federal Government contractors or concerns interested in conducting business with DHS to provide basic information on business capabilities and financial information. To register, visit <http://www.ccr.gov> or call 1-888-227-2423. Follow instructions found on the CCR website on how to obtain a Commercial and Government Entry (CAGE) code and DUNS number. ORCA is a web-based system that centralizes, standardizes, and moves the collection and storing of contractor representation and certifications online. To register in ORCA, visit <http://orca.bpn.gov/>.

5.12 Additional Information

- a. **General.** This Program Solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR Contract, the terms of the contract are controlling.
- b. **Small Business Data.** Before award of an SBIR contract, the Government may request the proposer to submit certain organizational, management, personnel, and financial information to confirm responsibility of the proposer in accordance with FAR Part 9.
- c. **Proposal Preparation Costs.** The Government is not liable for any costs expended by the proposer before award of any contract.
- d. **Government Obligations.** This Solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
- e. **Duplication of Work.** If an award is made pursuant to a proposal submitted under this Solicitation, the contractor shall be required to certify that he or she has not previously been, nor is currently being, paid for essentially equivalent work by an agency of the Federal Government.
- f. **Unsolicited Proposals.** The SBIR Program is a competitive program. Unsolicited Proposals *will not* be accepted under the DHS SBIR Program in either Phase I or Phase II. Phase III awards can only be made to recipients of Phase I or Phase II awards.
- g. **Classified Proposals.** Classified proposals will not be accepted under this DHS SBIR Solicitation.
- h. **Human/Animal Testing.** Funds cannot be released or used for any portion of the project involving human/animal testing until all of the proper approvals have been obtained in accordance with applicable regulations (see Section 2.0 of this Solicitation).
- i. **Adequate Accounting System.** In order to reduce the risk to the small business and avoid potential contracting delays, it is suggested that companies interested in pursuing Phase II SBIR contracts and other contracts similar in size with DHS, have an adequate accounting system per General Accepted Accounting Principles (GAAP), Generally Accepted

Government Auditing Standards (GAGAS), Federal Acquisition Regulation (FAR) and Cost Accounting Standards (CAS) in place. The accounting system will be audited by the Defense Contract Audit Agency (DCAA). DCAA's requirements and standards are available at the DCAA website www.dcaa.mil; click on "Publications" and then on "Information for Contractors".

- j. FAR Clauses 52.209-2 and 52.222-54 are incorporated into this Solicitation.

6.0 SUBMISSION OF PROPOSALS

Each Proposal must be submitted via the DHS electronic submission website at <https://www.sbir.dhs.gov> and contain a completed:

- Proposal Cover Sheet,
- Technical Proposal,
- Cost Proposal, and
- Commercialization Report (Phase II Proposals only).

6.1 Electronic Proposal Submission

For complete electronic proposal submission on the DHS electronic submission website, first prepare the Proposal Cover Sheets (select "Prepare/Edit Phase I Cover Sheet" from the Main Menu). The website will assign the Cover Sheet a Proposal Number, which will be used for tracking throughout the submission process. Prepare the Technical Proposal in a single Portable Document Format (PDF) file, check it for viruses, and upload it to the submission website, following instructions on the website. Do not use password protect, or encrypt your file. The Cost Proposal must be submitted on-line.

Technical Proposals must be a single file, including all graphics and attachments, should have the company name and proposal number (from the cover sheets) in the header, and must be in PDF. Proposers shall conduct a virus check on each Technical Proposal prior to uploading. Every uploaded file will be scanned for viruses by the DHS. If a virus is detected, the file will be deleted and may cause rejection of the proposal.

Once uploaded, the Technical Proposal file may be viewed or downloaded from the website by clicking on the Check Upload button. Proposers are responsible for verifying that the Technical Proposal was received and converted properly. Technical Proposals may be uploaded as often as necessary, each time overwriting the file previously submitted. Once a file is overwritten, the previous version is NOT retrievable. Proposers electing to modify their proposals in any way shall allow enough time to upload a complete updated proposal. Failure to provide a complete modification by the Solicitation closing will render the proposer's proposal as "late" regardless of whether the proposer had previously submitted a complete proposal. Proposals received after the deadline will not be accepted or evaluated.

Upon successful submission of your proposal, an email confirmation receipt will be forwarded to your email account. Signatures are not required on the Cover Sheets and Cost Proposal for electronic submission. If your proposal is selected for award, the DHS designated Contracting Officer will contact you for all appropriate signatures. Proposers are encouraged, but not required,

to have a CAGE code and DUNS number at the time of proposal submission; however, companies must obtain these before a contract can be awarded to the company.

6.2 Proposal Deadline

Proposals will be accepted from **May 11, 2010 – June 24, 2010**. The Deadline for electronic receipt of proposals is 2:00 PM EDST June 24, 2010. Proposals must be completely submitted to the DHS submission website by the specified closing time of 2:00 PM EDST, on June 24, 2010.

Complete submission means that the entire proposal (including the following three (3) parts: Cover Sheets, Technical Proposal, and Cost Proposal) has been properly completed and fully transmitted to the DHS submission website and electronically date stamped. The Solicitation deadline is firm. Late proposals will not be accepted or evaluated. Proposals received via any other means except the DHS submission website will not be accepted or evaluated. As the close date draws near, heavy traffic on the web server may cause delays. Plan ahead and leave ample time to prepare and submit your proposal. Proposers bear the risk of website inaccessibility due to heavy usage in the final hours before the Solicitation closing time. **In accordance with FAR 52.215-1, proposers are responsible for submitting proposals, and any modification, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the Solicitation.**

6.3 Notification of Proposal Receipt

Notification of receipt of each proposal will be provided via e-mail.

6.4 Information on Proposal Status

Evaluation of Phase I proposals and award of contracts will be expedited, but no information on proposal status will be available until the final selections are made. However, Contracting Officers may contact any and all qualified proposers prior to contract award. Selections will be posted on the DHS SBIR website when all selected proposals have been negotiated for award, generally within four months of the Solicitation closing time.

Evaluation of Phase II proposals will begin upon receipt of the proposals. DHS reserves the right to make Phase II awards incrementally as Phase II proposals are received and evaluated. Selections will be posted on the DHS SBIR website as awards are made.

6.5 Evaluation Results and Debriefing of Unsuccessful Proposers

Any proposer that submits a request within three (3) days of being notified of their proposal being selected or non-selected for award will be provided a copy of the evaluation results (i.e., the consensus review). The request must be emailed to STSBIR.PROPOSALS@dhs.gov. Be advised that a proposer that fails to submit a timely request is not entitled to a debriefing, although untimely debriefing requests may be accommodated at the Government's discretion.

6.6 Correspondence Relating to Proposals

All correspondence relating to proposals must cite the SBIR Solicitation Number, contractor's proposal number, and the specific Topic Number.

