



**U.S. Department of Homeland Security (DHS)**

**Small Business Innovation Research (SBIR) Program**

**Solicitation #: HSHQDC-14-R-00035**

Proposal Submission Deadline: May 21, 2014 at 2:00 pm ET

Issued By:

DHS Office of Procurement Operations (OPO)

On behalf of:

The Science and Technology (S&T) Directorate

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## 1.0 PROGRAM DESCRIPTION

### 1.1 Summary

The Department of Homeland Security (DHS) Small Business Innovation Research (SBIR) Program is comprised of the Science and Technology (S&T) Directorate's SBIR Program and the Domestic Nuclear Detection Office's (DNDO) SBIR Program. This solicitation covers the S&T Directorate's SBIR Program only and S&T invites small business concerns (SBCs) to submit innovative proposals under this Solicitation. Eligible small businesses with the capability to conduct research or research and development (R/R&D) in any of the homeland security-related topic areas described in **Appendix A**, and to commercialize the results of that R/R&D, are encouraged to participate. The DHS SBIR Program Office encourages all small businesses, particularly small disadvantaged, women-owned, veteran-owned, service-disabled veteran-owned, and socially and economically disadvantaged small businesses to submit proposals in response to topics described in this Solicitation.

#### **IMPORTANT:**

- Please read the solicitation carefully. Failure to comply with the requirements herein will result negatively in the proposal evaluation.
- This Solicitation contains topics for the S&T Directorate's SBIR Program only. Only proposals submitted in response to topics contained in this Solicitation will be accepted and considered for awards. **Section 7.0** outlines the six (6) research topics for which proposals are sought. Unsolicited proposals will not be accepted.
- While the Phase II proposal process is covered in this Solicitation, this Solicitation requests Phase I proposals only at this time. In accordance with the SBIR/STTR Reauthorization Act of 2011 (Section 5105, Public Law 112-81), **DHS no longer uses an invitation process for Phase II**. All small businesses awarded a Phase I contract(s) originating from this Solicitation will be eligible to participate in Phases II and III. **A Contracting Officer will notify Phase I awardees of the Phase II proposal submission requirements and the deadline for Phase II submissions.**
- DHS is not obligated to make any awards under Phase I, Phase II, or Phase III, and all awards are subject to the availability of funds. DHS is not responsible for any monies expended or costs incurred by the Offeror before contract award.
- Small businesses that are majority-owned by multiple venture capital operating companies, hedge funds or private equity firms are not eligible to submit proposals in response to this Solicitation. See **Section 3.8**, Eligibility.

### 1.2 DHS SBIR Program, Purpose and Objectives

The statutory purpose of the SBIR Program is to strengthen the role of innovative small business concerns in Federally-funded R/R&D. Program objectives are to: (1) stimulate technological innovation; (2) strengthen the role of small business in meeting Federal R/R&D needs; (3) foster and encourage participation by socially and economically disadvantaged small businesses (SDBs) and by women-owned small businesses (WOSBs); and (4) increase private

sector commercialization of innovations developed through Federal R/R&D, thereby increasing competition, productivity, and economic growth. The federal SBIR Program is mandated by the Small Business Research and Development Act of 1982 (Public Law 97-219), the Small Business Research and Development Act of 1992 (Public Law 102-564), and the SBIR/STTR Reauthorization Act of 2011 (Public Law 112-81).

The DHS SBIR Program follows the policies and practices of the Small Business Administration (SBA) SBIR Policy Directive, dated August 6, 2012, as amended on January 8, 2014. This Solicitation incorporates and uses the flexibility of the SBA SBIR Policy Directive to encourage innovative proposals in response to the research topics listed in **Section 7.0**.

In its commitment to also support Executive Order 13329 which encourages innovation in manufacturing-related research and development, DHS seeks, through its SBIR Program and topic descriptions, research related to advanced processing, manufacturing processes, equipment and systems; or manufacturing workforce skills and protection.

