

**DEPARTMENT OF HOMELAND SECURITY (DHS)  
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM  
Solicitation Number: DHSSBIRFY082**

**FY 08.2 PHASE I PROGRAM SOLICITATION  
Science and Technology (S&T) Directorate/  
Homeland Security Advanced Research Projects Agency (HSARPA)**

**Closing Date and Time:**

**EXTENDED TO JULY 8, 2008 at 4:30p.m. local Eastern Time**

**Contracting Officer: Elizabeth M. Moya (202-254-5619)**

**Availability:** The solicitation is available only in electronic format on the FedBizOpps website at: <https://www.fbo.gov> . The solicitation is being posted in advance to allow sufficient time for technical questions about solicitation topics prior to the specified closing date and time.

All proposers are responsible for monitoring the **FedBizOpps** website during the solicitation period for concurrent posting of any amendments to the solicitation, questions and answers, and other information relevant to the topic under which they are proposing.

**Submission of Proposals.**

- A.** Potential proposers desiring to submit proposals under the DHSSBIRFY02 solicitation were required to submit an e-mail to [STSBIR.PROPOSAL@DHS.GOV](mailto:STSBIR.PROPOSAL@DHS.GOV) by Friday, **June 20, 2008, at 4:30 p.m. local Eastern time. FAILURE TO SUBMIT AN E-MAIL REQUEST BY THE DATE AND TIME SPECIFIED ELIMINATES YOU FROM RESPONDING TO THIS SOLICITATION.** Facsimile proposals will not be accepted.
- B.** Complete proposals require a cover sheet, technical proposal, and cost proposal. The cover sheet and cost proposal templates for submitting a proposal are posted on FedBizOpps. Complete proposal shall be submitted by e-mail to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) and must be **zipped and password-protected**. The **password** shall be sent in a separate e-mail from the proposal to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV). Please reference the assigned proposal number in the body of the e-mail containing the password. **THE PROPOSAL RECEIPT DATE AND TIME WILL BE THAT WHICH IS RECORDED BY THE DHS E-MAIL SYSTEM. PROPOSERS ARE CAUTIONED TO ALLOW ADEQUATE TIME FOR SUBMITTING.**

**Topics:** There are four (4) topics in this solicitation.

(**Note:** This is a solicitation for DHS S&T SBIR only. The DHS Domestic Nuclear Detection Office (DNDO) does not have topics in this solicitation.)

**ALL REQUESTS FOR INFORMATION SHOULD HAVE BEEN SUBMITTED BY FRIDAY, JUNE 20, 2008, at 4:30 p.m. local Eastern time.** At this time, if you have questions regarding submittal response procedures only, please send your e-mail to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) . **These questions will be accepted through July 3, 2008.**

**The following applies to awards under this Solicitation:**

**1. This solicitation is for SBIR Phase I proposals only.** Only proposals submitted in response to topics contained in this solicitation will be accepted and considered for Phase I award. Several different proposed solutions to a single topic may be funded. Phase I awards may not exceed \$100,000 in cost nor extend beyond a six-month period of performance.

**2. Only those concerns awarded SBIR Phase I contracts in response to this solicitation are eligible to participate in SBIR Phases II and III; a separate solicitation will not be issued.**

a. DHS will invite Phase II proposals from a selected group of Phase I awardees to maintain the momentum of the Phase I R/R&D and to accomplish an expeditious review leading to a Phase II award. Subsequent Phase II awards will be made to concerns on the basis of results for their Phase I projects and on the scientific, technical, and commercial merit of the Phase II proposal. Phase II awards may not exceed \$750,000 in cost nor extend beyond a 24-month period of performance.

b. All Phase I awardees will be notified of Phase II invitation status after the Phase I period of performance has been completed. An invitation to submit a Phase II proposal is the onset of the Phase II review process and is not a commitment for award. Phase II proposals must be received no later than 30 days from the Phase II invitation request.

**3.** 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 for consideration as a SBIR Phase I award under this solicitation, if it is responsive to any of the topics listed in Section 8.0 of this solicitation.

**4.** SBIR Phase I proposals will be considered 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.

**5.** DHS is not obligated to make any awards under any of the SBIR Phases (I, II, or III) and all awards are subject to the availability of funds. Proposal preparation costs will not be paid under this solicitation, nor is DHS liable for any costs expended by any proposer prior to contract award.

## TABLE OF CONTENTS

	<b>Page</b>
<b>1.0 SBIR PROGRAM DESCRIPTION</b> .....	5
<b>1.1 SBIR Introduction</b> .....	5
<b>1.2 SBIR Three Phase Program</b> .....	5
<b>1.3 SBIR Proposer Eligibility and Limitations</b> .....	6
<b>1.4 SBIR Research and Analytical Work</b> .....	6
<b>1.5 SBIR Conflicts of Interest</b> .....	6
<b>1.6 Questions About SBIR Solicitation Topics</b> .....	6
<b>1.7 Outreach Conferences and Events</b> .....	7
<b>2.0 DEFINITIONS</b> .....	7
<b>2.1 Research or Research and Development</b> .....	7
<b>2.2 Small Business Concern</b> .....	7
<b>2.3 Research Institution</b> .....	8
<b>2.4 Socially and Economically Disadvantaged Small Business Concern</b> .....	8
<b>2.5 Women-Owned Small Business Concern</b> .....	8
<b>2.6 Funding Agreement</b> .....	8
<b>2.7 Subcontract</b> .....	9
<b>2.8 Commercialization</b> .....	9
<b>2.9 Essentially Equivalent Work</b> .....	9
<b>2.10 Historically Black Colleges and Universities/Minority Institutions (HBCU/MI)</b> .....	9
<b>2.11 Historically Underutilized Business Zone (HUB Zone) Small Business Concern</b> .....	9
<b>2.12 Service-Disabled Veteran</b> .....	9
<b>2.13 Small Business Concern Owned and Controlled by Service-Disabled Veterans</b> .....	9
<b>2.14 Small Business Concern Owned and Controlled by Veterans</b> .....	9
<b>2.15 United States</b> .....	10
<b>2.16 Manufacturing-related R&amp;D as a result of Executive Order 13329</b> .....	10
<b>2.17 Foreign National</b> .....	10
<b>3.0 PROPOSAL PREPARATION INSTRUCTIONS AND SUBMITTAL REQUIREMENTS</b> .....	10
<b>3.1 Electronic Proposal Submittal</b> .....	10
<b>3.2 Proposal Requirements</b> .....	11
<b>3.3 Administrative and Technical Screening Checklist</b> .....	11
<b>3.4 Proprietary Information</b> .....	12
<b>3.5 Limitations on Length of Proposal</b> .....	12
<b>3.6 Phase I Proposal Format</b> .....	12
<b>3.7 Phase II Proposal Invitation</b> .....	16
<b>3.8 Phase II Proposal Format</b> .....	16
<b>3.9 SBIR Phase II Cost Match</b> .....	18
<b>4.0 METHOD OF SELECTION AND EVALUATION CRITERIA</b> .....	20
<b>4.1 Introduction</b> .....	20
<b>4.2 Proposal Evaluations</b> .....	20
<b>4.3 Evaluation Criteria - Phase I</b> .....	21
<b>4.4 Evaluation Criteria – Phase II</b> .....	22
<b>4.5 Assessing Commercial Potential of Proposals</b> .....	22
<b>5.0 CONTRACTUAL CONSIDERATIONS</b> .....	22

