

**THE DEPARTMENT OF HOMELAND SECURITY**  
**THE HOMELAND SECURITY ADVANCED RESEARCH PROJECTS AGENCY**  
**(HSARPA)**  
**SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM**  
**AND**  
**SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM**  
**PROGRAM SOLICITATION FY06.1**

**HSARPA SBIR/STTR WILL NOT ACCEPT CLASSIFIED PROPOSALS**

**Closing Date: 10 April 2006, 4:00pm ET**

**Important Dates:**

- **10 February, 2006:** Pre-release issued
- **10 March, 2006:** Full-solicitation issued
- **10 March, 2006 – 10 April, 2006:** Full-proposals accepted
- **10 April, 2006:** Deadline for receipt of proposals at **4 p.m. ET**

**IMPORTANT**

**Deadline for Receipt:** Proposals must be completely submitted and date stamped by **4:00 p.m. ET, 10 April 2006**

**No Printed Solicitation Books.** Solicitations are available only in electronic format from the FedBizOpps website, in accordance with the Government Paperwork Elimination Act (GPEA).

**Information.** If you have questions about the HSARPA SBIR/STTR program, please submit your questions via the website at <http://www.dhssbir.com>

**NOTICE: For administrative purposes only, submissions to this solicitation will be handled by an HSARPA Support Contractor.**

## TABLE OF CONTENTS

	Page
1.0 SBIR PROGRAM DESCRIPTION .....	4
1.1 SBIR Introduction .....	4
1.2 SBIR Three Phase Program .....	4
1.3 SBIR Proposer Eligibility and Limitations .....	5
1.4 SBIR Research and Analytical Work .....	5
1.5 SBIR Conflicts of Interest .....	6
1.6 Questions About SBIR and STTR Solicitation Topics .....	6
2.0 STTR PROGRAM DESCRIPTION .....	7
2.1 STTR Introduction .....	7
2.2 STTR Three Phase Program .....	7
2.3 STTR Proposer Eligibility .....	8
2.4 STTR Conflict of Interest .....	9
3.0 DEFINITIONS .....	9
3.1 Research or Research and Development .....	9
3.2 Small Business Concern .....	9
3.3 Research Institution .....	10
3.4 Cooperative Research and Development .....	10
3.5 Socially and Economically Disadvantaged Small Business .....	10
3.6 Women-Owned Small Business .....	10
3.7 Funding Agreement .....	11
3.8 Subcontract .....	11
3.9 Commercialization .....	11
3.10 Essentially Equivalent Work .....	11
3.11 HBCU/MI .....	11
3.12 Historically Underutilized Business Zone (HUBZone) Small Business Concern .....	11
3.13 Service-Disabled Veteran .....	11
3.14 Small Business Concern Owned and Controlled by Service-Disabled Veterans .....	11
3.15 Small Business Concern Owned and Controlled by Veterans .....	12
3.16 United States .....	12
3.17 SBIR/STTR Technical Data .....	12
3.18 SBIR/STTR Technical Data Rights .....	12
3.19 Manufacturing-related R&D as a result of Executive Order 13329 .....	12
3.20 Foreign National .....	12
4.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS .....	13
4.1 Proposal Requirements .....	13
4.2 Administrative and Technical Screening Checklist .....	13
4.3 Proprietary Information .....	14
4.4 Limitations on Length of Proposal .....	14
4.5 Phase I Proposal Format .....	14
4.6 Page Numbering and Bindings .....	18
4.7 Phase II Proposal Invitation .....	18
4.8 Phase II Proposal Format .....	19
4.9 False Statements .....	20
5.0 METHOD OF SELECTION AND EVALUATION CRITERIA .....	20

5.1	Introduction.....	20
5.2	Evaluation Criteria - Phase I.....	21
5.3	Evaluation Criteria – Phase II.....	21
5.4	Assessing Commercial Potential of Proposals.....	22
5.5	Special Funding and Period of Performance considerations .....	22
5.6	SBIR/STTR Phase II Cost Match .....	22
6.0	CONTRACTUAL CONSIDERATIONS .....	25
6.1	Phase I Awards .....	25
6.2	Phase II Awards .....	25
6.3	Phase I Report.....	26
6.4	Commercialization Updates in Phase II.....	26
6.5	Payment Schedule.....	27
6.6	Markings of Proprietary Proposal Information.....	27
6.7	Copyrights.....	28
6.8	Patents.....	28
6.9	Technical Data Rights.....	28
6.10	Contractor Commitments.....	28
6.11	Contractor Registration.....	30
6.12	Invention Reporting .....	30
6.13	Additional Information .....	30
7.0	SUBMISSION OF PROPOSALS .....	30
7.1	Electronic Proposal Submission .....	31
7.2	Notification of Proposal Receipt.....	31
7.3	Information on Proposal Status.....	31
7.4	Evaluation Results .....	32
7.5	Correspondence Relating to Proposals .....	32
8.0	Scientific and Technical Information.....	32
9.0	Technical Topics.....	32
9.1	HSARPA STTR Model Agreement.....	33
9.2	HSARPA TOPICS -- HSARPA Small Business Fiscal Year 06 Publication 1 .....	34
9.3	DNDO TOPIC -- DNDO Small Business Fiscal Year 06 Publication 1 .....	34
9.4	HSARPA FY2006.1 Phase I SBIR/STTR Checklist .....	53

**HSARPA SOLICITATION FOR THE  
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM  
AND  
SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM**

**1.0 SBIR PROGRAM DESCRIPTION**

**1.1 SBIR Introduction**

The Homeland Security Advanced Research Projects Agency, hereafter referred to as HSARPA, invites small business firms to submit proposals under this solicitation for the Small Business Innovation Research (SBIR) Program. Firms with the capability to conduct research and development (R&D) in any of the topic areas described in Section 8.0, and to commercialize the results of that R&D, are encouraged to participate.

Objectives of the HSARPA 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 R&D 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 HSARPA 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 HSARPA. 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 the homeland security 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 is to determine, insofar as possible, the scientific, technical, and commercial merit and feasibility of ideas submitted under the SBIR Program. Phase I awards do not exceed \$100,000 in cost nor extend beyond a six-month period of performance. HSARPA has, however, permitted offerors submitting to the Domestic Nuclear Detection Office (DNDO), topic H.SB06.1-010 to propose up to \$150,000 for Phase I SBIR efforts, not to extend beyond a six-month period of performance. Proposals should concentrate on that research or research and development 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 HSARPA support in Phase II. 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. Bidders are encouraged to consider whether the research or research and development they are proposing to HSARPA also has private sector potential, either for the proposed application or as a base for other applications.

Subsequent Phase II awards will be made to firms on the basis of results of their Phase I and the scientific, technical, and commercial merit of the Phase II proposal. Phase II awards are \$750,000 in cost and do not exceed 24-months period of performance. Offerors submitting to the DNDO, topic H.SB06.1-010 are permitted to propose up to \$1,000,000 for Phase II SBIR efforts, not to extend beyond a 24-month period of performance. Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable prototype. A more comprehensive proposal will be required for Phase II.

Under Phase III, the small business is expected to obtain funding from the private sector and/or non-SBIR Government sources to develop the prototype into a viable product or non-R&D service for sale in Government and/or private sector markets.

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

For SBIR Phase II, no separate solicitation will be issued and no unsolicited proposals will be accepted. **Only those firms that were awarded Phase I contracts are eligible to participate in Phases II and III.**

HSARPA will invite Phase II Proposals from a group of Phase I awardees to maintain the momentum of the Phase I R/R&D and to accomplish an expeditious review leading to award of a Phase II. Phase II Proposals will be submitted online in accordance with Section 6.0.

HSARPA is not obligated to make any awards under either Phase I, II, or III, and all awards are subject to the availability of funds. HSARPA is not responsible for any monies expended by the proposer before award of any contract.

### ***1.3 SBIR Proposer Eligibility and Limitations***

Each proposer must qualify as a small business for research or research and development purposes as defined in Section 2.0 and certify to this on the Cover Sheet of the proposal. For both, SBIR Phase 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 must 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 must be performed by the proposing firm unless otherwise approved in writing by the contracting officer. The percent of work is usually measured by both direct and indirect costs for both Phases.

b. **For Phase II**, a minimum of one-half of the research and/or analytical work must be performed by the proposing firm, unless otherwise approved in writing by the contracting officer.

### ***1.5 SBIR Conflicts of Interest***

Awards made to firms owned by or employing current or previous Federal Government employees could create conflicts of interest for those employees 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 and STTR Solicitation Topics***

HSARPA SBIR questions/information.

- a. **Help Desk.** All questions about this solicitation, the proposal preparation and electronic submission should be submitted via the website: <http://www.dhssbir.com> or, call the Help Desk toll free number: 1-800-754-3043.

**HSARPA SBIR/STTR website** <http://www.dhssbir.com> offers electronic access to the SBIR solicitation, submission of frequently asked questions (FAQs), answers to FAQs, and hyperlinks to other useful information. All Phase I and Phase II proposals must be submitted via the electronic submission website at <http://www.dhssbir.com>. The HSARPA submission procedure is a four (4) step process before final submission is complete. Upon completion of the cover sheet, technical proposal, and cost proposal, offerors must select "Submit Proposal" for the complete proposal to be electronically date stamped and officially received by the HSARPA SBIR Program Office. Once the "Submit Proposal" button has been selected, an email confirmation receipt will be forwarded to your email account upon successful submission of your proposal.