7.0 SCIENTIFIC AND TECHNICAL INFORMATION ASSISTANCE

7.1 SAFETY Act

Congress enacted the Support Anti-terrorism by Fostering Effective Technologies Act of 2002 (the “SAFETY Act”) as part of the Homeland Security Act of 2002. The SAFETY Act provides limitations on the potential liability of those concerns that develop and provide qualified anti-terrorism technologies. The DHS Science and Technology Directorate, acting through its Office of SAFETY Act Implementation, encourage the development and deployment of anti-terrorism technologies by making available the SAFETY Act’s system of “risk management” and “liability management.”

Proposers submitting proposals in response to this Solicitation are encouraged to submit SAFETY Act applications on their existing technologies and are invited to contact the Office of SAFETY Act Implementation (OSAI) for more information at 1-866-788-9318 or visit OSAI’s website at www.safetyact.gov.

7.2 Scientific and Technical Reference

Scientific and technical reference information is provided with each individual topic provided in Section 8.0 of this Solicitation.

7.3 State and Other Assistance Available

Many states have established programs to provide services to small concerns and individuals wishing to participate in the Federal SBIR program. These services vary from state to state, but may include:

- Information and technical assistance.
- Matching funds to SBIR recipients.
- Assistance in obtaining Phase II funding.

Contact your State SBIR Support office at www.ed.gov/offices/OERI/SBIR/statelink.html for further information.

Small businesses may seek general administrative guidance from small and disadvantaged business utilization specialists located in various activities throughout the continental United States.

8.0 TECHNICAL TOPICS

This Section contains detailed topic descriptions outlining the technical areas in which DHS requests proposals under this Solicitation for innovative R/R&D from small businesses. Topics are listed and numbered separately. A list of the topics currently eligible for proposal submission is included in this Section followed by full topic descriptions. These are the only topics for which proposals will be accepted at this time.

DHS invests in programs offering the potential for revolutionary changes in technologies that promote homeland security or accelerates the prototyping and deployment of technologies that reduce homeland vulnerabilities. Thus, the DHS SBIR goal is to pursue as many innovative

research ideas and concepts that promote homeland security with the potential for commercialization.

The technical topics provided in this DHS S&T SBIR FY 10.2 Solicitation to which small businesses may respond are UNCLASSIFIED. Classified Phase I Proposals will **not be accepted**. Although the topics are unclassified, the subject matter may be considered to be a “critical technology.” If a contractor plans to employ non-U.S. citizens in the performance of a DHS SBIR Contract, the contractor shall identify these individuals (including subcontractors and consultants) in its proposal as specified in Section 3.5.b (7) of this Solicitation.

ELECTRONIC SUBMISSION of Cover Sheet, Technical and Cost Proposal IS REQUIRED. Only proposals submitted through the on-line submission website at <https://www.sbir.dhs.gov> will be accepted or considered for award by the DHS. Proposals must be prepared and submitted in accordance with the instructions below.

HELPFUL HINTS:

Consider the file size of the technical proposal to allow sufficient time for uploading.

- Perform a virus check.
- Signature is not required at the time of submission.
- If you encounter problems during electronic submission call toll free at 1-800-754-3043.
- Facsimile (fax) or e-mail proposals submissions will not be accepted or evaluated.
- Proposals received after the deadline will not be accepted or evaluated.

Phase I SBIR Proposals shall not exceed \$100,000 and must be a **six-month or less effort**.

DHS Phase II Proposals may be recommended by the respective DHS S&T Phase I Program Manager and invited by the Contracting Officer. Phase II invitations will be based upon progress toward meeting the Phase I technical objectives, the technical results reflected in the monthly and/or final reports, site visits conducted by DHS, and plans for Phase II.

Prior to receiving a contract award, the small business **MUST** be registered in the Central Contractor Registration (CCR) Program. You may obtain registration information by calling 1-888-227-2423 and pressing 3 or at <http://www.ccr.gov>.

As funding is limited, DHS reserves the right to select and fund only those proposals considered to be superior in overall technical quality and highly relevant to the DHS mission. As a result, DHS may fund more than one proposal in a specific topic area if the technical quality of the proposal(s) is deemed superior, or it may not fund any proposals in a topic area.

Each proposal submitted to DHS must have a topic number and must be responsive to only one topic.

Cost proposals will be considered to be binding for 180 days from closing date of this Solicitation.

Successful proposers will be expected to begin work no later than 30 days after contract award.

For planning purposes, the Phase I contract award process is normally completed within 30 to 45 days from issuance of the selection notification letter to Phase I proposers. Unsuccessful proposers will be notified after all contracts are awarded. Phase I award information is posted on the website generally four months after the close of the solicitation.

DHS holds kick-offs meetings with all successful proposers approximately two weeks after contract award to discuss the SBIR Program and reporting, invoicing, technical objectives and other subjects.

Closed

**DHS S&T DIRECTORATE TOPICS -- DHS Small Business Innovation Research (SBIR)
Fiscal Year 10 Publication 1**

- H-SB010.2-001 Detector for Smuggled Currency**
- H-SB010.2-002 Next Generation Vacuum Systems for Hand-held Mass Spectrometers**
- H-SB010.2-003 Large-Scale Network Survivability, Rapid Recovery, and Reconstitution**
- H-SB010.2-004 Non-Detonable, Non-Hazardous, Low-Cost, Hexamethylene Triperoxide Diamine (HMTD) Training Aids for Canines**
- H-SB010.2-005 Automated Tool for Assessing Usability**
- H-SB010.2-006 Helmet with Embedded Active Display for Emergency Responders (HEADER)**
- H-SB010.2-007 Accelerating the Deployment of DHS Center of Excellence Research through Advanced Business Practices**
- H-SB010.2-008 Handheld Multisensor Wands for the Detection of Threat or Illicit Objects on Persons**
- H0SB010.2-009 Personal Situational Awareness App**

8.1 SBIR TOPIC NUMBER: H-SB010.2-001

TITLE: Detector for Smuggled Currency

TECHNOLOGY AREAS: Stand-off sensing; computer aided detection; material identification

OBJECTIVE: Develop a demonstrable prototype that will search for and identify bulk quantities of currency, principally U.S. and Canadian, secreted on persons, in hand baggage and luggage, and/or in privately owned vehicles.

DESCRIPTION: The Department of Homeland Security's Science and Technology (S&T) Directorate is seeking a device that will search for and identify bulk quantities of currency, principally U.S. and Canadian, secreted on persons in hand baggage and luggage, and/or in privately owned vehicles. The device can in no way present a risk or hazard to any persons being screened, their baggage, or their vehicles and should, to the extent possible, be operated without the knowledge of the persons being screened. The device shall be capable of screening a person, with luggage, at walking speed and vehicles being driven slowly through an inspection area. The resultant operator display will be of sufficient clarity and resolution to allow operator verification of any machine detections. Although the device may be mounted in a fixed configuration for use in a land inspection venue, it must be portable, or there must be a portable variant, to accommodate movement within the venue or movement to another venue.