### 1.3 Three Phase Program

The SBIR Program is a three phase program. The objective of Phase I is to determine the scientific, technical, and commercial merit and feasibility of the proposed effort, and the quality of performance of the small business concern, with a relatively small agency investment prior to providing further Federal support in Phase II. Phase I proposals should concentrate on that R/R&D which will significantly contribute to proving the scientific and technical feasibility, and commercialization potential of the proposed effort, the successful completion of which is a prerequisite for further DHS support in Phase II. Offerors are encouraged to consider whether the R/R&D being proposed also has private sector potential, either for the proposed application or as a base for other applications.

The objective of Phase II is to continue the R/R&D effort from the completed Phase I. Phase II efforts further develop work from Phase I that meets particular program needs and exhibits potential for commercial application. Phase II is the principal R&D effort and is expected to produce a well-defined deliverable prototype. Phase II awards may be made to small business concerns on the basis of the results of their Phase I projects, and the scientific merit, technical merit, and commercialization potential of the Phase II proposal. Phase II awardees may receive up to one additional, sequential Phase II award to continue the work of an initial Phase II award. The additional, sequential Phase II award has the same guideline amounts and limits as an initial Phase II award. In addition, Phase II awardees may receive additional funding under the DHS SBIR Commercialization Readiness Pilot Program (see **Section 5.15**).

For details on the S&T Phase I and II Cost Proposal thresholds, see **Section 3.4**.

SBIR Phase III refers to work that derives from, extends, or completes an effort made under prior SBIR funding agreements, but is funded by sources other than the SBIR Program. Phase III work is typically oriented towards commercialization of SBIR research or technology. Under

Phase III, the SBIR awardee is expected to seek contracts and obtain funding from the private sector and/or the Federal government (non-SBIR federal government sources) to develop the prototype or supply goods or services related to the work performed under the SBIR contract(s) into a viable product or non-R&D service for sale in DHS and/or private sector markets.

A Phase III award, by its nature, is an SBIR award, has SBIR status, and must be accorded SBIR data rights. Phase III proposals can only be submitted by, and made to, a Phase I and/or Phase II awardee. The competition for SBIR Phase I and Phase II awards satisfies any competition requirement of the Armed Services Procurement Act, the Federal Property and Administrative Services Act, and the Competition in Contracting Act. Therefore, an agency that wishes to fund an SBIR Phase III project is not required to conduct another competition in order to satisfy those statutory provisions.

#### 1.4 Key Dates and Events

The following chart shows the important events and corresponding dates of the FY14.2 DHS SBIR Solicitation, HSHQDC-14-R-00035.

KEY DATES	
EVENT	DATE
<b>Pre-solicitation issued:</b>	April 1, 2014
<b>Direct contact with Topic POC permitted:</b>	April 1, 2014 – April 16, 2014
<b>Solicitation released:</b>	April 17, 2014
<b>Phase I proposals submission:</b>	April 17, 2014 – May 21, 2014
<b>Last day to submit questions:</b>	May 7, 2014 no later than 2:00 p.m. ET
<b>Last day Q&amp;A Posted on FedBizOpps</b>	May 14, 2014
<b>Deadline for receipt of proposals:</b>	May 21, 2014, 2:00 p.m. ET

#### 1.5 SBIR Office Contacts

For general questions about the S&T Directorate’s SBIR Program, please contact [STSBIR.PROGRAM@hq.dhs.gov](mailto:STSBIR.PROGRAM@hq.dhs.gov). For general questions about the DNDO SBIR Program, please contact [dndosbir@hq.dhs.gov](mailto:dndosbir@hq.dhs.gov).

#### 1.6 Definitions

Definitions provided in SBA’s SBIR Policy Directive (dated August 6, 2012, as amended on January 8, 2014) and the Federal Acquisition Regulation (FAR) apply for the purposes of this Solicitation. Terms that are unique to the SBIR Program, this specific SBIR solicitation, or may be unfamiliar to small business concerns, are defined in **Appendix B**.