- b. **General questions about HSARPA SBIR/STTR Program.** General questions pertaining to the HSARPA SBIR program should be submitted to [faq@hsarpasbir.com](mailto:faq@hsarpasbir.com) or call the HSARPA SBIR Program Contact: Mr. Tim Sharp, SBIR Program Manager, 202-254-6105.
- c. **Technical Questions about Solicitation Topics.** This solicitation is issued for pre-release on the HSARPA Website from 10 February, 2006 through 10 March, 2006. During this time, you may call or email topic questions to the Technical Point of Contact for the topic, before you prepare a proposal for the FY06.1 solicitation. Technical questions will be researched and answers provided in a timely manner. Contact with HSARPA after the 10 March, 2006, pre-release closing date, is restricted for reasons of competitive fairness, and therefore, all written questions submitted to [faq@hsarpasbir.com](mailto:faq@hsarpasbir.com) will be answered and posted electronically for general viewing to the HSARPA website, <http://www.dhssbir.com>.
- d. **All proposers are advised to monitor the** <http://www.dhssbir.com> **website** during the solicitation period for questions and answers, and other information relevant to the topic under which they are proposing.
- e. **Outreach Conferences and Events.** The DHS SBIR/STTR program participates in two National SBIR/STTR Conferences a year and in many state-organized conferences for small business. For information on these events, see our Website,

<http://www.dhssbir.com> located under “What’s New,” or refer to the SBIRWorld.com website for upcoming SBIR/STTR outreach events.

## **2.0 STTR PROGRAM DESCRIPTION**

### **2.1 STTR Introduction**

HSARPA invites small business firms and research institutions to jointly submit proposals under this solicitation for the Small Business Technology Transfer (STTR) program. The STTR Program is a program under which awards are made to small business concerns for cooperative research and development, conducted jointly by a small business and a research institution, through a uniform process having three phases. STTR, although modeled substantially on the Small Business Innovation Research (SBIR) Program, is a separate program and is separately financed. Subject to availability of funds, HSARPA will support high quality cooperative research and development proposals of innovative concepts to solve the listed defense-related scientific or engineering problems, especially those concepts that also have high potential for commercialization in the private sector.

The STTR Program is designed to provide a strong incentive for small companies and researchers at research institutions, i.e., non-profit research institutions, contractor-operated federally funded research and development centers (FFRDCs), and universities, to work together as a team to move ideas from the research institution to the marketplace, to foster high-tech economic development, and to address the technological needs of the DHS.

Partnerships between small businesses and Historically Black Colleges or Universities (HBCUs) or Minority Institutions (MIs) are encouraged, although no special preference will be given to STTR proposals from such offerors.

The Federal STTR Program is mandated by Public Laws 102-564 and 107-50. The basic design of the HSARPA STTR Program is in accordance with the Small Business Administration (SBA) STTR Policy Directive of 2005. The HSARPA SBIR Program presented in this solicitation strives to encourage scientific and technical innovation in areas specifically identified by the DHS. The guidelines presented in this solicitation incorporate and exploit the flexibility of the SBA Policy Directive to encourage proposals based on scientific and technical approaches most likely to yield results important to DHS and the private sector.

### **2.2 STTR Three Phase Program**

This program solicitation is issued pursuant to the Small Business Research and Development Enhancement Act of 1992, PL 102-564. Phase I is to determine the scientific, technical and commercial merit and feasibility of the proposed cooperative effort and the quality of performance of the small business concern with a relatively small investment before consideration of future DHS support in Phase II. Several different proposed solutions to a given topic may be funded. STTR proposals will be evaluated on a competitive basis giving primary consideration to the scientific and technical merit of the proposal along with its potential for commercialization. STTR Phase I awards are limited to \$100,000 in size over a period not to exceed one year. Offerors submitting to the DNDO, topic H.SB06.1-010 are permitted to propose up to \$150,000 for Phase I STTR efforts, not to exceed beyond one year.

Subsequent Phase II awards will be made to firms on the basis of results of their Phase I effort and the scientific, technical merit and commercial potential of their Phase II proposal. Phase II awards are limited to \$750,000 in size over a period generally not to exceed 24 months (subject to negotiation). Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable product or process. Offerors submitting to the DNDO, topic H.SB06.1-010 are permitted to propose up to \$1,000,000 for Phase II STTR efforts, not to extend beyond a 24-month period of performance (subject to negotiation).

Under Phase III, the small business is expected to use non-federal capital to pursue private sector applications of the research or development. Also, under Phase III, federal agencies may award non-STTR funded follow-on contracts for products or processes which meet the mission needs of those agencies.

This solicitation is for Phase I proposals only. Only proposals submitted in response to topics in this solicitation will be accepted and considered for Phase I award. For Phase II, no separate solicitation will be issued and no unsolicited proposals will be accepted. Only those firms that were awarded Phase I contracts are eligible to participate in Phases I and III.

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

### ***2.3 STTR Proposer Eligibility***

Each proposer must qualify as a small business for research or research and development purposes as defined in Section 2.3 and certify to this on the Cover Sheet of the proposal. In addition, a minimum of 40 percent of each STTR project must be carried out by the small business concern and a minimum of 30 percent of the effort performed by the research institution. The percent of work is usually measured by both direct and indirect costs, although proposers planning to subcontract a significant fraction of their work should verify how it will be measured with their DHS contracting officer during contract negotiations. The principal investigator must be primarily employed with either the small business firm or the research institution. At the time of award of a Phase I or Phase II contract, the small business concern must have at least one employee in a management position whose primary employment is with the small business and who is not also employed by the research institution. Primary employment means that more than one half of the employee'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 must be performed by the small business concern and its subcontractors in the United States. Deviations from the requirements in this paragraph must be approved in writing by the contracting officer (during contract negotiations).

A small business concern must negotiate a written agreement between the small business and the research institution allocating intellectual property rights and rights to carry out follow-on research, development, or commercialization (see: [Model Agreement for the Allocation of Rights](#)). This agreement must be signed prior to award.

Joint ventures and limited partnerships are permitted for the small business portion, 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 3.2.

#### **2.4 STTR Conflict of Interest**

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

### **3.0 DEFINITIONS**

The following definitions apply for the purposes of this solicitation:

#### **3.1 Research or Research and Development**

Any activity that is:

- a. **Basic Research.** Scientific study and experimentation to provide fundamental knowledge required for the solution of problems.
- b. **Exploratory Development.** A study, investigation or minor development effort directed toward specific problem areas with a view toward developing and evaluating the feasibility and practicability of proposed solutions.
- c. **Advanced Development.** Proof of design efforts directed toward projects that have moved into the development of hardware for test.
- d. **Engineering Development.** Full-scale engineering development projects for Department of Homeland Security (DHS) or first responder use but which have not yet received approval for production.

#### **3.2 Small Business Concern**

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

- 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.

### ***3.3 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.
- c. A contractor-operated federally funded research and development center, as identified by the National Science Foundation in accordance with a government-wide Federal Acquisition Regulation issued in accordance with section 35(c)(1) of the Office of Federal Procurement Policy Act. ([Click here](#) for a list of eligible FERDCs.)

### ***3.4 Cooperative Research and Development***

For the purposes of the STTR Program cooperative research and Development means research and development conducted jointly by a small business concern and a research institution in which not less than 40 percent of the work is performed by the small business concern, and not less than 30 percent of the work is performed by the research institution. The percent of work is usually measured by both direct and indirect costs; however, proposers should verify how it will be measured with the HSARPA contracting officer during contract negotiations.

### ***3.5 Socially and Economically Disadvantaged Small Business***

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.

### ***3.6 Women-Owned Small Business***

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.

### **3.7 Funding Agreement**

Any contract or grant 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.

### **3.8 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).

### **3.9 Commercialization**

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.

### **3.10 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.

### **3.11 HBCU/MI**

Listings for the Historically Black Colleges and Universities (HBCU) and Minority Institutions (MI) are available through the DTIC website <http://www.dtic.mil/dtic/hbcumi/>.

### **3.12 Historically Underutilized Business Zone (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 [www.sba.gov/hubzone](http://www.sba.gov/hubzone) for more details.

### **3.13 Service-Disabled Veteran**

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

### **3.14 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.

### **3.15 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.

### **3.16 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.

### **3.17 SBIR/STTR Technical Data**

All data generated during the performance of an SBIR/STTR award

### **3.18 SBIR/STTR Technical Data Rights**

The rights a small business concern obtains in data generated during the performance of any SBIR/STTR Phase I, Phase II, or Phase III award that an awardee delivers to the Government during or upon completion of a federally funded project, and to which the Government receives a license.

### **3.19 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.

### **3.20 Foreign National**

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

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

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

"Protected individual" is an alien who is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under 8 U.S.C.1160(a) or 8 U.S.C.1255a(a)(1), is admitted as a refugee under 8 U.S.C.1157, or is granted asylum under section 8 U.S.C.1158; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and

(ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within 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.

## **4.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS**

### **4.1 Proposal Requirements**

A proposal to any topic under the HSARPA SBIR/STTR Program is to provide sufficient information to persuade HSARPA 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 quality of the scientific or technical content of the proposal will be the principal basis upon which proposals will be evaluated. The proposed research or research and development must be responsive to the chosen topic, although need not use the exact approach specified in the topic (see Section 4.1) and unique. Any small business contemplating a proposal for work on any specific topic should determine that (a) the technical approach has a reasonable chance of meeting the topic objective, (b) this approach is innovative not routine, 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.

### **4.2 Administrative and Technical Screening Checklist**

Read and follow all instructions contained in this solicitation. All proposals that fail to address the following items will be considered "non-compliant" and will be eliminated from further consideration.