PHASE I: Conduct a feasibility analysis to determine the technical merit of the proposed solution and generate a technology roadmap that includes schedule and costs for possible SBIR Phase II and Phase III efforts.

PHASE II: Develop a definitive set of requirements including capabilities, limitations, and theoretical effectiveness. Develop preliminary software, sensor, and material discrimination requirements. Design the operator interface and any operator aids and/or tools. Conduct modeling of the sensor/sensor management suite. Conduct an Analysis of Alternatives (AoA). Develop a sufficiently robust prototype device to demonstrate attainment of the requirements developed during Phase I in both the laboratory and in a field demonstration. Demonstrate the capability to detect smuggled currency in a typical border environment. Estimate, from a limited set of targets, the potential effectiveness of a production device. Refine the technology roadmap, cost and schedule estimates.

PHASE III: COMMERCIAL APPLICATIONS: Such a device has a significant potential in the Homeland Security area of responsibilities. It may also have application in commercial security areas such as banks, casinos, or other facilities that routinely handle large quantities of money.

REFERENCES:

High Priority Technology Needs, version 3.0, Homeland Security, May 2009;
http://www.dhs.gov/xlibrary/assets/High_Priority_Technology_Needs.pdf

One Team, One Mission, Securing Our Homeland, U.S. Department of Homeland Security Strategic Plan Fiscal Years 2008-2013;
http://www.dhs.gov/xlibrary/assets/DHS_StratPlan_FINAL_spread.pdf

Securing America's Borders at Ports of Entry, Office of Field Operations Strategic Plan FY 2007-2011, U.S. Customs and Border Protection;
http://www.customs.gov/linkhandler/cgov/border_security/port_activities/securing_ports/entry_points.ctt/entry_points.pdf

National Strategy for Homeland Security, Homeland Security Council, October 2007;
http://www.dhs.gov/xlibrary/assets/nat_strat_homelandsecurity_2007.pdf

KEY WORDS: currency; smuggling; imagery; detection; remote sensing

Closed

8.2 SBIR TOPIC NUMBER: H-SB010.2-002

TITLE: Next Generation Vacuum Systems for Hand-held Mass Spectrometers

TECHNOLOGY AREAS: Chemical/Biological/Explosives Detection

OBJECTIVE: Develop robust and inexpensive vacuum system technology to enable chemical, biological, and/or explosive detection with portable, hand-held mass spectrometers.

DESCRIPTION: Many modern detectors for chemical, biological, or explosive materials are generally too large to be used as hand-held devices. The primary applications for such hand-held instruments include public safety, environmental monitoring, quality control, food safety, forensics, security, defense, and clinical diagnostics. Hand-held instruments must be sensitive, able to detect a wide variety of target compounds in a matter of seconds, reliably discriminate between innocuous and harmful compounds with low false positive and false negative rates, and be inexpensive. One of the biggest factors preventing the development of truly low-cost and portable chemical, biological, and explosives material detectors is the cost, size, and power demands of the high vacuum system required for their operation. The development of the vacuum system should enable the overall detector to be inexpensive, low power, robust towards environmental conditions as well as mechanical shock, and require minimal maintenance. Proposals should detail why and how the proposed vacuum system technologies will substantially improve the state-of-the-art; projected dates for likely operational field deployment should be stated.

PHASE I: Develop and demonstrate feasibility of the technology via bench testing of a next-generation vacuum system design concept that can enable hand-held mass spectrometers as a complete sensor package for field applications. Collect and document the evidence for the eventual miniaturization and low cost for the overall system and/or components. Include a preliminary analysis of manufacturability.

PHASE II: Produce prototype next-generation vacuum systems. Demonstrate the next-generation vacuum systems integrated with mass spectrometers in a portable form factor in an application important to the DHS. Some testing in operationally relevant environments will be required. Data supporting anticipated cost, power, maintenance, sensitivity, and selectivity (false alarm rates) must be acquired and reported on.

PHASE III: COMMERCIAL APPLICATIONS: Working with DHS program managers and commercial suppliers of detectors, provide working models of the developed technology for integration into commercial-off-the-shelf (COTS) portable mass spectrometers for biological, chemical and/or explosive materials detection. Phase III effort should focus on transition back into applicable DHS programs via support of

low rate initial production (LRIP) of systems and independent test and evaluation of the overall systems (vacuum technology integrated with COTS detectors).

REFERENCES:

Liang Gao, Qingyu Song, Garth E. Patterson, R. Graham Cooks, and Zheng Ouyang, "Handheld Rectilinear Ion Trap Mass Spectrometer", *Analytical Chemistry*, 2006, 78(17), 5994-6002

Adam Keil, Heriberto Hernandez-Soto, Robert J. Noll, Miriam Fico, Liang Gao, Zheng Ouyang, R. Graham Cooks, "Monitoring of Toxic Compounds in Air Using an Handheld Rectilinear Ion Trap Mass Spectrometer", *Analytical Chemistry*, 2008, 80, 734-741

Liang Gao, Andy Sugiarto, Jason D. Harper, R. Graham Cooks, Zheng Ouyang, "Design and Characterization of a Multisource Hand-Held Tandem Mass Spectrometer", *Analytical Chemistry*, 2008, Accelerated Article

Kenton, M. A. and Kline-Schoder, R., "Innovative Vacuum Pumps to Support Mass Spectrometry in Harsh Environments," Presented at: 4th Harsh-Environment Mass Spectrometry Workshop, St. Petersburg Beach, FL, 7-10 Oct 2005

Kline-Schoder, R. and Sorensen, P., "Miniature High Vacuum Pumps for Analytical Instruments," Presented at: 6th Harsh-Environment Mass Spectrometry Workshop, Cocoa Beach, FL, 17-20 Sept 2007

KEY WORDS: hand-held mass spectrometer; high vacuum system; detection of chemical, biological and explosive threat materials

8.3 SBIR TOPIC NUMBER: H-SB010.2-003

TITLE: Large-Scale Network Survivability, Rapid Recovery, and Reconstitution

TECHNOLOGY AREAS: Cyber security

OBJECTIVE: Develop technologies that support continued network operation in the presence of successful attacks.

DESCRIPTION: Today, our networks are largely defenseless against sophisticated adversary cyber attacks because of the lack of supporting tools and technology. Such attacks make systems unusable, degrade performance, lead decision-makers to make poor decisions due to faulty data, leak valuable secrets, and leave behind code that could provide continuing back-door access or be activated on a pre-determined event to take obstructive action. Government systems are vulnerable due to increased interconnection and connection to the Internet. Additional vulnerabilities exist in common COTS products and can be exploited by adversaries trying to attack government systems. The trend toward dominant use of commercial products and the increased use of mobile dynamic code significantly exacerbates an already hard problem of providing information assurance for emerging systems and networks.