## 1.7 Fraud, Waste and Abuse

DHS and the SBIR Program Office are taking proactive measures to reduce the vulnerability of the SBIR Program to fraud, waste, and abuse. The SBIR Policy Directive (dated August 6, 2012, as amended on January 8, 2014), Section 9 (f)(1) (i through ix), provides examples of fraud, waste and abuse relating to the SBIR Program. To report SBIR fraud, please contact the DHS Office of the Inspector General (OIG):

- Anonymous Hotline: 1-800-323-8603
- OIG Online Allegation Form: <http://www.oig.dhs.gov/hotline/hotline.php>
- Fax: (202) 254-4297
- Mail: DHS Office of Inspector General/MAIL STOP 2600  
Attention: Office of Investigations-Hotline  
245 Murray Drive SW, Building 410  
Washington, DC 20528

To reach someone within S&T's SBIR Program Office about fraud, waste and abuse, please contact Frank Barros, DHS S&T SBIR Program Analyst, at (202) 254 -6966 or [francis.barros@hq.dhs.gov](mailto:francis.barros@hq.dhs.gov).

To reach someone within the DNDO SBIR Program Office about fraud, waste and abuse, please contact the DHS DNDO SBIR PM at [dndosbir@hq.dhs.gov](mailto:dndosbir@hq.dhs.gov).

## 2.0 REGISTRATION, CERTIFICATIONS, AND DATA COLLECTION

### 2.1 Mandatory Registrations

In order to prepare and submit SBIR proposals to DHS under this Solicitation, Offerors must be registered in the DHS SBIR electronic online proposal submission system at <https://sbir2.st.dhs.gov>.

Company registration is also required in the U.S. Small Business Administration's (SBA) Company Registry Database at <http://sbir.gov/registration>. Prior to submitting the complete proposal to DHS, each Offeror must:

1. Affirm registration in the SBA Company Registry;
2. Input the company's SBC Control ID number in the Company Data section of the DHS SBIR Cover Sheet; and
3. Append a copy of the completed SBA Company Registration information as the last page of the Technical Proposal.

Before an SBIR contract can be awarded, proposing firms must also be registered in the System for Award Management (SAM). SAM is the official U.S. Government system that consolidated

the capabilities of the Central Contractor Registration (CCR)/Federal Register, Online Representations and Certifications Application (ORCA), and the Excluded Parties List System (EPLS) databases. Although not required at the time of proposal submission to the DHS SBIR Program, it is highly recommended that Offerors register in SAM during the proposal process. To register in SAM and/or update company's records, visit <https://www.sam.gov/portal/public/SAM/>.

Offerors are encouraged, but not required, to have a DUNS number and a CAGE code at the time of proposal submission. Companies must obtain these before a contract can be awarded to the company. To obtain a DUNS number, visit <https://fedgov.dnb.com/webform>. CAGE Codes are automatically assigned upon registration in SAM. For more information about the Commercial and Government Entry (CAGE) code, please visit [www.fsd.gov](http://www.fsd.gov).

## 2.2 Required Certifications

At the time of proposal submission, each small business concern must certify via the Cover Sheet of the proposal that it meets the size, ownership and other requirements of the SBIR Program. In addition, the SBA SBIR Policy Directive (dated August 6, 2012, as amended on January 8, 2014) includes certifications requirements set forth in Section 5143 of the SBIR/STTR Reauthorization Act of 2011. The certifications require small businesses to certify that they are meeting the Program's requirements during the life cycle of the funding agreement.

The DHS SBIR Programs will implement the certifications as follows:

1. SBIR Funding Agreement Certification – Time of Award (**Attachment 1**) – If selected for award, this certification will be provided by the Contracting Officer to the small business for completion prior to issuing the Phase I and Phase II award.
2. SBIR Funding Agreement Certification – Life Cycle Certification (**Attachment 2**) - The Life Cycle Certification will be included in resultant Phase I and Phase II contracts and considered a deliverable.