5.1	Phase I Awards .....	22
5.2	Phase II Awards .....	23
5.3	Phase I Report .....	24
5.4	Commercialization Updates in Phase II.....	24
5.5	Payment Schedule.....	25
5.6	Markings of Proprietary Proposal Information.....	25
5.7	Copyrights.....	26
5.8	Patents.....	26
5.9	Technical Data Rights.....	26
5.10	Contractor Commitments.....	26
5.11	Additional Information .....	28
6.0	SUBMISSION OF PROPOSALS .....	28
6.1	Electronic Proposal Submission .....	28
6.2	Proposal Deadline .....	29
6.3	Notification of Proposal Receipt.....	29
6.4	Information on Proposal Status.....	29
6.5	Evaluation Results .....	30
6.6	Correspondence Relating to Proposals .....	30
7.0	SCIENTIFIC AND TECHNICAL INFORMATION ASSISTANCE .....	30
7.1	SAFETY Act.....	30
7.2	Scientific and Technical Reference .....	30
7.3	State and Other Assistance Available.....	30
8.0	TECHNICAL TOPICS .....	31
8.1	SBIR TOPIC NUMBER: H-SB08.2-001 .....	33
8.2	SBIR TOPIC NUMBER: H-SB08.2-002 .....	34
8.3	SBIR TOPIC NUMBER: H-SB08.2-003 .....	36
8.4	SBIR TOPIC NUMBER: H-SB08.2-004 .....	39

CLOSED

# DHS SOLICITATION No. DHSSBIRFY082 UNDER THE SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM

## **1.0 SBIR PROGRAM DESCRIPTION**

### **1.1 SBIR Introduction**

The Department of Homeland Security (DHS), hereafter referred to as DHS, 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 and development (R&D) in any of the topic areas described in Section 9.0, and to commercialize the results of that R&D are encouraged to participate.

Objectives of the DHS SBIR Program include stimulating technological innovation, strengthening the role of small business in meeting research and development needs, fostering and encouraging participation by socially and economically disadvantaged 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 the Small Business Innovation Development Act of 1982 (PL 97-219, as amended by PL 106-554). The basic design of the DHS SBIR program is in accordance with the Small Business Administration (SBA) SBIR Policy Directive, 2002. The 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 likely to yield results important to DHS and the private sector.

### **1.2 SBIR Three-Phase Program**

This program solicitation is issued pursuant to the Small Business Innovation Development Act of 1982 (PL 97-219, as amended by PL 106-554).

#### **PHASE I:**

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 award may not exceed \$100,000 in cost nor extend beyond a six-month period of performance. Proposals should 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.

#### **PHASE II:**

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

Phase II awards are \$750,000 in cost and do not exceed 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. Upon invitation from DHS for a Phase II proposal, a more comprehensive proposal will be required (as delineated in the DHS invitation letter and in Section 3.7 of this solicitation).

### **PHASE III:**

Under Phase III, the small business is expected to obtain funding from the private sector and/or Government sources excluding SBIR funding, to perform further R&D, or to further develop the prototype into viable product(s) or service(s) for sale to Government and/or private sector.

### **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 and must certify to this on the Cover Sheet of the proposal. For both SBIR Phases I and II, the primary employment of the principal investigator must be with the small business firm 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.

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.

### **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 unless otherwise approved in writing by the contracting officer. 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 cost 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 SBIR Program, Solicitation, and Solicitation Topics**

**Help Desk.** All questions about this solicitation, the proposal preparation and electronic submission should **have been submitted by June 20, 2008, at 4:30 pm** via e-mail to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) or by contacting the Help Desk toll free number: 1-800-754-3043. The Help Desk may be contacted from 8:30 a.m. to 5:00 p.m. local Eastern Time.

**General Questions about the DHS SBIR Program.** General questions pertaining to the DHS SBIR program should be submitted to [STSBIR.PROGRAM@DHS.GOV](mailto:STSBIR.PROGRAM@DHS.GOV) or by calling the DHS SBIR Program contacts: Mr. Vinny Schaper, SBIR Program Director, 202-254-6119 or Ms. Elissa I. Sobolewski, SBIR Program Manager, 202-254-6768.

### **1.7 Outreach Conferences and Events**

The DHS SBIR program participates in two National SBIR Conferences each year and in many state-organized conferences for small business. For information on these events, refer to the <http://www.sbir.gov> web site for upcoming SBIR outreach events or send an e-mail to: [STSBIR.PROGRAM@DHS.GOV](mailto:STSBIR.PROGRAM@DHS.GOV).

## **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 produce fundamental knowledge required for the solution of problems.
- b. **Exploratory Development.** A study, investigation, or 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 Department of Homeland Security (DHS) or first responder use but which have not yet received approval for production.