- a. Submit your proposal electronically via website (<http://www.dhssbir.com>) and prepare your SBIR or STTR proposal as instructed on the website. A complete proposal consists of the proposal cover sheet, technical proposal and cost proposal. Your proposal is not a complete submission unless it has been finalized within the electronic submission system. You will receive email confirmation that your proposal has been submitted. If you do not receive and email, contact the Help Desk or the SBIR/STTR Program as instructed in Section 1.6.
- b. The proposal cost adheres to the topic criteria specified in the solicitation and the cost on the cover sheets matches the cost on the cost proposal.
- c. The Project Summary on the cover sheet contains NO proprietary information. Mark proprietary information within the technical proposal as instructed in Section 5.6.
- d. The content in the technical proposal, including optional documentation (if applicable), shall include all of the items in Section 4.5(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 25 pages.

- 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.

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

#### ***4.3 Proprietary Information***

If information is provided 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 it is clearly marked in accordance with Section 5.6. The cost proposal information will be treated as proprietary whether or not it is indicated.

#### ***4.4 Limitations on Length of Proposal***

This solicitation is designed to reduce the investment of time and cost to small firms 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 25 pages, including proposal cover sheet and cost proposal. Promotional and non-project related discussion is discouraged. The space allocated to each will depend on the problem chosen and the principal investigator's approach. In the interest of equity, pages in excess of the 25-page limitation (including attachments, appendices, or references) will not be considered for review or award.

#### ***4.5 Phase I Proposal Format***

- a. **Proposal Cover Sheets.** Prepare the proposal cover sheets (as provided on the electronic submission website <http://www.ds.sbir.com>), including a brief technical abstract of the proposed R&D project and a discussion of anticipated benefits and potential commercial applications. Once you save the cover sheets, the system will assign a proposal number. You may edit the cover sheets as often as necessary until the solicitation closes. Your cover sheets will count as the first two pages of your proposal no matter how they print out. If your proposal is selected for award, the technical abstract and discussion of anticipated benefits will be publicly released on the Internet; therefore, do not include proprietary information in these sections. **CLASSIFIED PROPOSALS WILL NOT BE ACCEPTED.**
- 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 upload the technical proposal to the HSARPA submission website until you have created a cover sheet and have been assigned a proposal number. Perform a virus check before uploading the technical proposal file. If a virus is detected, it may cause rejection of the proposal. The technical proposal 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 and where the work will be carried out, a schedule of major events, and the final product to be delivered. The Phase I effort should attempt to 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 if the project is successful. (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/STTR 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 foreign nationals 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.**

- a. **Subcontractors/Consultants for SBIR.** Involvement of a university or other subcontractors or consultants in the project may be appropriate. (see Section 2.6) 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 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 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.
- b. **Subcontractors/Consultants for STTR.** All subcontractors, including the research institution partner, must be identified and described according to the Cost Breakdown Guidance. The STTR program may only make awards to small businesses; therefore, the research institution must have a subcontracting arrangement with the small business. More than one subcontractor is allowed; however, the small business must perform at least 40% of the effort and the research institution listed on Proposal Cover Sheet must perform at least 30% of the work. Subcontractor costs and consultant costs must be detailed at the same level as prime contractor costs in accordance with the Cost Breakdown Guidance (in regards to labor, travel, equipment, etc.).

- (10) **Prior, Current, or Pending Support of Similar Proposals or Awards.** *Warning --* While it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see Section 2.8) for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award. If a proposal submitted in response to this solicitation is substantially the same as another proposal that has been funded, is now being funded, or is pending with another Federal Agency, the proposer must so indicate on the Proposal Cover Sheet and provide the following information:

- (a) Name and address of the Federal Agency(s) to which a proposal was submitted, will be submitted, or from which an award is expected or has been received.
- (b) Date of proposal submission or date of award.
- (c) Title of proposal.
- (d) Name and title of principal investigator for each proposal submitted or award received.

- (e) Title, number, and date of solicitation(s) under which the proposal was submitted, will be submitted, or under which award is expected or has been received.
- (f) If award was received, state contract number.
- (g) Specify the applicable topics for each SBIR/STTR proposal submitted or award received.

Note: If Section 4.5.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 Breakdown Guidance](#), using the online cost proposal form on the electronic submission website. Some items in the [Cost Breakdown Guidance](#) may not apply to the proposed project. If such is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to understand how the proposer plans to use the requested funds if the contract is awarded.
- (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 project. 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 HSARPA unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment.
  - (3) Cost for travel funds must be justified and related to the needs of the project. HSARPA requests that you budget, as a minimum, travel to attend a one day meeting with HSARPA Program Management. 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 HSARPA 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 form on the electronic submission website is required to complete the Cost Proposal. If additional cost proposal information is required, it may be placed at the end of your technical proposal.

If necessary, 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 HSARPA contracting officer to substantiate costs (e.g., a brief explanation of cost estimates for equipment, materials, and consultants or subcontractors).

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

#### **4.6 Page Numbering and Bindings**

Number all pages of your proposal consecutively. The cover sheets are pages 1 and 2. The technical proposal begins on page 3.

#### **4.7 Phase II Proposal Invitation**

HSARPA Program Managers for the applicable topic will invite Phase I performers 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 funding available, and the quality of the Phase I research. HSARPA reserves the right to invite all, some, or none of the Phase I awardees in a topic to submit Phase II proposals.

HSARPA SBIR/STTR may invite a Phase I contractor 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 has been reserved for those deserving Phase I projects that require the maximum period of performance to complete the Phase I effort. HSARPA will evaluate each Phase II proposal when received, and if the proposal is deemed to be highly rated, will enter into negotiations for award. The goal is to accelerate the technology development and reduce, or eliminate, the gap between the Phase I and Phase II efforts.

Invitations to submit a Phase II is the onset of the Phase II review process and not a commitment for award. An invitation to submit a Phase II proposal does not qualify as a Phase II award; each Phase II proposal must meet the SBIR/STTR Phase II criteria in the solicitation as well as undergo the HSARPA source selection process.

Phase I contractors that do not receive an invitation to submit a Phase II may conclude that HSARPA assessed the accomplishments of the Phase I effort and determined it did not demonstrate further consideration beyond the Phase I funding level. All contractors will be notified of Phase II invitation status after the Phase I period of performance has been completed. All Phase I awardees will receive a letter of notification of the Phase II invitation status from the HSARPA SBIR/STTR program.

Phase I contractors that are not invited to submit a Phase II proposal, may however submit a Phase II proposal in response to the FY06.1 solicitation, and such proposals must be received no later than 30 days from the Phase II invitation status notification. However, please keep in mind that the probability of selection for funding is low, since HSARPA will consider the technical results and performance of the Phase I as Phase II's are a continuation of the research effort from the completed Phase I.

#### **4.8 Phase II Proposal Format**

Phase II Proposal length is limited to 50 pages, using a type size no smaller than a 12-point font on standard 8 ½ X 11” paper with one (1) inch margins. No two-column format is allowed.

- a. Each Phase II** proposal must contain Proposal Cover Sheets, a Technical Proposal, Cost Proposal and Company Commercialization Report. See section 4.5. 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 5.4).

Offerors 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 5.6

#### **f. c. Company Commercialization Report**

For those firms that submit a Phase II proposal, a succinct commercialization report must be included with the proposal. The Company Commercialization Report is submitted online in accordance with Section 4.5. This report is required only for Phase II proposals that have received prior SBIR/STTR Phase II funding. 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 section 5.4

1. Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR/STTR 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 conducted under each Phase II award.

Update the information in the Company Commercialization Report for any prior Phase II award received by the firm. The firm 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.

Additional instructions regarding Phase II proposal preparation and submission is on the <http://www.dhssbir.com> website.

#### **4.9 False Statements**

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, or a violation of other criminal statutes.

### **5.0 METHOD OF SELECTION AND EVALUATION CRITERIA**

#### **5.1 Introduction**

Phase I proposals will be evaluated on a competitive basis and will be considered to be binding for six (6) months from the date of closing of this solicitation unless the offeror states otherwise. If selection has not been made prior to the proposal's expiration date, offerors will be requested as to whether or not they want to extend their proposal for an additional period of time. 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 HSARPA SBIR/STTR program as described in Section 1.6 to determine whether submission of such a proposal would be useful.)

Proposals found to be relevant will then be evaluated using the criteria listed in Section 4.2. Final decisions will be made based upon these criteria and consideration of other factors including possible duplication of other work and program balance. In the evaluation and handling of proposals, every effort will be made to protect the confidentiality of the proposal and any evaluations. There is no commitment by HSARPA to make any awards on any topic, to make a specific number of awards or to be responsible for any monies expended by the proposer before award of a contract.

For proposals that have been selected for contract award, a Government Contracting Officer will draw up an appropriate contract to be signed by both parties before work begins. Any negotiations that may be necessary will be conducted between the offeror 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.

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

Phase II Proposals will be subject to a technical review process similar to Phase I. Final decisions will be made 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. HSARPA is not obligated to make any awards under Phase II, and all awards are subject to the availability of funds. HSARPA is not responsible for any monies expended by the proposer before award of a contract.

Upon written request and after final award decisions have been announced, evaluation results will be provided to unsuccessful offerors on their Phase II Proposals (see Section 6.4). Restrictive notices notwithstanding, Phase II Proposals may be handled, for administrative purposes only, by support contractors. All support contractors are bound by appropriate non-disclosure agreements.

### ***5.2 Evaluation Criteria - Phase I***

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

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

Where technical evaluations are essentially equal in merit, cost to the Government and length of schedule will be considered in determining the successful offeror.

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., should be contained or referenced in the proposal and will count towards the 25-page limit.