This topic focuses primarily on the development of network technologies that will allow the networks of the future to be resilient to attacks and continue to provide network services. This topic area is aimed at the development of new approaches and technologies that allow networks to be self-monitoring, self-diagnosing, and self-repairing. The goal is to achieve long-term secure network operation with minimal human intervention. These new network technologies will be demonstrated individually and integrated together (where appropriate) to provide requisite capabilities within several challenge scenarios.

The technologies developed within this topic will leverage previous work in fault tolerant systems and apply these technologies to the networks of the future. This will reduce the amount of damage sustained during an attack and allow the networks to maintain an acceptable, minimum level of functionality. These include technologies for strengthening networks by introducing fault tolerance capabilities against possible attacks at the network level, emphasizing integrity and availability; and technologies for mitigating potential vulnerabilities associated with denial of service and other resource attacks. Additionally, technologies that address attack response mechanisms, using “active” network technology, and allow the networks of the future to assist in their own protection and be more tolerant of future attacks are encouraged.

PHASE I: Describe architectures or demonstrate prototypes of new networking technologies or integrated services capable of providing network protection using any of the following capabilities, but not limited solely to these mechanisms: self-monitoring, self-diagnosing, self-repairing, network resource defenses, fault tolerant techniques, and

“active” network defenses. Proofs-of-concept for integrated services may combine existing tools and techniques, applying new services to operational network environments.

PHASE II: Implementation and availability of operationally ready tools, methods, mechanisms, and services with initial results capable of being demonstrated in operational network environments.

PHASE III COMMERCIAL APPLICATIONS: Technology can be available to commercial network service providers. Additionally, transition into DHS programs such as Homeland Secure Information Network (HSIN) is possible.

REFERENCES:

Banking and Finance Sector R&D Agenda, Challenge #2, p. 1, 2008

National Research Council, “Toward a Safer and More Secure Cyberspace”, Category 5, p. 199, 2007

Federal Plan for Cyber Security and Information Assurance Research and Development, Fault Tolerant and Resilient Systems, p. 83, 2006

Infosec Research Council Hard Problems List, Problem #3 – Availability of Time-Critical Systems, p. 16, and Problem #4 – Building Scalable Secure Systems, p. 19, 2005

President’s Information Technology Advisory Committee (PITAC), “Cyber Security: A Crisis of Prioritization”, Research Priority #4, p. 40, and Research Priority #6, p. 42, 2005

KEYWORDS: resilience; survivability; recovery; reconstitution; self-healing; attack tolerant

8.4 SBIR TOPIC NUMBER: H-SB010.2-004

TITLE: Non-Detonable, Non-Hazardous, Low-Cost, Hexamethylene Triperoxide Diamine (HMTD) Training Aids for Canines

TECHNOLOGY AREAS: Canine explosives detection

OBJECTIVE: Development of non-detonable, non-hazardous, low-cost HMTD training aids to support canine explosives detection operations.

DESCRIPTION: Canines are utilized by multiple DHS components for explosives detection in a wide range of settings. All canines that are selected to become explosive detection canines undergo initial and maintenance training with the odors they are expected to detect. Current training practices utilize the actual explosives and chemicals used in the making of explosives. Current practices are manpower intensive, costly, and dangerous – i.e., personnel trained to handle explosive materials are required to conduct training. The explosive material must be handled, stored, and disposed of according to local, state, and federal explosives regulations. Finally, the nature of explosives creates a risk of injury to the canine and its handler.

This topic area seeks a non-detonable, non-hazardous, low-cost canine training aid that can be used to train canines to detect HMTD. The proposed training aid shall have minimal background odor chemicals that do not potentially trigger false alerts. The proposed training aid should have the following objectives: session life (training) for the proposed training aid is between 2 and 4 hours; shelf life for the training aid in original packaging would ideally be at least 18 months, and the cost per proposed multi-use training aid is between \$1 and \$5. The proposed training aid should not have any special handling requirements (i.e., does not require handling, storage, and disposal according to explosives regulations).

PHASE I: Demonstrate the feasibility of the proposed approach to the development of the training aid. Describe and document the process of making the aid and demonstrate the physiochemical properties of the proposed training aid. Odor signature of the proposed training aid should be compared to the explosive source and documented.

PHASE II: Develop and deliver 100 prototype training aids for testing with canine teams. Prototype training aids will be developed to provide a canine training session use time of at least 1 hour, and a shelf life of 12 months. Provide a detailed methodology to deliver up to 1000 training aids per month.

PHASE III COMMERCIAL APPLICATIONS: Multiple DHS components operate canine explosives detection teams. These DHS components can use the developed HMTD canine training aids to supplement current canine explosives detection training, lower the cost of training the canine on HMTD, increase the frequency of canine HMTD training, and increase safety of the canine and handler during training.

REFERENCES:

“SWGDOG SC7 – Research & Technology.” [http://www.ifri.fiu.edu/SWGDOG/SC7 for public site 4 11 2007.pdf](http://www.ifri.fiu.edu/SWGDOG/SC7_for_public_site_4_11_2007.pdf)

“SWGDOG SC8– Substance Detector Dogs Explosives Detection.” <http://www.ifri.fiu.edu/SWGDOG/SC8%20Explosives%20for%20site%2011-07.pdf>

KEY WORDS: canine explosives detection

Closed

8.5 SBIR TOPIC NUMBER: H-SB010.2-005

TITLE: Automated Tool for Assessing Usability

TECHNOLOGY AREAS: Usability; evaluation; user interface

OBJECTIVE: Develop and demonstrate an automated tool to support the planning and conduct of usability evaluations of the user-computer interface (UCI). This tool will be used for the design, test and evaluation of systems and technologies being developed by DHS elements and operational components. The tool should be suitable for deployment in an operational environment with a fielded system, as well as at a workstation in a laboratory setting.

DESCRIPTION: Poorly designed UCIs have been a continual problem for operators and maintainers of complex computer-based technologies and systems. Usability deficiencies have directly affected the affordability and acceptability and transition of those technologies to their intended customers and end users. Lesson learned compilations by the military and private industry indicate that more than 50% of identified problems in software development resulted from deficiencies in the design of the UCI. Furthermore, the importance of the design for usability in software development is evident in that the UCI accounts on average for a significant percentage (47% to 60%) of the total lines of code and at least 10% of software development budgets. In addition, a large percentage (50%) of the life cycle costs associated with software systems are due to changes required to improve the UCI due to unmet/unforeseen user requirements after the system has been deployed. Being able to better assess UCIs in a development environment is likely to significantly reduce costs associated with development, redesign, training, maintenance, and support.