### **2.2 Small Business Concern**

A small business concern is one that at the time of award of a Phase I or Phase II contract meets all of the following criteria:

- a. 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. 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. At least 51 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States, except in the case of a joint venture, where each entity to the venture must be 51 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States; and

- d. Not more than 500 employees, including its affiliates.

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, as identified by the National Science Foundation in accordance with the government-wide Federal Acquisition Regulation issued in accordance with section 101-11.6 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).

## **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 DTIC web site, <http://www.dtic.gov/dtic/hbcumi/>.

## **2.11 Historically Underutilized Business Zones (HUBZone) Small Business Concern**

HUBZone small business concern means a small business concern that appears on the List of Qualified HUB Zone Small Business Concerns maintained by the Small Business Administration. See <http://www.sba.gov/hubzone> 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 Foreign National**

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)(5).

"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 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.

## **3.0 PROPOSAL PREPARATION INSTRUCTIONS AND SUBMITTAL REQUIREMENTS**

### **3.1 Electronic Proposal Submittal**

Proposers desiring to submit Phase I proposals under the DHSSBIRFY082 solicitation **were required to** send an e-mail to [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) **by the date & time specified** to receive a confirmation e-mail with a proposal number that must be used when you

submit your complete proposal. **FAILURE TO HAVE SUBMITTED AN E-MAIL REQUEST BY THE DATE & TIME SPECIFIED WILL ELIMINATE YOU FROM RESPONDING TO THIS SOLICITATION.** All Phase I proposals shall be submitted via e-mail to **STSBIR.PROPOSALS@DHS.GOV** by the date & time specified and must be **ZIPPED AND PASSWORD-PROTECTED.** THE PROPOSAL RECEIPT DATE AND TIME WILL BE THAT WHICH IS RECORDED BY THE DHS E-MAIL SYSTEM. PROPOSERS ARE CAUTIONED TO ALLOW ADEQUATE TIME FOR SUBMITTING A ZIPPED RESPONSE VIA E-MAIL. The password used shall be sent in a separate e-mail to **STSBIR.PROPOSALS@DHS.GOV**. Please reference your DHS-assigned proposal number in the body of the e-mail containing the password.

### **3.2 Proposal Requirements**

Any small business contemplating a proposal for work on any specific topic should determine that (a) their technical approach has a reasonable chance of meeting the topic objective, (b) this approach is innovative, not routine, with commercial application, and (c) the firm has the capability to implement the technical approach, i.e., has or can obtain people and equipment suitable to the task.

Classified proposals will not be accepted under this DHS SBIR Solicitation and will be appropriately destroyed upon receipt.

### **3.3 Administrative and Technical Screening Checklist**

Proposals that fail to address the following items will be considered "non-responsive" to this solicitation and will not be evaluated.

- a. **By the specified closing date and time** submit your proposal via e-mail **as zipped and password-protected** to **STSBIR.PROPOSALS@DHS.GOV** (**after obtaining with the DHS-assigned proposal number that must be used when you submit your complete proposal by the date & time specified**). A complete proposal consists of the proposal cover sheets, technical proposal and cost proposal.
- b. The proposal shall adhere to the topic criteria and the proposal cost shall adhere to the funding thresholds specified in this solicitation. The cost on the cover sheets must match the cost on the cost proposal.
- c. The Project Summary on the cover sheets shall NOT contain proprietary information. Mark proprietary information within the technical proposal as instructed in Section 5.6.
- d. The content in the technical proposal, including supporting data (if applicable), shall include all of the items in Section 3.5(b,) in the order specified.
- e. The header on each page of your technical proposal shall 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 shall not be in two-column format.
- i. The cover sheets are considered pages 1 and 2. Number all pages of your proposal consecutively, beginning your technical proposal on page 3.

### 3.4 *Proprietary Information*

If any 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 it is clearly marked as such (in accordance with Section 5.6).

### 3.5 *Limitations on Length of Proposal*

This solicitation is designed to reduce the investment of time and cost to small 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 sheet 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 page limitations (including attachments, appendices, or references) will not be considered for review or award.

### 3.6 *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 FedBizOpps website at <http://www.fbo.gov>**), including a brief technical abstract of the proposed R&D project and a discussion of anticipated benefits and potential commercial applications. 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; 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 firm 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 file must be in Portable Document Format (PDF) for evaluation purposes. **You cannot e-mail your proposal without a cover sheet and an assigned a proposal number.** Perform a virus check before uploading **e-mailing the zipped, password-protected file with** the technical proposal file. If a virus is detected, it may cause rejection of the proposal.- The technical proposal should be a single file, including graphics and attachments. **~~Do not lock 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 should 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 should determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should 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 or more 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. Identify any non-U.S. citizen that you expect to be involved on this project, 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) shall 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). If such involvement is intended, it should 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 firm, unless otherwise approved in writing by the contracting officer. No portion of an SBIR award may be subcontracted back to any Federal Government Agency or Federally Funded Research and Development Centers (FFRDCs). 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.**

*NOTICE* -- While it is permissible, with proper notification within a proposal, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see Section 2.9) 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 under 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 this Section 3.5.b (10) 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 Proposal Breakdown Guidance, **using the online cost proposal form available for download on the FedBizOpps website.** The cost proposal will count as one page of your proposal no matter how it prints out. **If some of the data is not applicable to your proposal,** there is no need to provide information on each and every item. However, it is essential that enough information is provided to allow DHS to understand how the proposer plans to use the requested funds if an award is issued.
- (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 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. Hence, travel will typically be held at the beginning of your Phase I award or at the conclusion of the Phase I effort; depending on the Science & Technology program manager requirement.
  - (4) Cost sharing is permitted for proposals under this solicitation; however, cost sharing is not required nor will it be an evaluation factor in the consideration of a Phase I proposal.
  - (5) The cost proposal **format, as posted** on the **FedBizOpps** website, is **required for a complete** 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).
  - (6) If applicable, a brief explanation of cost estimates for equipment, materials, and consultants or subcontractors can be placed in the comment section of the cost proposal. However, when a proposal is selected for award, the proposer should be prepared to submit further documentation to the contracting officer to substantiate costs (e.g., a brief explanation of cost estimates for equipment, materials, and consultants or subcontractors).