### ***5.3 Evaluation Criteria – Phase II***

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

- a. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
- b. The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization as assessed utilizing the criteria in Section 4.4.

- 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.

The reasonableness of the proposed costs of the effort to be performed will be examined to determine those proposals that offer the best value to the Government. Where technical evaluations are essentially equal in merit, cost to the Government and length of schedule will be considered in determining the successful offeror.

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

#### ***5.4 Assessing Commercial Potential of Proposals***

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

- a. The proposer's commercialization strategy (see Section 4.5.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/STTR programs, or other sources, and
  - (2) any Phase III follow-on funding commitments; and
- b. The proposer's record of commercializing its prior SBIR/STTR 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 END USER.

#### ***5.5 Special Funding and Period of Performance considerations***

- a. Under special circumstances, requests for supplemental funds or modifications to an existing SBIR/STTR II contract and requests for an extension of the period of performance with or without funds may be considered.
- b. DHS SBIR/STTR has allowed flexibility regarding the award amount for the Domestic Nuclear Detection Office (DNDO), topic H-SB06.1-010, within HSARPA based on the wide variance of funds required for this technology. DHS SBIR/STTR will allow DNDO offerors to propose up to \$150,000 for Phase I SBIR/STTR efforts without justification; and up to \$1,000,000 for Phase II SBIR/STTR efforts without justification.

#### ***5.6 SBIR/STTR Phase II Cost Match***

- a. **General Provisions of the HSARPA SBIR/STTR Cost Match Program.** The HSARPA SBIR/STTR program has implemented a Cost Match program for SBIR/STTR

projects that attract matching cash from an outside investor for the Phase II SBIR/STTR effort. The purpose is to focus SBIR/STTR 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/STTR, government program; they do not include the owners of the small business, their family members, and/or affiliates of the small business. The outside investors must commit a minimum of \$100,000 up to a maximum of \$500,000. HSARPA will, at its option, match up to 50% of funds received. The SBIR/STTR 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 government award for the Phase II plus cost match cannot exceed \$1,000,000, and for the DNDO, topic H-SB06.1-010, Phase II cost match not to exceed \$1,250,000.

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/STTR Phase II Cost Matching.** To qualify for the SBIR/STTR Cost Match program, a company must be a Phase I awardee submitting a Phase II proposal or Phase II awardee. The company is encouraged to discuss the application with the SBIR/STTR program manager. The awardee is to follow Phase II proposal instructions and guidance but provide the cost matching documentation and request for matched funding.

1. A Phase II proposal must be submitted electronically on the HSARPA Electronic Submission website ([www.dhssbir.com](http://www.dhssbir.com)).
2. The proposing company must:
  - a. State that the outside investor will match funding in the SBIR/STTR 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 Matching investment, and the investor qualifies as an "outside investor," as defined above. Additional guidance on Cost Matching can be found at the on the website: <http://www.dhssbir.com/UsefulLinks.asp>
  - 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/STTR 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' ability to successfully commercialize technology, the investor's assessment of the market for this particular SBIR/STTR technology, and of the ability of the company to bring this technology to market.
    - b. The investor(s) must provide a letter of commitment, signed by the investor(s), containing a commitment to provide a minimum of \$100,000 or up to \$500,000 Phase II Cost Matching funding, in cash, contingent on the company's selection or performance on the Phase II award.
  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 accordance with the SBIR/STTR Cost Match procedures." The letter must be sent to the HSARPA appointed contracting office along with a copy of the company's bank statement showing the funds have been deposited. **IMPORTANT: If the HSARPA 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 HSARPA SBIR/STTR 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/STTR Cost Match. HSARPA 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; it must include a brief accounting (in the company's own format or format that has been provided by the HSARPA PM) of how the investor's funds were expended to support the project.

## 6.0 CONTRACTUAL CONSIDERATIONS

Note: Eligibility and Limitation Requirements (Section 1.3) Will Be Enforced

### 6.1 Phase I Awards

**a. Number of Phase I Awards.** The number of Phase I awards will be consistent with the agency's budget and the number of anticipated Phase II contracts. No Phase I contracts will be awarded until all qualified proposals (received in accordance with Section 6.2) 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.

**b. Type of Funding Agreement.** All winning proposals will be funded under negotiated contracts and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making firms for R/R&D work.

**c. Average Dollar Value of Awards.** Phase I awards to small businesses will typically cover a one-half person-year effort over a period not to exceed six months (subject to negotiation). Public Law 102-564 allows agencies to award Phase I contracts up to \$100,000 without justification.

DHS SBIR/STTR has allowed flexibility regarding the Average Dollar Value in the DNDO technology area within HSARPA based on the wide variance of funds required for this type of technology. DHS SBIR/STTR will allow DNDO, topic H-SB06.1-010, Phase I offerors to propose up to \$150,000 without justification.

**d. Timing of Phase I Awards.** The anticipated time between the date that this solicitation closes and the award of the Phase I is less than six (6) months.

### 6.2 Phase II Awards

**a. Number of Phase II Awards.** The number of Phase II awards will depend upon the results of the Phase I efforts and the availability of funds. HSARPA anticipates that approximately 30 percent of its Phase I awards will result in Phase II projects.

**b. Type of Funding Agreements.** Each Phase II proposal selected for an award will be funded under a negotiated contract or other agreement type and may include a reasonable fee or profit consistent with normal profit margins provided to profit-making firms for R/R&D work.

**c. Average Dollar Value of Awards.** Phase II awards will typically cover two to five person-years of effort over a period generally not to exceed 24 months. PL 102-564 states that the Phase II awards may be up to \$750,000 each without justification. DHS SBIR/STTR will allow DNDO, topic H-SB06.1-010, Phase II SBIR/STTR offerors to propose up to \$1,000,000 without justification.

**d. Timing of Phase II Awards.** Phase II awards will be made incrementally, as quickly as possible, to maintain the momentum of the Phase I effort. The Phase II Proposal invitation process is an attempt to identify expeditiously those Phase I awardees deserving of Phase II awards. HSARPA reserves the right to evaluate individual Phase II Proposals when received and make Phase II proposal invitations incrementally, to some, all, or none of the Phase I performers.

### 6.3 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 HSARPA. 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: HSARPA, 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 via the HSARPA website: <http://www.dhssbir.com>. 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 and on the HSARPA Website: [www.dhssbir.com](http://www.dhssbir.com).

### 6.4 Commercialization Updates in Phase II

If, after completion of Phase I, the contractor is awarded a Phase II contract, the contractor shall be required to periodically update the following commercialization results of the Phase II project through the Website at [www.dhssbir.com](http://www.dhssbir.com)

- 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/STTR 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 HSARPA 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/STTR program;
- e. Growth in number of firm employees; and
- f. Whether the firm has completed an initial public offering of stock (IPO) resulting, in part, from the Phase II project.

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

### **6.5 *Payment Schedule***

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

Phase II Funding awards may be Cost-Plus contracts or other types of funding agreements. Progress payments are allowed in accordance with the negotiated price and payment schedule. Provisions for payment of a fee or profit are also allowable. Final payment will follow completion of contract performance and acceptance of all work required under the agreement.

### **6.6 *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" (not "Company Confidential") and provided that the following legend that appears on the Proposal Cover Sheet of the proposal is completed:

"For any purpose other than to evaluate the proposal, this data except proposal cover sheet shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if a contract is awarded to the proposer as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use or disclose the data to the extent provided in the funding agreement. 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 may 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" (not "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 HSARPA 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 HSARPA pursuant to the Act is properly determined. *Classified Phase I proposals will not be accepted under the HSARPA SBIR/STTR program.*

### **6.7 Copyrights**

With prior written permission of the contracting officer, the awardee may copyright (consistent with appropriate national security considerations, if any) material developed with HSARPA support. HSARPA receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgment and disclaimer statement.

### **6.8 Patents**

Small business firms normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty-free license for its use, reserves the right to require the patent holder to license others in certain limited circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 USC §205, the Government will not make public any information disclosing a Government-supported invention for a period of five years to allow the awardee to pursue a patent.

### **6.9 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/STTR data. See FAR clause 52.227-20, "Rights in Data -- SBIR Program."

### **6.10 Contractor Commitments**

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

- a. **Standards of Work.** Work performed under the contract must conform to high professional standards.
- b. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all reasonable times.
- c. **Examination of Records.** The Comptroller General (or a fully authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.
- d. **Default.** The Government may terminate the contract if the contractor fails to perform the work contracted.
- 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 upon an understanding for compensation except bona fide employees or commercial agencies maintained by the contractor for the purpose of securing business.
- m. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.
- n. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract.
- o. **Security Requirements.** The contractor shall safeguard any classified information associated with the contracted work in accordance with applicable regulations.
- p. **American-Made Equipment and Products.** When purchasing equipment or a product under the SBIR/STTR funding agreement, purchase only American-made items whenever possible.

### **6.11 Contractor Registration**

Before HSARPA can award a contract to a successful proposer under this solicitation, the proposer must be registered in the Central Contractor Registration (CCR) database. The CCR allows Federal Government contractors or firms interested in conducting business with HSARPA to provide basic information on business capabilities and financial information. To register, visit [www.ccr.gov](http://www.ccr.gov) or call 1-888-227-2423.

### **6.12 Invention Reporting**

SBIR/STTR awardees must report inventions to the awarding agency within two (2) months of the inventor's report to the awardee. The reporting of inventions may be accomplished by submitting paper documentation, including fax, or through the Edison Invention Reporting System at [www.iedison.gov](http://www.iedison.gov).