Difficulties in efficiently conducting reliable usability evaluations of the UCI in the software development process, and our limited capacity to automate the usability assessment process constitute an important capability gap. A tool that can fully or partially automate some of the related tasks will go a long way toward closing this gap. The tasks the contemplated tool and related research must accomplish are: (1) enhancing thoroughness, effectiveness and efficiency in the identification of evaluation requirements and the generation of a usability test plan; (2) acquiring and logging evaluation data; and, (3) incorporating a set of UCI guidelines to be used in the analysis of the evaluation data. The approach to these tasks should be built on current usability evaluation methodology. The resulting automated tool should be portable, easy-to-use, and compatible across workstations and fielded systems.

PHASE I: The Phase I effort will produce a concept of operations for the tool, define the tool software and UCI requirements, and identify the host application(s) under which the tool will run. The host must be generally available to prospective users. Example use scenarios will be identified describing conditions, functions, and tasks for a representative DHS system application. A model of user-tool interactions and

transactions in representative tool use situations will be developed. Finally, the effort will develop and demonstrate a conceptual design for the tool, including user interfaces. The final report should include a plan for the Phase II effort.

PHASE II: Develop and demonstrate a functional prototype of the tool in various use cases to support validation of a Concept of Operations. The functional prototype will contain the database of the design criteria, user interface and decision support capabilities of the final tool. The prototype will be demonstrated and tested in Phase II and the products of this phase will be a functional representation of the final tool. User support/training documentation will also be provided in this phase.

PHASE III COMMERCIAL APPLICATIONS: This tool would be available for usability evaluation for a wide range of DHS, military, civilian organizations and private companies that develop technologies and systems requiring a UCI.

REFERENCES:

Dray, S.M. (1992). "Understanding and Supporting Successful Group Work in Software Design." Proceedings of the Computer-Supported Cooperative Work Conference, New York, Association for Computing Machinery Press

Helander, M. (Ed.) (1988). Handbook of Human-Computer Interaction, Elsevier

Lewis, J.R. (2006). "Usability Testing." Salvendy, G. (Ed.). Handbook of Human Factors and Ergonomics, Wiley

Seffah, A., J. Gulliksen, and M.C. Desmarais (Eds.) (2005). Human-Centered Software Engineering: Integrating Usability in the Software Development Life Cycle, Springer

Shneiderman, B. and C. Plaisant (2005). Designing the User Interface, 4th edition, Pearson

KEY WORDS: usability, design and evaluation; user-computer interface; automated software development; human performance; graphical user interface; human factors

8.6 SBIR TOPIC NUMBER: H-SB010.2-006

TITLE: Helmet with Embedded Active Display for Emergency Responders
(HEADER)

TECHNOLOGY AREAS: Flexible displays and IC Technology; miniaturization; mobile wireless intelligent computing; human machine interface

OBJECTIVE: Develop a next generation helmet with an embedded heads up display for personal situational awareness for emergency responders

DESCRIPTION: The safety of emergency responders, for example firefighters, is of utmost importance during incident operations. Currently, responders carry a variety of gear such as an air tank, radios, and a Personal Alert and Safety System (PASS). It is anticipated that in the future, they will also rely on new technologies for location tracking and health monitoring. The ability to integrate all of these signals and status parameters into a readily available display for the responder will enhance situational awareness for the person and will lead to better decision making, response tactics, maneuvers, and response effectiveness.

Similar to how astronauts are equipped with a set of integrated sensors and a visor, this SBIR topic seeks and envisions a next-generation helmet with an embedded active heads-up display that is modular and will integrate with current or next generation personal protective equipment (PPE) facemasks and helmets. It will provide a localized advanced situational awareness by displaying read-outs and alerts of multiple sensors worn by the first responder, such as current PASS and future technologies (location, physiological status info, air status, internal/external temperature status, range finder, etc.) The helmet display will be able to switch from normal to enhanced mode and be able to augment the actual scene. The system will process and display personnel data from body-worn devices and will integrate necessary alert information to help the emergency responders. It is anticipated that the system will use low-power, operate in extreme environments (humidity, temperature, haze, smoke, etc.), be lightweight and will not impact response operations movements and can transfer data periodically, through body worn wireless networks or similar small efficient wireless radios, to command posts away from the scene of an incident.

PHASE I: Develop concepts for a viable helmet with embedded heads-up display and an innovative method for integrating various status parameters as mentioned above. The concept should describe the state of technologies, e.g., displays, user interface, data visualization/representation, and identify the gaps that must be overcome. To the extent possible, the development may include the use of simulation models as well as concept prototypes to demonstrate the validity and performance of the proposed solution.

PHASE II: Develop a prototype of the concept. Evaluate the prototype in a simulated operational environment. Conduct tests of the prototype using multiple real/simulated sensors in representative operating environments.

PHASE III: COMMERCIAL APPLICATIONS: The HEADER system has significant commercial applications with the directly intended end users, as well as indirect related applications such as the medical, sports, telecom, and many other critical infrastructure sectors. HEADER units could be produced by various manufacturers thereby creating a market for this capability in numerous flexible configurations for both responders as well as other civilian and military applications.

REFERENCES:

Pope, Stephen, "The future of head-up display technology, January 1, 2006:
<http://www.ainonline.com/news/single-news-page/article/the-future-of-head-up-display-technology/>

NASA Ames Research Center (ARC), Human Centered Systems Lab <http://human-factors.arc.nasa.gov/ih/hcsl/publications.html#SADisplays>

KEY WORDS: heads up display; sensor integration; user interface; human machine interface; mobile computing; fusion algorithms

Closed

8.7 SBIR TOPIC NUMBER: H-SB010.2-007

TITLE: Accelerating the Deployment of DHS Center of Excellence Research through Advanced Business Practices

TECHNOLOGY AREAS: rapid research transition; rapid technology transition; computer science; visual analytics; data analytics

OBJECTIVE: Develop innovations for enabling DHS components and first responders to more readily access and utilize advancements in visual and data analytics capabilities. Seeks to radically shorten the time from the availability of an enabling capability to its widespread use by DHS stakeholders and first responders.

DESCRIPTION: Members of the Information Age are remarkable at generating data. The Internet is teeming with a constantly growing number of websites, many now with associated “blogs,” e-mail continues to consume more of our time and reports, proposals and other documents are regularly produced in industry, academia and elsewhere. Despite this propensity to create, share and replicate data, the Age is considerably slower in leveraging and learning from this data. Information application for many reasons, does not keep pace with data generation; thereby important and actionable information is regularly missed, overlooked, or not applied in a timely manner. This motivates the need to develop and deploy technologies that aid human users in understanding, exploring and integrating information, including in homeland security applications.