For more information about cost proposals and accounting standards, see the DCAA publication called “Information for Contractors” available at <http://www.dcaa.mil>.

### **3.7 Phase II Proposal Invitation**

A Phase II proposal is invited from a Phase I awardee and only in response to a request from the Contracting Officer. **The Contracting Officer’s request(s) will specify the Electronic Submittal Process.** DHS Program Managers for the applicable topic may recommend Phase I performers 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 performers 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 quality of the Phase I research and available funding. 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 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. (*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, funding is reserved for those deserving Phase I projects that require the maximum period of performance to complete the Phase I effort. 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, reduce, or eliminate, the gap between the Phase I and Phase II efforts.

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 the solicitation, as well as undergo the DHS SBIR source selection process.

Phase I awardees not receiving an invitation to submit a Phase II proposal may submit a Phase II proposal. However, non-invited Phase I awardees shall 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.

### **3.8 Phase II Proposal Format**

***Phase II proposal length is limited to 50 pages.***

- a.** Each Phase II Proposal must contain a Proposal Cover Sheet, Technical Proposal, Cost Proposal and Company Commercialization Report, if applicable. In addition, each Phase II proposal must contain approximately two or more pages of a Commercialization Strategy in the Technical Proposal.
- b. Commercialization Strategy**
  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 section 4.4).

- 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 launching of the innovative products, processes, or services into the marketplace. Additional Phase II Cost Match guidance can be found in section 4.6.

**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 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.

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 *SBIR Phase II Cost Match*

- a. **General Provisions of the DHS SBIR Cost Match Program.** The DHS SBIR program has implemented a Cost Match program for SBIR projects to 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, or affiliates of the small business. The outside investors must commit a minimum of \$100,000. DHS will, at its option, match up to 50% of funds received, contributing up to a maximum of \$250,000. 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 \$100,000, however, DHS SBIR will only match 50% up to the \$250,000 maximum.

The additional work proposed should be an expansion 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 program, 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 the SBIR program manager. The awardee is to follow Phase II proposal instructions and guidance, but provide the cost match documentation and request for matched funding.
  1. A Phase II proposal must be submitted electronically **as specified in the letter requesting submission.**
  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. Additional guidance on Cost Matching may be obtained by submitting a request to: [STSBIR.PROGRAM@DHS.GOV](mailto:STSBIR.PROGRAM@DHS.GOV).
  - 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 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 \$100,000 Phase II Cost Match; however Government matching funds will not exceed 50% up to the \$250,000 maximum.

4. The transfer of Investor Funding:

The company must certify within 60 days that the entire amount of the matching funds from the outside investor has been transferred to the company.

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 the DHS appointed contracting office 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 office does not receive, within 60 days, this certification showing the transfer of

funds, the company will be ineligible to compete for a Phase II Cost Matching funding, unless a specific written exception is granted by the DHS SBIR program manager.

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 Phase II Cost Match requests. Phase II Cost Match funding is contingent upon, 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**

A proposal to any topic under the DHS SBIR Program must provide sufficient information to persuade government evaluators 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 it need not use the exact approach specified in the topic. DHS will select proposals for funding based on technical merit and the evaluation criteria contained in this solicitation document.

SBIR proposals will be processed and distributed to the appropriate technical Program Manager within DHS for evaluation and action. DHS Program Managers may use Federal government employees as technical evaluators and seek advice from technical and business experts who may be non-Federal Government employees. In all cases, individuals with access to proposals will be required to sign Non-Disclosure Agreements – including support contractor personnel selected to handle the administrative functions for the program. Release of any source selection information to third parties is prohibited.

**4.2 Proposal Evaluations**

Phase I SBIR proposals will be evaluated on a competitive basis. Those proposals meeting stated solicitation requirements will be evaluated by scientists or engineers knowledgeable in the topic area. Proposals will be evaluated first on their relevance to the chosen topic. 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 Manager, as identified in Section 1.6, to determine whether submission of such a proposal would be useful.)

SBIR Phase I proposals found to be relevant will then be evaluated using the criteria listed in Section 4.3. (See Section 4.4 for Phase II criteria). Final decisions will be made based upon these criteria and consideration of other factors including possible duplication of other work and program balance.

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.

In the evaluation and handling of proposals, every effort will be made to protect the confidentiality of the proposal and any evaluations.

Restrictive notices withstanding, Phase I and Phase II proposals may be handled, for administrative purposes only, by subcontractors. All support contractors are bound by appropriate non-disclosure agreements.

Upon written request, and after final award decisions have been announced, evaluation results will be provided to unsuccessful proposers on their Phase II Proposals (see Section 6.5).

#### **4.3 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 descending 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 4.5.

Each Cost Proposal will be evaluated for cost realism and reasonableness, and overall best value to the Government. 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 firm or key individuals or any referenced experiments. Relevant supporting data such as journal articles, literature, including Government publications, etc., may be referenced in the proposal. If submitted with the proposal, supporting data will count towards the 25-page limit.

#### **4.4 Evaluation Criteria – Phase II**

The Phase II proposal will be reviewed for overall merit based upon the criteria below, in descending 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 4.5.
- 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.

Each Cost Proposal will be evaluated for cost realism and reasonableness, and overall best value to the Government. 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.

#### **4.5 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 3.6.b (6)] 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 programs, 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 report showing that the proposing firm has no prior Phase II awards will not affect the firm's ability to win an award. Such a firm's proposal will be evaluated for commercial potential based on its commercialization strategy in item (a), above.

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

### **5.0 CONTRACTUAL CONSIDERATIONS**

#### **5.1 Phase I Awards**

- a. **Awards.** The number of Phase I awards will be consistent with the DHS Science and Technology Directorate's SBIR budget and the number of anticipated Phase II contracts. Upon completion of proposal evaluations, the government will notify successful proposers that their proposal has been selected for negotiation. No Phase I contracts will be awarded until all qualified proposals on a specific topic have been evaluated. Proposers will be

notified of selection/non-selection within three (3) months of the closing date of this solicitation. For planning purposes, the contract award process is normally completed within 45 to 60 days from issuance of the selection notification letter.