### **6.13 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/STTR 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. Proposal Preparation Costs.** The Government is not responsible for any monies expended by the proposer before award of any contract.
- d. 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.
- e. Duplication of Work.** If an award is made pursuant to a proposal submitted under this Program 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.
- f. Classified Proposals.** Classified proposals for Phase I are not accepted under the HSARPA SBIR/STTR program.

## **7.0 SUBMISSION OF PROPOSALS**

Each proposal must be submitted on the HSARPA electronic submission website at <http://www.dhssbir.com> and contain a completed:

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

### ***7.1 Electronic Proposal Submission***

For complete electronic proposal submission on the HSARPA electronic submission website, first prepare the proposal cover sheet (select "Prepare/Edit Phase I Cover Sheet" from the Main Menu). The website will assign the cover sheet a proposal number, which will be used for tracking throughout the submission process. Prepare the technical proposal in a single PDF file, check it for viruses, and upload it to the submission website, following instructions on the website. The cost proposal may be submitted either using the on-line form or as the last page(s) of your technical proposal file. Technical proposals should be a single file, including all graphics and attachments, should have the company name and proposal number (from the cover sheets) in the header, and should be in Portable Document Format (PDF). Offerors are responsible for performing a virus check on each technical proposal prior to uploading. Every uploaded file will be scanned for viruses. If a virus is detected, the file will be deleted and may cause rejection of the proposal. Once uploaded, the technical proposal file may be viewed or downloaded from the website by clicking on the Check Upload button. Offerors are responsible for verifying that the technical proposal was received and converted properly. Technical proposals may be uploaded as often as necessary, each time overwriting the file previously submitted. Once a file is overwritten, the previous version is NOT retrievable. Offerors electing to modify their proposals in any way must allow enough time to upload a complete updated proposal. Failure to provide a complete modification by the solicitation closing will render the offeror's proposal as "late" regardless of whether the offeror had previously submitted a complete proposal. Once the "Submit Proposal," button has been selected; an email confirmation receipt will be forwarded to your email account upon successful submission of your proposal. Signatures are not required on the cover sheets and cost proposal for electronic submission. If the proposal is selected for award, HSARPA will contact you for signatures.

Proposals are accepted from **10 March, 2006 – 10 April, 2006**. Deadline for electronic receipt of proposals is 4:00 pm ET 10 April 2006. Proposals must be completely submitted to the HSARPA submission website by the specified closing time. Complete submission means that the entire proposal (including the following three (3) parts: cover sheets, technical proposal, and cost proposal) has been properly completed and fully transmitted to the HSARPA submission website and date stamped. The solicitation deadline is firm. As the close date draws near, heavy traffic on the web server may cause delays. Plan ahead and leave ample time to prepare and submit your proposal. Offerors bear the risk of website inaccessibility due to heavy usage in the final hours before the solicitation closing time. In accordance with FAR 52.215-1, offerors are responsible for submitting proposals, and any modification, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation.

### ***7.2 Notification of Proposal Receipt***

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

### ***7.3 Information on Proposal Status***

Evaluation of Phase I proposals and award of contracts will be expedited, but no information on proposal status will be available until the final selection is made. However, contracting officers may contact any and all qualified proposers prior to contract award. Selections will be posted on the HSARPA SBIR/STTR website when all selected proposals have been negotiated for award within six months of the solicitation closing date.

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

#### **7.4 Evaluation Results**

Any offeror that submits a 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. The request should be emailed to [faq@hsarpasbir.com](mailto:faq@hsarpasbir.com).

#### **7.5 Correspondence Relating to Proposals**

All correspondence relating to proposals should cite the SBIR/STTR solicitation number, proposal number, and specific topic number.

### **8.0 SCIENTIFIC AND TECHNICAL INFORMATION**

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

### **9.0 TECHNICAL TOPICS**

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

HSARPA 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 HSARPA SBIR/STTR goal is to pursue as many innovative research ideas and concepts that promote homeland security with the potential for commercialization.

HSARPA has identified technical topics to which small businesses may respond in the first part of the fiscal year (FY 2006) solicitation (FY06.1). Please note that these topics are UNCLASSIFIED and only UNCLASSIFIED Phase I proposals will be entertained. Although the topics are unclassified, the subject matter may be considered to be a "critical technology." If you plan to employ Non-U.S. citizens in the performance of an HSARPA SBIR/STTR contract, please identify these individuals in your proposal as specified in Section 4.5.b(7) of the program solicitation. 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.

ELECTRONIC SUBMISSION of Cover Sheet, Technical and Cost proposal **IS REQUIRED**. Only proposals submitted through the on-line submission website at <http://www.dhssbir.com> will be accepted or considered for award. Proposals must be prepared and submitted in accordance with the instructions below.

#### **HELPFUL HINTS:**

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

- Perform a virus check.
- Signature is no longer required at the time of submission.
- If you encounter problems during electronic submission call toll free at 1-800-754-3043.

- Facsimile (fax) or e-mail proposals submissions will not be accepted.

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

Phase I STTR awards are limited to \$100,000, and should not exceed one year. Phase I offerors submitting to DNDO, topic H-SB06.1-010 are permitted to propose up to \$150,000, and should propose a six-month or less period of performance.

HSARPA Phase II proposals will be invited by the respective Phase I HSARPA Program Manager. Phase II invitations will be based upon progress toward meeting the Phase I technical objectives, on the technical results reflected in the monthly and/or final reports, by site visits conducted by HSARPA, and plans for Phase II.

Prior to receiving a contract award, the small business **MUST** be registered in the Centralized Contractor Registration (CCR) Program. You may obtain registration information by calling 1-888-352-9333 and pressing 3 or Internet at [www.ccr.gov](http://www.ccr.gov).

SBIR/STTR proposals will be processed and distributed to the appropriate technical office within HSARPA for evaluation and action. HSARPA Program Managers may seek technical advice from qualified Federal employees and/or from technical and business experts. In all cases, designated HSARPA support contractor personnel (who also have signed Non-Disclosure Agreement and Conflict of Interest Agreement) will handle the administrative responsibilities and procedures for the program. HSARPA selects proposals for funding based on technical merit and the evaluation criteria contained in this solicitation document.

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

- Cost proposals will be considered to be binding for 180 days from closing date of solicitation.
- Successful offerors will be expected to begin work no later than 30 days after contract award.
- For planning purposes, the contract award process is normally completed within 45 to 60 days from issuance of the selection notification letter to Phase I offerors.
- HSARPA holds kick-offs meetings with all successful bidders approximately two weeks after contract award to discuss the SBIR/STTR program and reporting, invoicing, technical objectives and other subjects.

### **9.1 HSARPA STTR Model Agreement**

A Model Agreement for small business concerns and non profit organizations, can be accessed on the HSARPA SBIR website: <http://www.dhssbir.com>

**9.2 HSARPA TOPICS -- HSARPA Small Business Fiscal Year 06 Publication 1**

- H-SB06.1-001** AEROSOL COLLECTION INTO LOW ANALYSIS VOLUMES (ACLAV)
- H-SB06.1-002** RELIABLE PEROXIDE-BASED EXPLOSIVES DETECTION WITH LOW FALSE ALARM RATE
- H-SB06.1-003** ENHANCED EXPLOSIVE SAMPLE COLLECTION AND/OR PRECONCENTRATION SYSTEMS
- H-SB06.1-004** SIGNAL PROCESSING FOR A SOUTHERN BORDER SURVEILLANCE SYSTEM
- H-SB06.1-005** HUMAN DETECTOR FOR CARGO SHIPPING CONTAINERS
- H-SB06.1-006** INSTANTANEOUS REMOTE SENSING DATA RECEIVING AND PROCESSING FOR EMERGENCY RESPONSE
- H-SB06.1-007** NETWORK-BASED BOUNDARY CONTROLLERS
- H-SB06.1-008** BOTNET DETECTION AND MITIGATION
- H-SB06.1-009** MANAGING MULTI-MEDIA SURVEILLANCE INFORMATION NETWORKS

**9.3 DNDO TOPIC -- DNDO Small Business Fiscal Year 06 Publication 1**

- H-SB06.1-0010** NON-NUCLEAR SOURCES OR TECHNIQUES TO REPLACE NUCLEAR SOURCES IN COMMERCIAL (NON-MEDICAL) APPLICATIONS

**SBIR/STTR TOPIC NUMBER: H-SB06.1-001**

**TITLE: AEROSOL COLLECTION INTO LOW ANALYSIS VOLUMES (ACLAV)**

**TECHNOLOGY AREAS:** Biological Countermeasures, Detection

**OBJECTIVE:** Design, develop and test devices to collect aerosols into small volumes for subsequent biological or chemical analysis for threat detection.

**DESCRIPTION:** Highly sensitive biological analysis instrumentation is only capable of performing analysis on sample volumes on the order of microliters, whereas current aerosol collection methods produce liquid samples on the order of milliliters. This difference in sample size produces a large loss of system sensitivity, and represents inefficient system resource utilization. The focus of this effort is to produce an aerosol collector system that produces a liquid sample of no more than 300 microliters, while maintaining the equivalent of a 100 liter per minute collection with 90% efficiency of aerosols between 1 and 10 microns. Proposed systems should consider the efficiency of the entire collection process, in order to produce the most efficiently collected sample that can be presented to an analysis stage. This would include reducing or eliminating efficiency losses due to elution from a solid surface or collection fluid. Other considerations include: operational cost of the device (which includes consideration for disposables or reuse of components), the time lag between collection and presentation of the sample to the analysis unit, issues with clogging or decrease in sampling efficiency over time, and power and space requirements.