## 2.3 Data Collection Requirement

Each Phase I and Phase II applicant is required to either enter information into SBA's database at [www.SBIR.gov](http://www.SBIR.gov) or to update previously entered information. Companies should login to [www.SBIR.gov](http://www.SBIR.gov) using the account created when registering for the SBA company registry database. The following are examples of data to be entered into the database:

- Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR award is made.
- Revenue from the sale of new products or services resulting from the research conducted under each Phase II award;
- 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.

The SBC 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.

In addition, each Phase II awardee is required to update the appropriate information on the award in the database upon completion of the last deliverable under the funding agreement and is requested to voluntarily update the information in the database annually thereafter for a minimum period of 5 years.

### 3.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

#### 3.1 Proposal Preparation and Length of Proposal

Offerors responding to this Solicitation must submit a direct, concise, and informative research or research and development proposal. Each complete proposal must be submitted via the DHS SBIR online proposal submission system portal at <https://sbir2.st.dhs.gov>.

Complete proposals contain the following:

PROPOSAL REQUIREMENTS		
	PHASE I	PHASE II
Page Limitation	25 pages	50 pages
Cover Sheet <sup>1</sup>	Pages 1-2	Pages 1-2
Technical Proposal	Pages 3-24	Pages 3-49
SBA Company Registry Information <sup>2</sup>	Mandatory	Mandatory
Cost Proposal <sup>3</sup>	Page 25	Page 50
Briefing Chart ( <b>Attachment 3</b> ) <sup>4</sup>	Mandatory	Mandatory
Commercialization Report <sup>4</sup>	N/A	If Applicable
Company Financial Information <sup>5</sup>	N/A	Mandatory

<sup>1</sup> Counts as two pages no matter how it prints out

<sup>2</sup> Appended to the Technical Proposal (See **Section 2.1**), but not included in the page count

<sup>3</sup> Counts as one page no matter how it prints out

<sup>4</sup> Not included in page count

<sup>5</sup> Company Financial Information must not be included in the proposal, instead it must be submitted via email; See **Section 3.7**

The Cover Sheet and the Cost Proposal are completed online via the DHS SBIR online proposal submissions system, while the Technical Proposal, Briefing Chart, and the Commercialization Report, if applicable, are uploaded as PDF documents.

No additional attachments, appendices or referenced material beyond the page limitations shall be considered in proposal evaluation.

### 3.2 Proposal Coversheet, Technical Abstract, Project Aims, and Summary of Results

Offerors are required to provide basic details about the proposed effort on the proposal cover sheet. Additionally, the cover sheet includes the following fillable sections: Technical Abstract, Project Aims, and Summary of Results.

The Technical Abstract is limited to 250 words. The abstract must identify the purpose of the work and briefly describe the work to be carried out, the finding or results, and the potential commercial applications of the effort. If the Offeror's proposal is selected for award, the Technical Abstract section will be publicly posted on the DHS SBIR website and on the Small Business Administration's website; therefore, do not include proprietary or classified information in the Technical Abstract section of the Cover Sheet.

The Project Aims section is limited to 500 words and is for Government use only. **For Phase I proposals only**, the Offeror must state the specific objectives of the Phase I R/R&D effort, including the technical questions the Offeror will answer to determine the Phase I feasibility of the proposed approach and the impact that the results of the proposed research will exert on the research field(s) involved. The Offeror must state concisely and realistically what the proposed research is intended to accomplish in terms of its potential for technological innovation and commercial application. The proposed product, process or service that will ultimately be developed must be defined. Milestones for each of the aims must be included, as these will be used in the evaluation process. **For Phase II proposals only (including second Phase II awards and CRPP awards)**, the Offeror must state the specific objectives of the Phase II research and development effort including the impact that the results of the proposed research will exert on the research field(s). The Offeror must state concisely and realistically what the proposed research is intended to accomplish in terms of its potential for technological innovation and commercial application. The proposed product, process or service that will ultimately be developed must be defined. Milestones for each of the aims must be included, as these will be used in the evaluation process.

The Summary of Results section is limited to 500 words, must not contain proprietary information, and is for Government use only. The Offeror must provide the anticipated results and implications of the approach (both Phases I and II) and the potential commercial applications of the research.