- b. **Negotiations.** Any necessary negotiations for selected proposals will be conducted between the proposer and the government 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.) Successful proposers shall expect to begin work no later than 30 days after award. (For planning purposes, 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.)
- c. **Eligibility.** Eligibility and Limitation Requirements (Section 1.3) will be enforced. Prior to receiving an award, proposers must be registered in the Central Contractor Registration (CCR) database. 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.
- d. **Type of Funding Agreement.** SBIR Phase I proposals will be awarded on a firm, fixed price basis and may include reasonable profit consistent with normal profit margins provided to profit-making concerns for R/R&D work.
- e. **Timing of Awards.** The anticipated processing time is estimated at six (6) months or less from the date the solicitation closes to the Phase I award.

## 5.2 Phase II Awards

- a. **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 only an advisory estimate and the government reserves the right and discretion not to award any, or to award less than or more than, this percentage of Phase I projects. Proposers will be notified of selection/non-selection within three (3) months of the closing date of this solicitation. For planning purposes, the contract award process is normally completed within 90 to 120 days from issuance of the selection notification letter.
- b. **Type of Funding Agreements.** Each Phase II proposal selected for award will typically be funded under a negotiated cost reimbursement contract and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making concerns for R/R&D work.
- c. **Timing of Phase II Awards.** Phase II proposal invitations and 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 to select some, all, or none of the Phase I performers for Phase II invitations and also reserves the right to evaluate individual Phase II proposals when received.

### 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 and progress reports will be required by DHS. Please keep in mind that the monthly status reports and/or final reports are used as a basis to determine progress made towards the accomplishments of Phase I technical objectives when inviting 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 must state one of the following statements:
    - a) Approved for public release; distribution unlimited.
    - b) Distribution authorized to U.S. Government Agencies only; contains proprietary information. Note: DHS, after reviewing the company's entry, 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 schedule. 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. Please include the company name, topic number, proposal number and contract number in each report. **Detailed submission instructions will be provided at contract award.**

### 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 **using an electronic process as specified at time of award.**

- 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.

Small Business Concerns are required to provide updates of commercialization progress to DHS on an annual basis, and for five years after the completion of Phase II. Updates must be submitted via the SBIR web site, and must be submitted on the anniversary of the project completion date.

### **5.5 *Payment Schedule***

The specific payment schedule (including payment amounts) for each contract will be incorporated 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 or costs and payment schedule.

### **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, it will be treated in confidence, to the extent permitted by law, provided this information is clearly marked by the proposer with the term "PROPRIETARY" (do not use "Company Confidential") and provided that the following legend that appears on the Proposal Cover Sheet of the proposal is completed:

"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 these 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."

Any other legend, will be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration and without assuming any liability for inadvertent disclosure. The Government will limit dissemination of properly marked information to within official channels. In addition, 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 of the contracting officer, the awardee may copyright and publish (consistent with appropriate national 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**

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 an invention in the United States must normally manufacture it domestically. SBIR awardees must report inventions to the awarding agency within two (2) months of the inventor's report to the awardee. Awardees may report inventions to DHS through the Edison Invention Reporting Systems at: <https://s-edison.info.nih.gov/iEdison/>. 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, except that any such data that is also protected and referenced under a subsequent SBIR award must remain protected through the protection period of that subsequent SBIR award. See FAR clause 52.227-20, "Rights in Data -- SBIR Program."

### **5.10 Contractor Commitments**

Upon award of a contract, the contractor shall make certain legal commitments through acceptance of Government clauses and provisions. Award terms and conditions will be part of the negotiations between the successful proposer and the contracting officer. The following outline illustrates the types of terms and conditions required by the Federal Acquisition Regulations under Phase I awards. This is not a complete list of terms and conditions, nor does it contain specific wording from clauses and provisions.

- 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.
- 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 shall be decided by the contracting officer with 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 will 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 will 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 will 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 on 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.

### 5.11 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.
- c. **Government Obligations.** This Program 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.
- d. **Duplication of Work.** If an award is made pursuant to a proposal submitted under this solicitation, the contractor will 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.
- e. **Unsolicited Proposals.** 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.

### 6.0 SUBMISSION OF PROPOSALS

Each proposal must be submitted to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) and contain a completed:

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

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.

### 6.1 Electronic Proposal Submission

#### **ELECTRONIC PROPOSALS MUST BE ZIPPED AND PASSWORD PROTECTED.**

a. **Proposal Cover Sheet.** For electronic proposal submission, **proposers were required to send an e-mail to [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) by the date and time specified to obtain a confirmation e-mail with a proposal number that must be used when you submit your complete proposal.** FAILURE TO SUBMIT AN E-MAIL REQUEST BY THE DATE & TIME SPECIFIED WILL ELIMINATE YOU FROM RESPONDING TO THIS SOLICITATION. Facsimile proposals will not be accepted. The proposal number will be used for tracking throughout the submission, evaluation and award process.

b. **Technical Proposal.** Prepare the technical proposal in a single Portable Document Format (PDF) file **and e-mailed as a zipped and password-protected in accordance with this**

**solicitation.** Technical proposals should be a single file, including all graphics and attachments, and shall have the company name and proposal number (from the cover sheets) in the header. **Consider the file size of the technical proposal to allow sufficient time for uploading. Proposers electing to modify their proposals in any way must allow enough time to upload a complete updated proposal by the solicitation closing date and time.** Incomplete proposals will not be accepted or evaluated.

**c. Cost Proposal.** The cost proposal may be submitted as a separate file or as the last page(s) of your technical proposal file. Cost proposals will be considered binding for 180 days from the closing date of this solicitation.

**PROPOSERS ARE CAUTIONED TO ALLOW ADEQUATE TIME FOR SUBMITTING A COMPLETE ZIPPED PROPOSAL (cover sheets, technical proposal, cost proposal) RESPONSE VIA E-MAIL.** The **password** shall be sent in a separate e-mail to **[STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV)**. Please reference your proposal number in the body of the e-mail containing the password.