**PHASE I:** Perform necessary design and analysis to support development of proposed concepts and assess feasibility. Perform first-order testing to validate core technical concepts and to develop system model to evaluate overall system efficiency and identify technical risk areas and critical system components.

**PHASE II:** Execute focused technology development for risk reduction and develop prototype design. Provide engineering prototypes for delivery and testing in government-sponsored test-bed. Provide support to test-bed in identification of critical system risks and assist in development of experimental design.

**PHASE III COMMERCIAL APPLICATIONS:** Establish relationships with commercial and government entities to further mature demonstrated system, improve manufacturability and eventual production. Successfully developed technologies in this program would transition to commercial products for federal, state and local homeland security applications. Identify government and commercial application of core technologies for other than stated purposes..

**REFERENCES:** Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC).

**KEYWORDS:** biological, chemical, aerosols, sampling

**TECHNICAL POINT OF CONTACT:** Mr. Mike McLoughlin, 202.254.6134  
michael.mcloughlin@dhs.gov

**SBIR/STTR TOPIC NUMBER: H-SB06.1-002**

**TITLE: RELIABLE PEROXIDE-BASED EXPLOSIVES DETECTION WITH LOW FALSE ALARM RATE**

**TECHNOLOGY AREAS:** Explosives detection, transportation security.

**OBJECTIVE:** Develop or modify a reliable, easy to use, portable device for detecting trace amounts of peroxide-based explosives from particulates which has superior capabilities to any existing equipment.

**DESCRIPTION:** There is a growing need for the ability to detect trace amounts of peroxide-based explosives on individuals traveling by means of public transportation. Peroxide-based materials are of interest because they are generally known to be used for homemade explosives (HME). This type of explosive, while not complex, is highly dangerous because the components are easily obtainable; typical peroxide-based HMEs are made from peroxide and sugar.

The main locations for using such detection devices will be airports, train stations, bus depots, or other areas where passengers are required to purchase a ticket for transportation (although the source for sampling should not be limited to tickets).

Trace detection technologies are being used at various airports but the devices are not hand-held and are used to detect other types of explosives. We are seeking to build on research and development already being performed to incorporate portability of trace detection devices that can detect peroxide-based explosives. A desired capability includes a decreased dependence on use of a substrate (i.e. tickets).

**PHASE I:** Evaluate technologies to detect trace amounts of peroxide-based explosives. Develop a design that will build on those technologies that will include portability and novel ways for sample collection of peroxide-based explosives. Present prototype design and proof of feasibility.

**PHASE II:** Develop and fabricate the prototype system and run laboratory and field testing, including testing to determine and assess the false alarm rate.

**PHASE III COMMERCIAL APPLICATIONS:** Work with commercial entities to demonstrate manufacturability of demonstrated system which would have commercial and military application and identify commercial applications of underlying technologies for other than stated purposes.

**REFERENCES:**

Hannum, D. and J. Parmeter, "Survey of Commercially Available Explosives Detection Technologies and Equipment," Office of Science and Technology, Washington D.C.: U.S. Department of Justice, National Institute of Justice, National Law Enforcement and Correction Technology Center Report, September 1998, NCJ 171133.

Moore, D. "Instrumentation for Trace Detection of High Explosives." American Institute of Physics 2004: vol. 75 no. 8, 2499-2512.

National Research Council of the National Academies. Containing the Threat from Illegal Bombs. Washington, DC: National Academy Press, 2003.

National Research Council of the National Academies. Existing and Potential Standoff Explosives Detection Techniques. Washington, DC: National Academy Press, 2003.

National Research Council of the National Academies. Opportunities to Improve Airport Passenger Screening with Mass Spectrometry. Washington, DC: National Academy Press, 2003.

KEYWORDS: explosives, detection, peroxide-based

TECHNICAL POINT OF CONTACT: Mr. Trent DePersia, [trent.depersia@dhs.gov](mailto:trent.depersia@dhs.gov), 202.254.6152

CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-003**

**TITLE: ENHANCED EXPLOSIVE SAMPLE COLLECTION AND/OR  
PRECONCENTRATION SYSTEMS**

**TECHNOLOGY AREAS:** Explosives Detection

**OBJECTIVE:** Enhanced sample collection and/or pre-concentration systems are needed to improve the effectiveness of trace explosive detection systems. Collection systems employing *non-contact*, or otherwise *non-intrusive* methods of sampling, although not required, are highly desirable. Proposed particle and vapor systems should be amendable to a number of applications including, but not limited to, *walk-through* detection portals and handheld detection scenarios. Design considerations should include cleaning procedures as well as the incurred costs of expendables.

**DESCRIPTION:** Trace explosive detection equipment has been developed for a broad range of applications and venues. In many cases, these *Commercial Off-the-Shelf (COTS)* devices are not limited by the sensitivity or selectivity of the techniques, rather from the shortcomings of the particular sampling interface. Such limitations arise from the low vapor pressures of explosives and/or the low levels of explosive residue associated with domestic screening applications. This solicitation seeks technology-based solutions to address these inherent shortcomings as related to (Option A) *Ion Mobility Spectrometry (IMS) based COTS detectors* and (Option B) non-IMS and/or other unconventional detection technologies. Individual submissions shall address either Option A or Option B but NOT address both Options A and B.

The aforementioned limitations have restricted most domestic operational concepts to contact sampling (i.e., “patch” or “ticket” swabbing). Desirable capabilities of the proposed system include the following:

- Non-contact means of sampling
- Short interrogation/collection time (< 6 sec) -or- ability for continuous collection and subsequent detection
- Flexible Concept of Operations (CONOPs) options (e.g., vehicle and people screening)
- Particle and vapor sampling
- Means of selective sampling (based upon chemical and/or physical properties)

**PHASE I:** Demonstrate the feasibility of the proposed technical approach. A laboratory demonstration, although not required, is desirable. The chemical and/or physical basis of the proposed technology should be described.

**PHASE II:** Develop prototype system and integrate with a mutually acceptable trace explosive detector. For Option A, this integration will be with a COTS IMS system. For Option B, integration will be with a mutually acceptable trace detection system (or prototype), not limited to IMS. Analytical characterization of the prototype system, with the pre-selected detector, should be documented to quantitatively demonstrate enhanced sampling capability.

PHASE III COMMERCIAL APPLICATIONS: In addition to homeland security and defense applications, enhanced sampling capabilities are required by state and federal law enforcement entities as well as private security organizations.

REFERENCES:

1. *Survey of Commercially Available Explosives Detection Technologies and Equipment 2004*, prepared by Sandia National Laboratories for The National Law Enforcement and Correction Technology Center, a Program of the National Institute of Justice, U.S. Department of Justice, November 2004.
2. Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC).

KEYWORDS: Trace Explosives, Explosives Detection, Sampling, Portals, Vapor Detection

TECHNICAL POINT OF CONTACT: Mr. Trent DePersia, 202.254.6152,  
trent.depersia@dhs.gov

CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-004**

**TITLE: SIGNAL PROCESSING FOR A SOUTHERN BORDER SURVEILLANCE SYSTEM**

**TECHNOLOGY AREAS:** Border and Transportation Security

**OBJECTIVE:** Develop signal processing algorithms for a cost effective land based surveillance system that can be used by the Border Patrol along the Southern Border for detection and tracking of people and vehicles. Perform data collection and analysis and/or modeling and simulation to validate the signal processing approach.

**DESCRIPTION:** The concept is a network of fixed land based sensors along the Southern border to detect people and vehicles crossing the border in rural areas. The fixed sensors can be augmented by low cost mobile sensors. The focus of this topic is to validate signal processing for reliable detection, tracking, and classification of small, slow moving targets in a high clutter environment. The offeror will identify a proposed system architecture and requirements for hardware components. The offeror will define signal processing and algorithm components and an approach to demonstrate high probability of detection ( $P_d$ ), low false alarm rate ( $P_{fa}$ ), and low false target rate for people walking, groups of people walking, and moving vehicles.

Bidders should have a specific surveillance suite in mind. Proposals to study non-specific possible alternatives will not be favorably received. Low-cost and COTs solutions for hardware and communications will be favorably received.

The innovation sought is principally in the signal processing proposed. The Offeror will also fully describe the sensor(s) performance against various targets in various conditions, and the basis of the range and detection parameters postulated. Any communications systems proposed to support the surveillance should be described.

**PHASE I:** This phase of the research will consist solely of development of the performance of the proposed sensor suite and the signal processing and algorithm components needed to achieve high  $P_d$ , and low  $P_{fa}$ , based on the proposed sensor(s). It will culminate in concept review at the contractor's site.

**PHASE II:** This phase will include the collection, analysis, and processing of field data at the Southern border (or Southern border-like region), and/or the modeling and simulation of the effectiveness of the surveillance system using the proposed signal processing techniques. Provide Modeling and Simulation or Data Collection results that support the  $P_d$  and  $P_{fa}$  for the proposed system. Include the estimated acquisition and support cost for Phase III work.

**PHASE III COMMERCIAL APPLICATIONS:** The Phase III work will include fielding a portion of the surveillance network. The portion fielded must be able to be scalable to a realistic network that would provide surveillance for long distances in rural areas..