The field of visual and data analytics directly addresses this need by combining visualization techniques with data analytics technologies. However, despite the significant progress made in recent years in the development of advanced techniques for visual and data analytics, the adoption of these technologies lags behind the market demand.

One of the challenges facing the first responder and homeland security communities is the plethora of options for visual and data analytics tools. It is extremely difficult for an end-user to make sense of all the many options. The DHS Science & Technology Directorate is also generating visual and data analytic components through the Centers of Excellence program. In order to effectively disseminate the many commercial and DHS S&T technologies to first responders, a new paradigm of distribution may be needed.

PHASE I: Develop advanced concepts for enabling DHS operating components and first responders to more readily access and deploy the plethora of visual and data analytics capabilities that have been developed.

PHASE II: Develop and demonstrate a prototype implementation of the Phase I concept. Test and evaluate it in a real-world environment. The Phase II project will result in a demonstration of the concept with a selected subset of analytic tools and a set of DHS stakeholders.

PHASE III: COMMERCIAL APPLICATIONS: Establish a capability for effective and responsive interaction with potential users to: (a) define needs and requirements; and (b) specify timely customization, installation and continuing support services. Complete product development and install product in a number of real world DHS operating sites.

REFERENCES:

National Visualization and Analytics Center, <http://NVAC.PNL.GOV>

DHS High Priority Technology Needs, http://www.dhs.gov/xlibrary/assets/High_Priority_Technology_Needs.pdf

Wikipedia Definition – Long Tail, http://en.wikipedia.org/wiki/Long_Tail

DHS Homeland Security Centers of Excellence, http://www.dhs.gov/files/programs/editorial_0498.shtm

KEY WORDS: computer science; visual analytics; data analytics; rapid research; rapid transition; rapid technology transition

Closed

8.8 SBIR TOPIC NUMBER: H-SB010.2-008

TITLE: Handheld Multisensor Wand for the Detection of Threat or Illicit Objects on Persons

TECHNOLOGY AREAS: analytical chemistry; molecular physics; nuclear magnetic resonance; nuclear quadrupole resonance; eddy currents; electrochemical impedance spectroscopy; electric impedance tomography; sensors

OBJECTIVE: Develop a robust handheld system for the bulk properties detection of threat or illicit objects hidden on a person's body, under clothing or in body cavities.

DESCRIPTION: Checkpoint security incorporates a wide variety of screening technologies and processes to detect person-borne threats and illicit objects, including weapons, explosives, and narcotics. Individuals attempting to circumvent checkpoint security have resorted to a variety of techniques to avoid detection, including hiding threat or illicit objects under clothing and in body cavities. Techniques for the detection of hidden or body cavity embedded objects, both conductive and non-conductive, are being sought for deployment at security checkpoints, and the development of novel methods for detection of these objects is encouraged.

Transportation Security Administration (TSA) Security Officers screen passengers and their carry-on baggage at airport checkpoints prior to departure gate access. U.S. airlines set an annual record by carrying 769.4 million scheduled domestic and international passengers on their systems in 2007. A TSA checkpoint screens about 200 passengers per hour. TSA is proceeding with limited deployment of Advanced Imaging Technologies (AITs), such as millimeter wave or backscatter x-ray, to enable checkpoint screeners to detect non-metallic anomalies located under clothing. While very effective at detecting anomalies, AITs are generally unable to identify an object, cannot interrogate body cavities - and have raised privacy issues.

All persons arriving at a port of entry to the United States are subject to inspection by U.S. Customs and Border Protection (CBP) Officers. Such officers are required to question all arriving persons to determine whether they are admissible to the U.S. and may also examine baggage or vehicles. There are 327 official ports of entry in the United States and 15 Preclearance offices in Canada and the Caribbean. Every year, CBP processes nearly half a billion people, 130 million trucks and cars, and 20 million cargo containers at ports of entry.

Emerging technologies such as Nuclear Magnetic Resonance (NMR), Nuclear Quadrupole Resonance (NQR), and Electrochemical Impedance Spectroscopy (EIS) offer the potential for a new type of handheld sensor that can detect threat or illicit objects hidden on a person's body, under clothing or in body cavities. Many scientific techniques exploit NMR phenomena to study molecular physics and materials through NMR spectroscopy. Recent work with ex situ NMR technology, which operates with ultra-low field strength, suggests that a small, handheld device could be developed for the

detection of threat liquids and semi-solids. NQR or “zero field NMR” has been employed in portable mine detectors. EIS is being widely employed in a wide variety of scientific fields such as fuel cell testing, biomolecular interaction, and microstructural characterization.

While NMR, NQR, and EIS may provide the desired capabilities, other innovative approaches will also be considered for a handheld multisensory wand which would be of interest to various DHS components and other security forces.

PHASE I: Design a non-imaging handheld multisensory system for the bulk detection of threat and illicit objects hidden on a person’s body, under clothing or in body cavities. Describe the achievable signal to noise ratio for the appropriate sensor against a user defined set of threat and illicit objects. Evaluate the affect of different environments and hiding locations on the ability to detect distinct signatures. Deliver a detailed report on the design, including acquisition and operating costs.

PHASE II: Fabricate and demonstrate a prototype of the Phase I handheld multisensory system. Verification and validation in the prototype demonstration shall be achieved through empirical analysis, simulations, and/or other quantitative means. This analysis shall include, but not to be limited to: the probability of detection and false detection rate (characterized by a Relative Operating Characteristic or ROC curve) for a user defined set of threat and illicit objects in an operational environment. The potential for threat and illicit objects to be camouflaged shall also be assessed. Deliver a detailed report of the effort and its results.

PHASE III: COMMERCIAL APPLICATIONS: Incorporate lessons learned in Phase II and develop a mature handheld multisensory system for independent evaluation by the Transportation Security Lab (TSL). Adoption of this handheld multisensory system will depend upon performance and cost. Checkpoint screening is ubiquitous, and the potential market for a robust system is considerably greater than that offered by DHS components including TSA and CFP.