Signatures are not required on the cover sheets and cost proposal for electronic submission. If the proposal is selected for award, the DHS designated contracting officer will contact you for all appropriate signatures.

## **6.2 Proposal Deadline**

Proposals must be submitted in their entirety to the DHS submission web site **[STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV)** by the specified closing date and time. A complete Phase I submission includes the following three (3) parts: cover sheets, technical proposal, and cost proposal. **THE PROPOSAL RECEIPT DATE AND TIME WILL BE THAT WHICH IS RECORDED BY THE DHS E-MAIL SYSTEM.**

## **LATE PROPOSALS WILL NOT BE CONSIDERED.**

As the solicitation closing date draws near, heavy traffic on the **DHS e-mail** server may cause delays. Plan ahead and leave enough time to prepare and submit proposals. Proposers bear the risk of **e-mail** inaccessibility due to heavy usage in the final hours before the solicitation closing time. Proposers are responsible for submitting proposals, and any modification or revisions, by the specified closing date and time.

## **6.3 Notification of Proposal Receipt**

Notification of proposal receipt will be provided electronically **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 awards are made.

Evaluation of Phase II proposals will begin upon receipt of the individual proposals. DHS reserves the right to make Phase II awards incrementally, as Phase II proposals are received and evaluated.

## **6.5 Evaluation Results**

Any proposer that submits a written request within 3 days of being notified of their proposal being selected, or non-selected, for award will be provided a copy of the evaluation results. These debriefing requests should be e-mailed to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV)

## **6.6 Correspondence Relating to Proposals**

All correspondence relating to proposals should cite the SBIR solicitation number, proposal number, and 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."

Offerors 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 800-788-9318 or [helpdesk@safetyact.gov](mailto:helpdesk@safetyact.gov) or visit OSAI's web site at [www.safetyact.gov](http://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.

### **7.3 State and Other Assistance Available**

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

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

Contact your State SBIR Support office at [www.ed.gov/offices/OERI/SBIR/statelink.html](http://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.

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

## **8.0 TECHNICAL TOPICS**

This section contains detailed topic descriptions outlining the technical areas in which DHS requests proposals. Topics are listed and numbered separately.

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.

DHS has identified four (4) technical topics in this solicitation to which small business concerns may respond. Please note that these topics 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.” 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.

Closed

**DHS S&T DIRECTORATE TOPICS -- DHS Small Business Innovation Research (SBIR)  
Fiscal Year 08 Publication 2**

- H-SB08.2-001**      Engineered Building Materials
- H-SB08.2-002**      Innovative Educational Environments to Develop the Necessary  
Intellectual Basis for a National DHS S&T Workforce
- H-SB08.2-003**      High Speed DNA (Deoxyribonucleic Acid) Sequencing for Environmental  
Sample Biological Threat Detection, Identification, and Support for  
Attribution
- H-SB08.2-004**      Telecommunications Linking System

Closed

## 8.1 SBIR TOPIC NUMBER: H-SB08.2-001

**TITLE:** Engineered Building Materials

**TECHNOLOGY AREAS:** Infrastructure Protection, Damage Mitigation

**OBJECTIVE:** To develop technologies, devices, systems that will prevent or mitigate damage from explosions, kinetic attacks, or deliberate fires against bridges, tunnels, or other critical infrastructure.

**DESCRIPTION:** DHS is seeking technologies, devices, and systems that can prevent or mitigate damage from blasts, projectiles, and fire. Of particular interest are materials that can be used to construct/protect critical built infrastructures such as bridges, tunnels, and buildings. These materials should be able to withstand explosive/kinetic/or thermal attacks while protecting the structural integrity of the target. The materials may accomplish this through yielding, stiffening, or absorption of energy. Approaches may include nano-engineered materials, or other tailored materials. Novel applications or combinations of existing materials may be proposed. Energy absorbing connections for use with blast resistant panels are also of interest.

**PHASE I:** The technology and concept of operations should be proposed. The proposer should demonstrate a full understanding of the threat being addressed and the rationale behind candidate technological solutions, and will offer a promising material solution. A full or scale model of the solution should be presented, with actual or hypothetical (modeled) test results.

**PHASE II:** In Phase II, the developer will demonstrate the material or system in a simulated operational environment. DHS research facilities, such as the Transportation Security Laboratory, may assist in this Phase. The developer is expected to use the test results to optimize the technology or system. This will be followed by additional evaluation of the optimized technology, to possibly include a larger scale installation and demonstration. The developer is also expected to develop a plan for commercialization in a potential Phase III.

**PHASE III COMMERCIAL APPLICATIONS:** The commercialization of the technology or system is the responsibility of the developer. DHS S&T will monitor the development of the commercial product and may after successful testing, place the device on a qualified products list. Potential customers include federal agencies, state, local, and commercial authorities, state and local law enforcement agencies, and foreign governments.

**KEY WORDS:** blast mitigation, bridges, tunnels, infrastructure, nanotechnology, engineered building materials

**TECHNICAL POINT OF CONTACT:** Mr. John Fortune, Phone 202-254-6622, john.fortune@dhs.gov

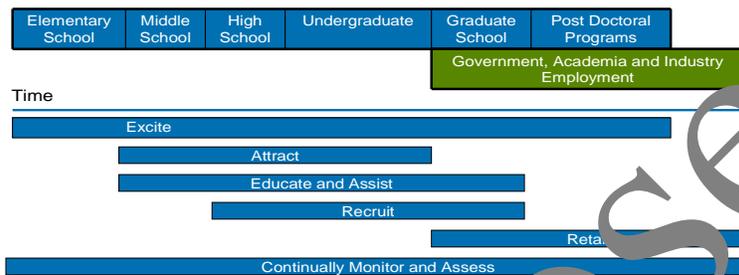
## 8.2 SBIR TOPIC NUMBER: H-SB08.2-002

**TITLE:** Innovative Educational Environments to Develop the Necessary Intellectual Basis for a National DHS S&T Workforce

**TECHNOLOGY AREAS:** All Areas of DHS Relevant Science, Technology, Engineering and Mathematics

**OBJECTIVE:** This topic seeks innovative educational environments to develop the necessary intellectual basis for a national S&T workforce. In particular, this solicitation looks for methods to take new discoveries in science and mathematics from the DHS sponsored Centers of Excellence ([http://www.dhs.gov/xres/programs/editorial\\_0498.shtm](http://www.dhs.gov/xres/programs/editorial_0498.shtm)) and bring those discoveries to the US population. For the purpose of this solicitation workforce development includes the full spectrum of the education system, from elementary school to post doctoral programs.