**REFERENCES:** Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC).

KEYWORDS: land based surveillance, signal processing

TECHNICAL POINT OF CONTACT: Leslee Shumway, 202.254.5628,  
leslee.shumway@dhs.gov

CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-005**

**TITLE: HUMAN DETECTOR FOR CARGO SHIPPING CONTAINERS**

**TECHNOLOGY AREAS: CARGO SECURITY, CONTAINER SECURITY, CHEMICAL SENSOR**

**TECHNOLOGY AREAS:** Border and Transportation Security, Border Watch, Container Security

**OBJECTIVE:** Design, develop and demonstrate a low cost, low power, chemical sensor that reliably detects human(s) hiding in cargo shipping containers. A vital aspect is the operational conditions in which intermodal shipping containers operate given the objective for detection of human presence in these containers. A device is sought with low cost, low power usage, high component reliability, and ability to operate in the harsh intermodal shipping environment

**DESCRIPTION:** Humans hiding in shipping containers are a threat to homeland security and detection means are sought to reliably identify the presence of individual(s). The device should have a low acquisition cost (\$100-\$150) with very low power usage (500 uA to 1 mA). Duty cycling the sensor for human detection in the early part of the trip (e.g., within four hours after container door is closed and loading is generally accomplished) is desired. Approaches must demonstrate a promising method for providing a very low false alarm rate while ensuring successful detection, that is, the device's ability to successfully detect human presence from non-threat materials that might otherwise trigger an alarm. The desired operating lifetime of the device is five years. The device size is envisioned to be small, 2"x 2"x 1", battery-powered, environmentally sealed, and ruggedized and capable of surviving all handling and transportation modalities

Responses must consider the harsh operating environment of intermodal shipping containers. The device should be able to operate satisfactorily and survive in the range of environmental conditions including extreme ranges for temperature, thermal shock, humidity, shock (e.g. handling drop, container drop, conveyance shocks), vibration, rain/snow, salt fog, sand and dust, submersion, electromagnetic electricity, static electricity, fungus, cleaning (of containers).

The device should be able to operate independently, or be integrated into another system. Stand alone functionality requires event time and date stamping, alert detection, notification and recording, data logging and battery status indication. Ideally, communications with the device will be over a wireless interface (e.g., RF, IR) with a hardwire interface as a required back up. As an integrated component of another system, such as the Advanced Container Security Device (ACSD) currently under development by HSARPA (see Reference), the functionality of event time and date stamping, alert detection, notification and recording, data logging and battery status indication must be maintained. In order to be capable of integration into the ACSD or similar system, a standard physical interface will be required. This interface is to be determined and will be defined by HSARPA as part of the ACSD Performance Specification.

Lessons Learned. Chemical sensors currently available in the market place require large amounts of power relative to the total power budget and the required device life. Many cargoes out-gas during transit so detection systems must be able to differentiate goods being shipped

from people. Combining sensors/detectors (collaborative affect) may help improve probability to detect and reduce false alarms.

PHASE I: The Phase I effort will demonstrate the feasibility of the proposed concept to accurately and reliably detect humans within shipping containers

PHASE II: A prototype will be designed, developed, fabricated and tested in Phase II. This prototype must be able to demonstrate the capability of the device to perform as proposed in a container with both benign and challenging cargo. Several prototypes will be delivered to the government to conduct further testing.

PHASE III PROTOTYPE DEVELOPMENT: Technology successfully developed and demonstrated in this program will transition to commercial security products for supply chain security, as well as other Homeland Security and possibly DoD applications, such as detection of stowaways aboard ship or aircraft.

REFERENCES: Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC). Also look to the medical field and chemical detection areas (Industrial Hygiene) for alternate sources of information.

HSARPA BAA 04-06 Advanced Container Security Device (ACSD)  
[http://www.hsarpabaa.com/Solicitations/AdvConSecDev\\_BAA\\_FINAL\\_508.pdf](http://www.hsarpabaa.com/Solicitations/AdvConSecDev_BAA_FINAL_508.pdf)

Refer to existing standards for environmental specifications and testing applicable to shipping containers and devices that must uphold to comparable rigor

- ISO\_DIS\_18185-3.2 -- Draft Freight Containers, Electronic Seals, Part 3 Environmental Characteristics
- ISO\_1496-1 -- Series 1 Freight Containers, Specification and Testing, Part 1 General Cargo Containers for General Purposes
- ISO\_10374 -- Freight Containers, Automatic Identification (Environments listed in Annex A)
- MIL-STD-810F -- Test Method Standard for Environmental Engineering Considerations and Laboratory Tests
- MIL-HBK-310 -- Global Climatic Data for Developing Military Products
- STANAG-2985 -- NATO Extreme Climatic Conditions and Derived Conditions for Use in Defining Design/Test Criteria for NATO Forces Materiel
- MIL-STD-202G -- Test Method Standard Electronic and Electrical Components Parts
- MIL-STD167B -- Mechanical Vibrations of Shipboard Equipment

KEYWORDS: Human detector, chemical sensor, low power, container, cargo security

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**SBIR/STTR TOPIC NUMBER: H-SB06.1-006**

**TITLE: INSTANTANEOUS REMOTE SENSING DATA RECEIVING AND PROCESSING FOR EMERGENCY RESPONSE**

**TECHNOLOGY AREAS:** Emergency Preparedness and Response

**OBJECTIVE:** Develop innovative solutions to (a) ingesting a variety of remote sensing data in near-real time from airborne platforms; (b) transmit derived image-based products to field emergency centers and national operations facilities. Demonstrate these solutions in a vehicle or other platform that is deployable in disaster relief efforts.

**DESCRIPTION:** Lessons learned from Hurricanes Katrina and Rita showed that there is an urgent need for improved situational awareness using local geographic data of the incident linked to near real-time images. There is presently an unreasonable latency in transmitting imagery and geospatial products of disaster impact to state and federal operations centers. The ability to share these data and the analysis that follows catastrophic events through a NIMS compliant communications protocol with local, state, and federal emergency response teams is critical for a common operating picture at all levels of incident response. The capability to conduct these functions must be rapidly deployable to the incident for maximum effectiveness.

Innovative solutions are sought for the development of a mobile capability that can ingest real-time remote sensing data with the capability to conduct image exploitation in support of all phases of incident response. Data receipt must be possible for a variety of airborne remote sensing systems including panchromatic and multi-spectral framing cameras, push-broom and scanning sensor systems, and active sensor systems such as LiDAR. The proposed capability should include innovative approaches for downlink transmission of remotely sensed data to the receive facility, mission tasking, tracking of assets, knowledge of mission progress, and communication with mission crew. Included in the mobile capability is the need for new methods of high speed data transfer to share image data with all levels of incident response including local, state, and federal emergency operations centers. While innovations are sought that demonstrate the ability to transfer traditionally large image data to operations centers in a geographically dispersed incident command system, a significant use of Commercial-Off-The-Shelf (COTS) equipment is anticipated.

**PHASE I:** Propose and demonstrate an architecture and data exchange that provides enhanced situational awareness for incident management.

**PHASE II:** Develop a prototype and test the prototype in the operational environment to demonstrate its capability, including the mobility of the system.

**PHASE III COMMERCIAL APPLICATIONS:** DHS internal organizations and the first responder community are envisioned to be potential customers for this technology

REFERENCES: Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC)

KEYWORDS: Remote sensing, GIS, telecommunications.

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CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-007**

**TITLE: NETWORK-BASED BOUNDARY CONTROLLERS**

**TECHNOLOGY AREAS:** Cyber Security

**OBJECTIVE:** This topic seeks a network-based boundary controller capability that each network could install and easily customize to enforce its own policies, while enabling information exchanges in a variety of digital media. This network-based boundary controller would eliminate the traditional “high-side/low-side” configurations with its attendant ownership/maintenance/flow control issues. Also, by eliminating the trusted operating system platform with its purchase, licensing, maintenance, and administration costs would be significantly reduced. Last, the development of a network-based boundary controller will eliminate the need for Guard vendors to develop unique software filters within the trusted platform environment by providing a user interface for customizing control rule sets, driving costs even lower.

**DESCRIPTION:** The current, dominant approach to implementing secure boundary controls across networks for information exchange is the use of security Guards. This technology consists of a separate computer system using a trusted operating system and hosting the guarding software and appropriate filters. User interfaces are then implemented on each network to enable the staging and receipt of information that pass through the Guard system. This basic architecture has existed since 1982, basically unchanged. It is based on our nation’s most stringent security policies defined in Director Central Intelligence Directive’s and Department of Defense (DoD) Security Directives. By definition, the use of a Guard requires that networks be defined as “high side” and “low side” and the Guard system itself must reside within the “high side” domain. While this approach satisfies DoD and Intelligence Community security requirements, it has proven to be unworkable and cost prohibitive in the commercial network environment. Moreover, the fundamental Guard architecture enforces security policies far in excess of the requirements for commercial or other non-classified processing environments. Given today’s information-sharing needs across heterogeneous processing environments which encompass numerous network ownership domains that, while not classified, still require strong boundary control mechanisms exceeding the capabilities of commercial firewall technology, a “guarding” capability that eliminates the traditional “black box”, but retains the protection functionality is required.

This topic seeks a network-based boundary controller capability that each network could install and easily customize to enforce its own policies, while enabling information exchanges in a variety of digital media. This network-based boundary controller would eliminate the traditional “high-side/low-side” configurations with its attendant ownership/maintenance/flow control issues. Also, by eliminating the trusted operating system platform with its purchase/licensing/maintenance/administration, costs would be significantly reduced. Last, the development of a network-based boundary controller will eliminate the need for Guard vendors to develop unique software filters within the trusted platform environment by providing a user interface for customizing control rule sets, driving costs even lower.

PHASE I: Develop the system design (including algorithms) for the boundary controller that would be installed on a network and customize to enforce network security policies.

PHASE II: Develop and test a potentially commercial boundary controller that exceeds the capabilities of commercial firewall technology.