REFERENCES:

Bart Elias, Airport Passenger Screening: Background and Issues for Congress, Congressional Research Service R40543, April 23, 2009

Juan Perlo, Federico Casanova, and Bernhard Blumich, Ex Situ NMR in Highly Homogeneous Fields: 1H Spectroscopy, Science Vol. 315, February 23, 2007

Sankaran Kumar and Pablo Prado, Detection of Concealed Liquid Explosives and Illicit Drugs in Unopened Bottles, Explosives Detection Using Magnetic and Nuclear Resonance Techniques, Springer Science + Business, 2009

Michelle Espy et al, Ultra-low Field MRI for the Detection of Liquid Explosives Using SQUIDS, IEEE/CSC & ESAS European Superconductivity News Forum (ESNF), No. 8, April 2009

A. N. Garroway, M. L. Buess, J. B. Miller, B. H. Suits, A. D. Hibbs, G. A. Barrall, R. Matthews, and L. J. Burnett, Remote Sensing by Nuclear Quadrupole Resonance (NQR), *IEEE Transactions on Geoscience and Remote Sensing*, No. 39, 2001, pp. 1108–1118

Jörg Mauler, Ernesto Danieli, Federico Casanova and Bernhard Blümich, Identification of Liquids Encountered in Carry-On Luggage by Mobile NMR, In [*Explosives Detection Using Magnetic and Nuclear Resonance Techniques*](#) (pp. 193-203), 2009, Springer Netherlands

Evgenij Barsoukov and J. Ross Macdonald (eds), *Impedance Spectroscopy: Theory, Experiment, and Applications, Second Edition*, John Wiley & Sons, Inc., Hoboken, New Jersey, 2005

KEY WORDS: nuclear magnetic resonance; nuclear quadrupole resonance; explosives detection; narcotics detection; handheld multisensory; checkpoint security

Closed

8.9 SBIR TOPIC NUMBER: H-SB010.2-009

TITLE: Personal Situational Awareness App

TECHNOLOGY AREAS: Mobile computing; information sharing; collaboration

OBJECTIVE: Develop a downloadable commercial software app that provides situational awareness to individuals based on their location and/or stated location.

DESCRIPTION: State and local responders often have information that they find useful for dissemination to the public at large. The creation and distribution of cellular phone applications providing direct connections to public communications, such as the police and fire radio channels, have been established and make it possible for individuals to monitor events that are taking place in their surrounding area, or in a specific area of interest. These applications enable the public to listen in live and demand a constant level of attention in order to glean information of utility to an individual. Still, other applications make it possible for users to subscribe to specific areas of coverage and receive information that is pushed explicitly into the subscriber space of public officials.

In this effort, DHS is seeking to automate public opportunities to gain useful situational awareness information through a new commercial service that enables individuals to subscribe to an information push service that condenses and possibly qualifies information that responders feel are useful for public consumption. For example, a subscriber could be interested in knowing if a sex offender has moved into their neighborhood, or if a fire has been reported on their block, or that an accident has occurred within 10 miles of their travel location. Each of these alert services could be enabled through a robust software application that makes use of publically available information and the user's current location.

Solutions to this problem may take many forms, and there is no specific technical solution favored over another. Sample solution scenarios are provided to provoke thought and encourage competition in the solution space. In a first example, it may be possible to monitor public radio transmissions, automatically converting speech to text. Any personally identifiable information is suppressed and local chatter is ignored. From the text that is generated, key information may be extracted to determine the presence and type of a handful of events and their location. For example, a fire has been reported at a specific address. Because this information is not validated, perhaps the app can determine the validity of the reported information, and depict the status using color codes or key words, e.g., Report of a fire at location X (2 miles from your location), or Suspected burglary at location Y (in your vicinity). These events might be noted on a map, or through another equally convenient contextual interface. Some jurisdictions might be more sophisticated and allow transmission of controlled and limited segments of structured text database information to the service, making it possible to report information without the sophisticated analytics suggested in the first example.

Regardless of the solution proposed, processing must be scalable to mobile computing platforms, and methods for creating and maintaining the application should be efficient, promote efficient information sharing, and create a service from the broadest collection of publically available sources as possible. The application should be available and executable on a wide variety of devices, making it possible for a broad segment of the population to utilize and subscribe to the variety of alert services. The resultant product should also ultimately be available to users at a low cost, enabling wide adoption.

REFERENCES:

“Automatic Content Extraction”. National Institutes of Standards and Technology. <http://www.itl.nist.gov/iad/mig//tests/ace/> (16 Jan 2009).

Martin, James A. “From Speech to Text.” http://www.pcworld.com/article/138262/from_speech_to_text.html (10 October 2007).

Ostendorf, Favre, Grishman, Hakkani-Tur, Harper, Hillard, Hirschberg, Ji, Kahn, Yui, Maskey, Matusov, Ney, Rosenberg, Shriberg, Wang & Woollers Speech Segmentation and Spoken Document Processing. IEEE Signal Processing Magazine. May 2008. pp 59-69.

KEY WORDS: mobile computing; information application; personal safety awareness

CLOSED

9.0 DHS SBIR FY 10.2 PHASE I SBIR CHECKLIST

Page Numbering:

- Number all pages of your proposal consecutively; the Cover Sheets count as pages 1 and 2 no matter how they print out; the Technical Proposal begins on page 3
- Total for each Phase I proposal is 25 pages inclusive of Cover Sheets, Technical Proposal, Cost Proposal and resumes
- Beyond the Phase I 25-page limit, do not send appendices, attachments and/or additional references

Proposal Format:

- Cover Sheet, Technical and Cost Proposals MUST be submitted electronically at <https://www.sbir.dhs.gov>

The Technical Proposal Must Address:

- Identification and Significance of the Problem or Opportunity
- Phase I Technical Objectives
- Phase I Work Plan
- Related Work
- Relationship with Future Research or Research and Development
- Commercialization Strategy
- Key Personnel, Resumes
- Facilities/Equipment
- Subcontractors/Consultants
- Prior, Current, or Pending Support of Similar Proposals or Awards

Final Checklist:

- The Cover Sheet was prepared on-line
- The Technical Proposal was uploaded in pdf (file is not locked, password protected, or encrypted)
- The Cost Proposal was submitted on-line and shows detailed cost and fee/profit breakout and the total cost and fee/profit are also listed on the Cover Sheet. The total cost and fee/profit shown on the Cost Proposal matches the cost and fee/profit listed on the Cover Sheet.
- The “Finalize/Submit Proposal” button was selected to transmit the completed proposal to DHS
- Email confirmation of the receipt of your Proposal was received
- SBIR Help Desk. Phone: 1-800-754-3043; email: sbirhd@sainc.com

10.0 FAR CLAUSES:

52.209-2 Prohibition on Contracting with Inverted Domestic Corporations - Representation. (Jul 2009)

(a) *Definition.* “Inverted domestic corporation” means a foreign incorporated entity which is treated as an inverted domestic corporation under [6 U.S.C. 395\(b\)](#), *i.e.*, a corporation that used to be incorporated in the United States, or used to be a partnership in the United States, but now is incorporated in a foreign country, or is a subsidiary whose parent corporation is incorporated in a foreign country, that meets the criteria specified in [6 U.S.C. 395\(b\)](#), applied in accordance with the rules and definitions of [6 U.S.C. 395\(c\)](#).