### 3.3 Technical Proposal Format and Content

Prepare the Technical Proposal in single column format, 12-point Times New Roman, with 1" margins on 8 ½" x 11" paper. Company name, topic number, and proposal number should be included in the header of each page. (The header may be included in the 1" margin.) The use of 10-point font is permissible for imbedded tables, figures and graphics. See **Section 3.1** for page limitations for Phase I and Phase II proposals.

The Technical Proposal must be a single file, including tables, figures, graphics and table of contents (if included). Do not lock, password protect, or encrypt the file to be uploaded. Perform a virus check before uploading the Technical Proposal file. If a virus is detected, it may cause rejection of the proposal.

The Technical Proposal must include the following sections in the order provided:

PROPOSAL FORMAT	
PHASE I PROPOSAL	PHASE II PROPOSAL
I. Identification And Significance Of The Problem Or Opportunity	I. Identification and significance of the problem or Opportunity
II. Phase I Technical Objectives	II. Phase I Technical Objectives and Results
III. Phase I Work Plan	III. Phase II Work Plan
IV. Related R/R&D	IV. Related R/R&D
V. Key Individuals and Bibliography of Directly Related Work	V. Key Individuals and Bibliography of Directly Related Work
VI. Relationship with Future R/R&D	VI. Relationship with Future R/R&D
VII. Commercialization Strategy	VII. Commercialization Plan
VIII. Facilities/Equipment	VIII. Facilities/Equipment
IX. Subcontractors/Consultants	IX. Subcontractors/Consultants
X. Potential Post Applications	X. Prior, Current, or Pending Support of Similar Proposals or Awards
XI. Prior, Current, or Pending Support of Similar Proposals or Awards	

The following is a brief description of each section of the Technical Proposal as applicable for each Phase:

- **Identification and Significance of the Problem or Opportunity** – Succinctly define the specific technical problem or opportunity addressed; the proposed innovation; the relevance and significance of the proposed innovation to a need(s) within the topic description; the proposed innovation relative to the state of the art; and the importance of the work proposed.
- **Technical Objectives (Phase I proposals only)** – State the specific objectives of the Phase I R/R&D effort, including the technical questions that must be answered to determine the feasibility of the proposed innovation/approach.
- **Technical Objectives and Results (Phase II proposals only)** – State the specific objectives of the Phase I R/R&D effort including the technical questions addressed to determine the feasibility. Address the progress, results and findings of the Phase I effort.
- **Work Plan (Phase I proposals only)** (including the efforts of the subcontractor(s)/consultant(s), if applicable) – Provide an explicit, detailed description of the Phase I approach. The Plan must indicate what tasks are planned, how, when, and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered. The Phase I effort must determine the technical feasibility of the proposed

concept, and address the questions cited in the Technical Objectives immediately above. The methods planned to achieve each objective or task must be discussed explicitly and in detail. Task descriptions, schedules, resource allocations, estimated task hours for each key personnel and planned accomplishments, including project milestones, must be included. This section will be a substantial portion of the total Technical Proposal.