PHASE III COMMERCIAL APPLICATIONS: New technology successfully developed in this program will transition to commercial internet and network security products for federal, state, and local Homeland Security applications. In addition, this technology has commercial potential in the private sector.

REFERENCES: Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (NTIC).

KEYWORDS: cyber security, cyber monitoring, information exchange.

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CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-008**

**TITLE: BOTNET DETECTION AND MITIGATION**

**TECHNOLOGY AREAS:** Cyber Security

**OBJECTIVE:** : This SBIR topic seeks technology to begin to address ways for identifying bots and botnets and using botnet weaknesses, exploring possible control server actions, and investigating other technical approaches for dealing with possible infected client actions. Technologies developed under this topic must perform their functions within legal and ethical boundaries, while considering how the resultant technology can use the “botnet” mindset and work with other systems that might deploy similar technology in order to defeat the botnets and their malicious activities. It is expected that the resultant tools would be commercialized and available to critical infrastructure providers in addition to government network operations.

**DESCRIPTION:** One of the rising problems in today’s networks is the existence of bots and bot networks. A Bot is a generic term and is used to describe an automated process in the computer world. Search engines use Bots to spider websites. Online games, such as Quake, use Bots as artificial opponents. Bots do not need external support and will relentlessly do their masters bidding until told to stop. Other Bots include Internet Relay Chat (IRC) Bots and they operate in much the same manner. An IRC Bot is basically an IRC script that responds to IRC events on its own without user interaction. A botnet is a collection of compromised hosts (infected with one or more types of bots), under (usually) a single command and control channel (typically on an IRC channel), with its major purpose to do malicious action such as Denial of Service, or DoS, ID theft, keyloggers, phishing and spam. The bots normally contain servant code, one or more exploits and one or more attack tools. Most bots are delivered to machines via a trojan horse program – hidden code from other files, websites, etc. The trojan will also have been coded to make the bot join a certain channel once it has silently connected to the Internet from the compromised machine. If the trojan has infected many computers, then many bots will join the channel. Some channels have been seen with thousands of bots and each one of those bots represents a computer infected with a trojan. A collection of these bots in a channel is a botnet, and even a couple of hundred of them can cause significant damage when used to attack servers and other machines. The command and control (C&C) for these botnet functions is mostly centralized, often using one or more IRC servers. The bots and botnets described above are almost always on the machine without the knowledge of the person.

Unfortunately, there is no exact way to recognize a bot. Usually bots are silent until given commands in a channel, but some may 'report for duty' with a word, phrase or even a dot (period). Bots with the capability to sniff the wire or keystrokes are now ubiquitous. They can be found on all networks, to include government and military networks. These bots dutifully report back their findings to the C&C server, and the information can be used for a variety of means. Bots have methods of spreading to other systems by exploiting vulnerability on the target system that allows execution of arbitrary code and targeting of unpatched machines.

The recent RTAP BAA (BAA 05-10) solicited for a BOTNET Detection and Mitigation Tool to automatically scan for associated malicious codes on networks and machines, and then recommend solutions to mitigate the attacks. The proposed RTAP BOTNET Detection and

Mitigation Tool is required not to adversely impact network or system performance and operations. Government system administrators will control the application of this tool and it will not be generally available.

PHASE I: Develop the proposed system design (including algorithms) and determine feasibility for the proposed botnet tool that would mitigate negative behavior.

PHASE II: Develop and test a potentially commercial botnet tool and determine the capability to defeat botnets and their malicious activities without negative impact to networks or system performance.

PHASE III COMMERCIAL APPLICATIONS: New technology successfully developed in this program will transition to commercial internet and network security products for federal, state, and local Homeland Security applications. In addition, this technology has commercial potential in the private sector.

REFERENCES: Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC).

KEYWORDS: cyber security, cyber monitoring, information exchange

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CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-009**

**TITLE:** MANAGING MULTI-MEDIA SURVEILLANCE INFORMATION NETWORKS

**TECHNOLOGY AREAS:** Critical Infrastructure Protection

**OBJECTIVE:** Develop new innovative technologies to improve the performance of surveillance systems that can scale in the automation of processing, retrieving and organizing multimedia surveillance data obtained through numerous sensors and sensor types in order to improve the effectiveness of security analysts in government and critical industries.

**DESCRIPTION:** The current inventory of surveillance sensors continues to expand with interest in detecting a wide variety of phenomena across the frequency spectra. As choices in sensing evolve, systems that can manage and organize data from a wide variety of sensor data, specifically supporting physical surveillance and security are over-engineered and often do not scale for large distributed operations. For example, video and infrared sensors have evolved in function, cost, and size to enable very large networks with significant and high resolution coverage of physical areas. With each of these sensors potentially producing a sizeable data stream, this poses a significant challenge for systems that can coordinate, organize and automate human interface to, and understanding of, the data. Prior to, during and post event retrieval of event related data is a significant challenge for federal, state, local government and critical industry security staff who collect and analyze this data.

Innovative technologies are sought to enable intelligent coordination, management, recognition and retrieval of events and data from multi-sensor networks. The principal design efforts might include but are not limited to the following: (1) effective data reduction techniques; (2) scalable and platform independent methods for object detection, recognition and tracking; (3) searchable data compression; (4) efficient multi-media data management and retrieval; (5) effective human computer interfaces; (6) scalable systems and architecture for very large, distributed and coordinated surveillance networks. The proposed work, however, does not have to address all these areas to receive consideration.

**PHASE I:** Determine the feasibility, architecture, standards and interfaces for the proposed systems design and demonstrate proof-of-concept.

**PHASE II:** Develop a prototype system and demonstrate and validate its capability to be utilized by a typical surveillance staff. Address and mitigate false positive and missed detection problems through generalized solutions that do not over-engineer the system for specific surveillance scenarios. The prototype should include cameras, microphones, other supporting electronics and software. Perform environmental testing of the electro-mechanical design.

**PHASE III COMMERCIAL APPLICATIONS:** Successful design and implementation of improved surveillance systems provide a potential for a new generation of physical security protection for Government and critical industry facilities, resulting in improved indications and warning, improved cognitive involvement of security staff and analysts, and more effective protection of vulnerable assets.

REFERENCES: Successful design and implementation of the data management system provides a potential for a new generation of physical security protection for Government and critical industry facilities, resulting in improved indications and warning, improved cognitive involvement security staff and analysts, and more effective protection of vulnerable assets.

KEYWORDS: Multi-sensor surveillance networks; multi-media retrieval; missed detection; false alarm

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CLOSED

**SBIR/STTR TOPIC NUMBER: H-SB06.1-0010**

**TITLE:** NON-NUCLEAR SOURCES OR TECHNIQUES TO REPLACE NUCLEAR SOURCES IN COMMERCIAL (NON-MEDICAL) APPLICATIONS

**TECHNOLOGY AREAS:** (DNDO) Radiological

**OBJECTIVE:** Non-nuclear sources or techniques are sought to replace the many radiological gamma and neutron sources now in use for commercial applications. Our goal is to dramatically reduce the amount of radioactive material in common use in order to improve public security and prevent the diversion of nuclear material for dirty bombs.

**DESCRIPTION:** In the past few years Congress and various government agencies have recognized the problem of orphaned radioactive sources worldwide. Such sources pose a security risk in the form of potential material for a “dirty bomb” or for other illicit applications. This SBIR seeks replacements for existing operating nuclear sources of radiation in non-medical applications, such as oil well logging, food irradiation, industrial thickness and liquid level gauging and soil density gauging. Each of these problems may be solved by alternate techniques (not requiring gammas or neutrons) or alternate sources of radiation to accomplish the tasks at hand. These sources and techniques must achieve the full capabilities of the existing systems, but not require the use of a radioactive nuclear material. (New ideas are sought, not simply implementations of commercial off-the-shelf retrofits.) They must be financially viable, adding little extra cost in instrumentation compared to the replaced source. Their size, weight, power requirements, must not be so onerous as to prevent their use under the conditions normally envisioned for the application. Last, they must be sufficiently robust to withstand the temperatures, pressures, humidity, vibration, and shock encountered in the typical operating environment for the application. Concepts which cross several applications are especially desired.

**PHASE I:** Demonstrate the feasibility of the proposed technical approach with a benchtop apparatus or with a clear design. The physics of critical design elements should be described.

**PHASE II:** Produce and test a prototype to demonstrate the viability and capabilities of a replacement source or technique. Feasibility must be clearly demonstrated in the field or in a similar environment.

**PHASE III COMMERCIAL APPLICATIONS:** The goal is to produce units for commercial sale by manufacture, partnering, or licensing. DHS will benefit from reduced nuclear sources in the public realm. Applications may include oil well logging, food irradiation, industrial thickness and liquid level gauging and soil density gauging.

**REFERENCES:** Use web-sites or references easily found through the National Technical Information Service (NTIS) or the Defense Technical Information Center (DTIC).

**KEYWORDS:** Radiation, radiological, radioactive sources, nuclear sources

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#### 9.4 HSARPA FY2006.1 Phase I SBIR/STTR 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
- Beyond the 25-page limit do not send appendices, attachments and/or additional references

##### Proposal Format:

- Cover Sheet, Technical and Cost proposals MUST be submitted electronically at <http://www.dhssbir.com>

##### 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:

- The Cover Sheet was prepared on-line.
- The Technical Proposal was uploaded
- The Cost Proposal was prepared on-line and shows detailed cost breakout and the total cost is also listed on the Cover Sheet
- The Submit Proposal button was selected to transmit the proposal to DHS and time stamp the proposal
- Email confirmation of the receipt of your proposal was received
- Website Help Desk 1-800-754-3043