### STEM Workforce Development Strategy



**DESCRIPTION:** The National Academy Report: Rising Above the Gathering Storm – Energizing and Employing America for a Brighter Economic Future (executive summary available at [http://www.nap.edu/catalog.php?record\\_id=11463](http://www.nap.edu/catalog.php?record_id=11463)) provides background on the need to increase the talent pool by vastly improving K-12 science and mathematics education. For the DHS workforce, an increase in the US talent pool is critical. In addition, the ongoing research at the DHS sponsored Centers of Excellence are in topic areas critical to Homeland Security and, as such, require special attention. Innovative educational environments, both formal and informal, need to be developed to bring these new science and math applications to the workforce.

**PHASE I:** Develop the system design of the innovative educational environment. Develop prototype modules for field test.

**PHASE II:** Field test the prototype modules in multiple markets, including with underserved populations. Develop a commercialization plan.

**PHASE III COMMERCIAL APPLICATIONS:** Provide a mechanism for national distribution of the modules.

**REFERENCES:** DHS Centers of Excellence  
[http://www.dhs.gov/xres/programs/editorial\\_0498.shtm](http://www.dhs.gov/xres/programs/editorial_0498.shtm))

Rising Above the Gathering Storm – Energizing and Employing America for a Brighter Economic Future (executive summary available at [http://www.nap.edu/catalog.php?record\\_id=11463](http://www.nap.edu/catalog.php?record_id=11463))

**TECHNICAL POINT OF CONTACT:** Ms. Desiree Linson, 202-254-6309, [Desiree.Linson@dhs.gov](mailto:Desiree.Linson@dhs.gov)

Closed

### 8.3 SBIR TOPIC NUMBER: H-SB08.2-003

**TITLE:** High Speed DNA (Deoxyribonucleic Acid) Sequencing for Environmental Sample Biological Threat Detection, Identification, and Support for Attribution

**TECHNOLOGY AREAS:** DNA Sample Preparation, Sequencing and Bioinformatics

**OBJECTIVE:** Research and develop a prototype instrument that performs high speed DNA and RNA sample preparation, DNA sequencing, DNA sequence data generation and data analysis to detect and identify, at the strain level, biological threat agents in less than four hours from collected sample to warning signal.

**DESCRIPTION:** Complex samples from the environment need to be analyzed for biological threat agents in backgrounds of near neighbor strains, other endogenous species, mammalian cells and a variety chemical and biological clutter. One method identified as a possible solution to this issue is robust sample preparation followed by high-speed DNA sequencing. However, current commercial platforms take between twenty and sixty hours to generate sequencing data and are not designed for the analysis of environmental samples of the type stated above. Speeding up the process at all stages will be required. No assumption of technique beyond DNA Sequencing is made by this call for proposals.

**Sample Preparation** – Current sample preparation and library building for high throughput DNA sequencing is long (greater than four hours). This is particularly true when analyzing environmental samples where many different types of biological threat agents may be present e.g., bacteria and RNA viruses. As a result, research and development to produce an automated sample preparation and library building front end for high throughput sequencing would dramatically speed up the process of obtaining threat agent data. If library building is not required by the sequencing technique proposed to satisfy the next section of this call for proposals, it can be left out.

Develop an automated instrument for the extraction and preparation of sequencing quality DNA and RNA from complex samples derived from a filter sample (e.g., a dry filter unit). Assume that the sample contains the components of floor sweepings as a guide to defining relevant background contaminants.

**DNA Sequencing** – Current technology requires approximately three, eight hour shifts to complete one run of DNA sequencing, this includes: Sample preparation and library building (approximately four hours), amplification of genomic fragments (on the order of eight hours), sequencing data collection (on the order of eight hours). These runs produce millions of bases of finished product with relatively poor quality.

Develop a DNA sequencing prototype instrument and control system that, through any means, speeds up the process of producing high quality DNA sequencing data with read lengths of twenty bases or more without assembly. No assumption of technology is made by this call for proposals. Assume that the output from automated sample preparation defined in the previous sections is the input for this instrument. Sample preparation and sequencing instrumentation need not be integrated but an integrated system is preferred.

**Sequencing Data Analysis** – Current sequencing systems require the completion of a run to start assembling data. For the purpose of biological threat detection it may not be necessary to assemble the sequencing information as biological threat identification should be possible with as little as twenty bases of sequence information.

Develop a computer algorithm and program that uses known sequence databases to analyze sequencing data as it is generated (initiating at a sequencing stage where a positive identification can be made, e.g., the twenty base stage) and identifies biological threat signatures allowing phylogenetic mapping to the strain level. No assumption of sequencing technology is made by this call for proposals but the proposed computer program in this section must be consistent with the sequencing instrument proposed as a response to the *DNA Sequencing* section above.

**Informatic Gene Attribution** – When analyzing environmental samples that include many different species and strains of interest, there currently are only a few ways of determining that all of the signatures detected come from a single strain or few strains i.e., the threat(s). *Flanking sequence* and *copy number* are among the indications that the components found in a metagenomic study are coming from a single threat strain. When a set of threat signatures are detected it is important to know that a single organism type (or a few types) are responsible for all or at least a set of signatures.

Develop improved computer based algorithms and programs for the analysis of partly assembled metagenomic data from environmental samples for the purposes of knowing that a set of threat signatures come from a single species and strain. Demonstrate that this program reduces the false positive rate when detecting threat organism. No assumption of sequencing technology is made by this call for proposals but the proposed computer program in this section must be consistent with the sequencing instrument proposed as a response to the *DNA Sequencing* section above.