- Work Plan (Phase II proposals only) (including the efforts of the subcontractor(s)/consultant(s), if applicable) – Provide an explicit, detailed description of the Phase II approach. The Plan must indicate what tasks are planned, how, when, and where the work will be conducted, a schedule of major events, the final product to be delivered, and the completion date of the effort. The Phase II effort must satisfy the anticipated results, as specified in the topic description. The methods planned to achieve each objective or task must be discussed explicitly and in detail. Task descriptions, schedules, resource allocations, estimated task hours for each key personnel and planned accomplishments, including project milestones, must be included. This section must be a substantial portion of the total proposal.
- Related Research/Research and Development – Describe significant (current and/or previous) R/R&D activities that are directly related to the proposed effort, including any conducted by the principal investigator, the Offeror, consultants, or others. Discuss any planned coordination with outside sources. Describe how these activities relate to the proposed project. Describe previous efforts similar but directly related to the proposed effort. For each effort, 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. The Offeror must persuade reviewers of his or her awareness of key, recent R/R&D conducted by others in the specific topic area.
- Key Individuals and Bibliography of Directly Related Work – Identify key personnel who will be involved in the effort including information on directly related education, experience, and bibliographic information. A concise resume for the Principal Investigator and all key personnel, including a list of relevant publications (if any), must be included. All resumes will count toward the appropriate page limitation, see **Section 3.1. Offerors must identify any non-U.S. citizen(s) expected to be involved on proposed project** [including direct employees, subcontractors and consultants], their country of origin, type of visa or work permit under which they are performing, and an explanation of their anticipated level of involvement on this project. **Do not include Privacy Act Information.**
- Relationship with Future Research/Research and Development (Phase I proposals only) – State the anticipated results of the proposed approach if the project is successful through Phase I and Phase II. Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort, application and commercialization efforts (Phase III).
- Relationship with Future Research/Research and Development (Phase II proposals only) – State the anticipated results of the proposed approach if the project is successful through Phase II and Phase III. Discuss the significance of the Phase II effort in providing a foundation for Phase III commercialization efforts.

- **Commercialization Strategy (Phase I proposals only)** - Explicitly describe the company's strategy (vision) for commercializing the proposed technology and how it will transition to the specific operational component in DHS, other Federal Agencies, and/or private sector markets. Provide specific information on what related technologies, if any, already exist in the market and why the technology being proposed will be superior and how this information was ascertained. Also, include a discussion on the Offeror's current capability to commercialize previously developed technologies, as well as how the Offeror intends to develop the proposed technology all the way to the market.
- **Commercialization Plan (Phase II proposals only)** – The Commercialization Plan must address the following:
  - a. *Company Information.* Focused objectives/core competencies; specialization area(s); products and significant product sales; and history of previous Federal and non-Federal funding, regulatory experience, and subsequent commercialization. Does the Offeror have marketing expertise and, if not, how does the Offeror intend to bring that expertise into the company?
  - b. *Customer and Competition.* Provide a clear description of key technology objectives, current competitors, and advantages (cost and technical) compared to competing products or services. Address who the customers will be, and for non-DHS customers explain the demand drivers for this technology. Estimate the market size. Has the Offeror made contact with anyone in the projected target customer base including DHS customers? Identify potential factors that could have positive and/or negative impacts regarding the transition of the proposed product.
  - c. *Market.* Provide milestones, target dates, analyses of market size, and the estimated market share after first and five year sales. Provide detailed explanation on the plan to obtain market share.
  - d. *Financing.* Provide detailed information on the identification and acquisition of costs associated in transitioning the proposed product/services into the market. If available, provide brief discussion on potential financial sources. What are the plans for securing necessary funding for Phase III?
  - e. *Intellectual Property (IP).* Provide a detailed description on how the company plans to acquire and protect appropriate IP of the proposed product/service. What is the IP strategy and how will it be protected? Address patent status, technology lead, trade secrets or other demonstrations of a plan to achieve sufficient protection to realize the commercialization stage and attain at least a temporal competitive advantage.
  - f. *Assistance and Mentoring.* Provide plans for securing needed technical or business assistance through mentoring, partnering, or through arrangements with state assistance programs, small business development centers, Federally-funded research laboratories, Manufacturing Extension Partnership centers, or other assistance providers. Address how the product will be produced.

The Commercialization Plan must also include a schedule and the basis for that schedule showing the quantitative results from the Phase II project that the 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.).

- Facilities/Equipment – Provide information to allow the evaluators to assess the ability of the Offeror to carry out the activities of the proposed phase as well as all subsequent phases. Describe available instrumentation and physical facilities necessary to carry out the proposed effort. Equipment to be purchased, as detailed in the Cost Proposal, must be justified under this section. Also state whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state, 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.
- Subcontractors/Consultants – Involvement of any subcontractor(s) or consultant(s) (including Federal Laboratories, FFRDCs, universities, and technical assistance providers) is permitted. If such involvement is proposed, it must be described in detail in this section and also in the Cost Proposal. Subcontractors' or consultants' involvement under Discretionary Technical Assistance (see **Section 5.11**) must be clearly delineated from involvement by other subcontractors and consultants. A minimum of two-thirds (66%) of the research and/or analytical work in Phase I, as measured by total contract value, must be carried out by the proposing small business concern. A minimum of one-half (50%) of the research and/or analytical work in Phase II, as measured by total contract value, must be carried out by the proposing small business concern.