(b) *Relation to Internal Revenue Code.* A foreign entity that is treated as an inverted domestic corporation for purposes of the Internal Revenue Code at [26 U.S.C. 7874](#) (or would be except that the inversion transactions were completed on or before March 4, 2003), is also an inverted domestic corporation for purposes of [6 U.S.C. 395](#) and for this solicitation provision (see FAR [9.108](#)).

(c) *Representation.* By submission of its offer, the offeror represents that it is not an inverted domestic corporation and is not a subsidiary of one.

(End of provision)

52.222-54 Employment Eligibility Verification. (Jan 2009)

(a) *Definitions.* As used in this clause—

“Commercially available off-the-shelf (COTS) item”—

(1) Means any item of supply that is—

(i) A commercial item (as defined in paragraph (1) of the definition at [2.101](#));

(ii) Sold in substantial quantities in the commercial marketplace; and

(iii) Offered to the Government, without modification, in the same form in which it is sold in the commercial marketplace; and

(2) Does not include bulk cargo, as defined in section 3 of the Shipping Act of 1984 ([46 U.S.C. App. 1702](#)), such as agricultural products and petroleum products. Per 46 CFR 525.1 (c)(2), “bulk cargo” means cargo that is loaded and carried in bulk onboard ship without mark or count, in a loose unpackaged form, having homogenous characteristics. Bulk cargo loaded into intermodal equipment, except LASH or Seabee barges, is subject to mark and count and, therefore, ceases to be bulk cargo.

“Employee assigned to the contract” means an employee who was hired after November 6, 1986, who is directly performing work, in the United States, under a contract that is required to include the clause prescribed at [22.1803](#). An employee is not considered to be directly performing work under a contract if the employee—

- (1) Normally performs support work, such as indirect or overhead functions; and
- (2) Does not perform any substantial duties applicable to the contract.

“Subcontract” means any contract, as defined in [2.101](#), entered into by a subcontractor to furnish supplies or services for performance of a prime contract or a subcontract. It includes but is not limited to purchase orders, and changes and modifications to purchase orders.

“Subcontractor” means any supplier, distributor, vendor, or firm that furnishes supplies or services to or for a prime Contractor or another subcontractor.

“United States”, as defined in [8 U.S.C. 1101\(a\)\(38\)](#), means the 50 States, the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands.

(b) *Enrollment and verification requirements.*

(1) If the Contractor is not enrolled as a Federal Contractor in E-Verify at time of contract award, the Contractor shall—

- (i) *Enroll.* Enroll as a Federal Contractor in the E-Verify program within 30 calendar days of contract award;
- (ii) *Verify all new employees.* Within 90 calendar days of enrollment in the E-Verify program, begin to use E-Verify to initiate verification of employment eligibility of all new hires of the Contractor, who are working in the United States, whether or not assigned to the contract, within 3 business days after the date of hire (but see paragraph (b)(3) of this section) and
- (iii) *Verify employees assigned to the contract.* For each employee assigned to the contract, initiate verification within 90 calendar days after date of enrollment or within 30 calendar days of the employee's assignment to the contract, whichever date is later (but see paragraph (b)(4) of this section).

(2) If the Contractor is enrolled as a Federal Contractor in E-Verify at time of contract award, the Contractor shall use E-Verify to initiate verification of employment eligibility of—

- (i) *All new employees.*
 - (A) *Enrolled 90 calendar days or more.* The Contractor shall initiate verification of all new hires of the Contractor, who are working in the United States, whether or not assigned to the contract, within 3 business days after the date of hire (but see paragraph (b)(3) of this section); or
 - (B) *Enrolled less than 90 calendar days.* Within 90 calendar days after enrollment as a Federal Contractor in E-Verify, the Contractor shall initiate verification of all new hires of the Contractor, who are working in the United States, whether or not assigned to the

contract, within 3 business days after the date of hire (but see paragraph (b)(3) of this section); or

(ii) *Employees assigned to the contract.* For each employee assigned to the contract, the Contractor shall initiate verification within 90 calendar days after date of contract award or within 30 days after assignment to the contract, whichever date is later (but see paragraph (b)(4) of this section).

(3) If the Contractor is an institution of higher education (as defined at [20 U.S.C. 1001\(a\)](#)); a State or local government or the government of a Federally recognized Indian tribe; or a surety performing under a takeover agreement entered into with a Federal agency pursuant to a performance bond, the Contractor may choose to verify only employees assigned to the contract, whether existing employees or new hires. The Contractor shall follow the applicable verification requirements at (b)(1) or (b)(2) respectively, except that any requirement for verification of new employees applies only to new employees assigned to the contract.

(4) *Option to verify employment eligibility of all employees.* The Contractor may elect to verify all existing employees hired after November 6, 1986, rather than just those employees assigned to the contract. The Contractor shall initiate verification for each existing employee working in the United States who was hired after November 6, 1986, within 180 calendar days of—

(i) Enrollment in the E-Verify program; or

(ii) Notification to E-Verify Operations of the Contractor's decision to exercise this option, using the contact information provided in the E-Verify program Memorandum of Understanding (MOU).

(5) The Contractor shall comply, for the period of performance of this contract, with the requirements of the E-Verify program MOU.

(i) The Department of Homeland Security (DHS) or the Social Security Administration (SSA) may terminate the Contractor's MOU and deny access to the E-Verify system in accordance with the terms of the MOU. In such case, the Contractor will be referred to a suspension or debarment official.

(ii) During the period between termination of the MOU and a decision by the suspension or debarment official whether to suspend or debar, the Contractor is excused from its obligations under paragraph (b) of this clause. If the suspension or debarment official determines not to suspend or debar the Contractor, then the Contractor must reenroll in E-Verify.

(c) *Web site.* Information on registration for and use of the E-Verify program can be obtained via the Internet at the Department of Homeland Security Web site:

<http://www.dhs.gov/E-Verify>.

(d) *Individuals previously verified.* The Contractor is not required by this clause to perform additional employment verification using E-Verify for any employee—

(1) Whose employment eligibility was previously verified by the Contractor through the E-Verify program;

(2) Who has been granted and holds an active U.S. Government security clearance for access to confidential, secret, or top secret information in accordance with the National Industrial Security Program Operating Manual; or

(3) Who has undergone a completed background investigation and been issued credentials pursuant to Homeland Security Presidential Directive (HSPD)-12, Policy for a Common Identification Standard for Federal Employees and Contractors.

(e) *Subcontracts.* The Contractor shall include the requirements of this clause, including this paragraph (e) (appropriately modified for identification of the parties), in each subcontract that—

(1) Is for—

(i) Commercial or noncommercial services (except for commercial services that are part of the purchase of a COTS item (or an item that would be a COTS item, but for minor modifications), performed by the COTS provider, and are normally provided for that COTS item); or

(ii) Construction;

(2) Has a value of more than \$3,000; and

(3) Includes work performed in the United States.

(End of clause.)