**PHASE I:** Using prototype or commercial on the shelf laboratory equipment (modified or unmodified) and computer algorithms demonstrate and report the feasibility of improving upon the time to detect and identify biological agents in a complex environmental background (e.g., from a dry filter containing dust) by the use of DNA sequencing. A written report including graphical and tabular data comparisons with statistical significance clearly stated, and copy of all raw data collected shall be delivered.

The report should include details of experiments including: Biological threat simulant species (e.g., *bacillus thuringensis* spores) in a complex background, standard laboratory sample preparation techniques, operational details for a commercial or in development DNA sequencing instrument, the real time base calling data and an algorithm(s) used to analyze this data. The report should state results of testing to determine whether or not, early in the sequencing data collection, the species of interested can be detected and identified in blind samples.

**PHASE II:** Deliver a prototype instrument and analysis/control software suite, capable of: (1) Taking raw vacuum filters as its input and generating DNA sequencing data, (2) building a phylogenetic map of the biological threat agent(s) present (based on DNA sequence matching algorithms), (3) sending a signal to the operator that a threat has been detected, and (4) providing a confidence value for that identification, in less than four hours. The computer algorithm and program should use information about the likelihood that all threat signatures came from a single organism type (strain) to generate a second confidence measure that indicates this likelihood.

**PHASE III COMMERCIAL APPLICATIONS:** Deliver a shippable analytical instrument platform and analysis/control software suite capable of generating, analyzing and utilizing DNA sequencing data to detect and identify biological threat agents in less than four hours starting from a dry vacuum filter sample.

This instrument has multiple commercial applications. The smaller market may in fact be the Homeland Security market. However, Homeland Security is the intended beneficiary of this development and must be part of the commercialization plan.

The human molecular diagnostics and research markets will clearly benefit by this development and will most likely be the larger commercial market for this technology. Solving the problems associated with the identification of biological threat agents from environmental samples will help solve problems in clinical molecular diagnostics. Examples include: Speeding up DNA sequence analysis in the point of care arena and reducing the complexity of comparisons needed to answer specific molecular diagnostic questions without requiring complete genome sequencing and sequence assembly.

**KEY WORDS:** DNA, Nucleic Acid, Sequencing, Analysis, Bioinformatic, Biological, Threat, Warfare, Genes, Virulence Factor, Antibiotic Resistance

**TECHNICAL POINT OF CONTACT:** Dr. James Anthony, 202-251-5742,  
[james.anthony@dhs.gov](mailto:james.anthony@dhs.gov)

Closed

#### **8.4 SBIR TOPIC NUMBER: H-SB08.2-004**

**TITLE:** Telecommunications Linking System

**TECHNOLOGY AREAS:** Intelligence Analysis and Gathering

**OBJECTIVE:** Provide analysis tools, report generator, and automated case de-confliction/case collaboration notification to the end users (case agents).

**DESCRIPTION:** Immigration and Customs Enforcement (ICE) uses a system to store information regarding known suspects (suspects identification and phone numbers called) and associates phone calls made by these suspects to other phone numbers (links). The goal is to improve the linking capability and the user interface for an existing database. The focus of this topic area is to provide a network tool to:

- Access all Immigration and Customs Enforcement (ICE) mainframe databases where telephone information, both structured and unstructured, is entered;
- Automatically identify a minimum of fourth order linkages between telephone information (i.e., telephone #1 associated with #2 associated with #3 associated with #4)
- Provide automated notification to the end users (case agents) of potential case de-confliction and case collaboration (i.e., telephone numbers from different cases intersect);
- Provide method of weighting linkages;
- Provide textual and graphical interfaces for identifying linkages between telephone information;
- Provide a means for end users to associate or disassociate telephone information (link / de-link);
- Provide functionality to allow end users to export records, reports, charts and graphs;
- Allow storage and retrieval of known voice samples associated with other telephone information to facilitate the identification of voices encountered during investigations;

**PHASE I:** As a minimum, Phase I will include a requirements identification / assessment report, initial architecture development, user interface mock-up, initial software development, and a risk assessment of ability of software to perform multiple linkages.

**PHASE II:** A working prototype will be provided no later than halfway through the Phase II period for assessment against realistic (or real) databases. Success criteria will be developed by contractor and approved by Government prior to initiation of this assessment.

**PHASE III COMMERCIAL APPLICATIONS:** While this effort is specifically being assessed for ICE uses, linking of structured and unstructured data is applicable to security organizations (e.g., background checks) and financial organizations (e.g., credit checks).

**KEY WORDS:**

Associative processing; data management; data reduction; data storage systems; linking systems; graphical user interface

**TECHNICAL POINT OF CONTACT:** David Throckmorton, 202-254-5622,  
[david.throckmorton@dhs.gov](mailto:david.throckmorton@dhs.gov)

## DHS FY 08.2 Phase I SBIR Checklist

---

### Page Numbering:

- Number all pages of your proposal consecutively
- Total for each proposal is 25 pages inclusive of cover sheets, technical proposal, cost proposal and resumes (excess pages will not be considered)

### Proposals:

- An e-mail was sent to [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) by date & time specified and with **the DHS-assigned** proposal number that must be used when you submit your complete proposal.
- The cover sheet and cost proposal templates for submitting a proposal were obtained from the DHSSBIRFY082 solicitation on FedBizOpps.
- Cover Sheet, Technical and Cost proposals **MUST** be submitted electronically to: [STSBIR.PROPOSALS@DHS.GOV](mailto:STSBIR.PROPOSALS@DHS.GOV) as **zipped and password protected**. **Send the password in a separate e-mail.**

### The Technical Proposal addresses:

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

### Final checklist:

- Complete proposals require a cover sheet, technical proposal, and cost proposal.**
- The Cost Proposal shows detailed cost breakout and the total cost is also listed on the Cover Sheet
- THE PROPOSAL RECEIPT DATE AND TIME WILL BE THAT WHICH IS RECORDED BY THE DHS E-MAIL SYSTEM. ALLOW ADEQUATE TIME FOR SUBMITTING A ZIPPED AND PASSWORD-PROTECTED RESPONSE VIA E-MAIL.**