If the small business determines that it needs to acquire services from a non-U.S. source, it must fully explain in its proposal why a non-U.S. source must be used, and why no qualified U.S. source exists to perform the same services.

- Potential Post Applications – Briefly describe the following: (1) whether and by what means the proposed project appears to have potential commercial application; and (2) whether and by what means the proposed project appears to have potential use by the Federal Government.
- 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 **Appendix B**) for consideration under numerous Federal program solicitations, it is unlawful to enter into funding agreements (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 an Offeror elects to submit identical proposals or proposals containing a significant amount of essentially equivalent work in response to this Solicitation, or other Federal program solicitations, or is substantially the same as another proposal that has been funded, is now being funded, will be submitted to other agencies for funding consideration, or is pending with DHS or another Federal Agency, the Offeror must indicate so on the Proposal Cover Sheet and provide the following information in the Technical Proposal:

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

**Note:** If this section does not apply, the following statement should be included in the Technical Proposal: "No prior, current, or pending support for proposed work."

### 3.4 Cost Proposal

All Offerors must submit a cost proposal via <https://sbir2.st.dhs.gov>. Proposed costs must not exceed the maximum thresholds outlined below.

S&T SBIR THRESHOLD	
PHASE I	PHASE II
\$100,000.00 6 months	\$750,000.00 24 months

Note: Phase totals are exclusive of Discretionary Technical Assistance (**Section 5.11**) and Cost Match (**Section 5.15**), if applicable.

For additional information on the items in the Cost Proposal, reference *the DHS SBIR Cost Proposal Guide* at <https://sbir2.st.dhs.gov> under "Reference Materials."

Additionally, more information about cost proposals and accounting standards can be found in the DCAA publication, *Information for Contractors*, available at [www.dcaa.mil/dcaap\\_7641.90.pdf](http://www.dcaa.mil/dcaap_7641.90.pdf).

Proposals submitted under this Solicitation will be considered valid for 90 days. If a proposal is selected for award, Offerors should be prepared to submit further cost/pricing documentation to the Contracting Officer in order to justify items on the cost proposal.

The following are required elements of the cost proposal:

- Direct Labor – list the name, labor category, labor hours and labor rate of each employee working on the project
- Overhead Cost – specify the current overhead rate. Use overhead rate approved by a cognizant federal agency, if available.

- Other Direct Cost – include direct material, special testing, equipment, travel, subcontracts, etc.

For planning purposes, Offerors should budget for travel to Washington, DC for a mandatory one-day post-award kick-off meeting and an additional one-day meeting to present the results in the final report.

### 3.5 Briefing Chart

The mandatory one-page Briefing Chart should provide a very concise summary of the overall effort. The Briefing Chart is uploaded during proposal submission and may be used in the evaluation process. The briefing chart **MUST NOT** contain proprietary or classified data. Offerors must use the Briefing Chart template provided in **Attachment 3**.

### 3.6 Commercialization Report

Offerors that have not received any Phase II awards should check the appropriate box on the cover sheet certifying that the company has not received SBIR Phase II funding from any agency. Offerors with no prior Phase II awards will not be negatively impacted in the evaluation process. Instead, such companies will be evaluated based on the Commercialization Plan, see **Section 3.3**.

All Phase II Offerors with previous Phase II awards must submit a Commercialization Report.

If applicable, the succinct Commercialization Report should be in PDF format and submitted as a separate upload during the Phase II proposal submission. The following are examples of company commercialization data expected in the Commercialization Report:

- Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR award is made.
- Revenue from the sale of new products or services resulting from the research conducted under each Phase II award; delineate revenue by government, open market, prime contractors, other awards, and when this revenue event occurred.
- Additional investment from any source, other than Phase I or Phase II awards, to further the research and development and/or commercialization conducted under each Phase II award.
- Whether the Phase II technology has been used in a fielded DHS system or acquisition program, and, if so, which system or program.
- The number of patents resulting from the contractor's participation in the SBIR Program and whether any licenses based on these patents have been issued.
- Whether the company has completed an initial public offering (IPO) of stock, merged or been acquired resulting, in part, from any DHS SBIR Phase II project.

The Commercialization Report for any prior Phase II award received by the company must be current as of the end of the company's last full fiscal year (FY). The company may apportion sales or additional investment information relating to more than one Phase II award among those awards, if it notes the apportionment for each award.

### 3.7 Company Financial Information

As part of the S&T Phase II proposal submission, companies are required to submit company financial information, including current balance sheet and income statement delineating sales to the government and prime contractors, and sales derived from SBIR developed products whether as stand-alone or enablers. Financial information should be from the previous twelve months or the most recent company full fiscal year. **This information must not be included as a part of the Phase II proposal** which is uploaded to the system. Financials must be sent via email to [stsbir.program@hq.dhs.gov](mailto:stsbir.program@hq.dhs.gov) and must be received by the SBIR Program Office prior to Phase II proposal due date/time.

### 3.8 Eligibility

Small business Offerors that are majority-owned by multiple venture capital operating companies, hedge funds or private equity firms are not eligible to submit proposals in response to this Solicitation nor are they eligible to receive a DHS SBIR award.

To receive SBIR funds, each awardee of a Phase I or Phase II award must qualify as a small business concern at the time of award and at any other time set forth in SBA's regulations at 13 CFR 121.701 through 121.705.

For both Phase I and Phase II, the primary employment of the principal investigator must be with the small business concern at the time of the award and during contract performance. Primary employment means that more than one-half of the principal investigator's time is spent in the employ of the small business Offeror. This precludes full-time employment with another organization.

For both Phase I and Phase II, all research or research and development must be performed by the small business concern and its subcontractors in the United States.

### 3.9 DHS Phase II Transition Rate Benchmark

***For this Solicitation, the DHS Phase II Transition Rate benchmark requirement applies only to Offerors that have received 21 or more Phase I awards over the five (5) fiscal year period, from October 1, 2007 through September 30, 2012.***

The Phase II Transition Rate sets the minimum required number of Phase II awards an Offeror must have received for a given number of Phase I awards during a specified period. The SBIR awardee Phase II Transition Rate is calculated using the data in SBA's TechNet database. SBA

posts the company transition rates on the Company Registry at <http://www.sbir.gov>. For the purpose of this benchmark requirement, awardee firms are assessed once a year, on June 1<sup>st</sup>, using their prior SBIR and STTR awards across all agencies.

Offerors to this Solicitation that have received 21 or more Phase I awards across all federal SBIR/STTR agencies over the five (5) year period should, prior to proposal preparation, verify that the company's Phase II Transition Rate in the Company Registry at <http://www.sbir.gov> meets or exceeds DHS' minimum benchmark. If the Offeror to this Solicitation believes its Phase II Transition Rate, as shown in the Company Registry, is incorrect, it may provide SBA with the pertinent award information and request a reassessment. To do so, use the link on the Company Registry at [www.sbir.gov](http://www.sbir.gov).

The Phase II Transition Benchmark that DHS will use for this Solicitation is 25%.

Companies that apply for a DHS Phase I award and do not meet or exceed the DHS Phase II Transition benchmark rate will not be eligible for a DHS Phase I award during the one-year period beginning on June 1<sup>st</sup> and ending on May 31<sup>st</sup>.

### 3.10 DHS Commercialization Rate Benchmark

***The DHS Commercialization Rate benchmark requirement applies only to SBIR applicants that have received more than 16 Phase II awards over the past 10 fiscal years, excluding the most recently completed two fiscal years.***

The DHS Commercialization Rate benchmark sets the minimum Phase III commercialization results a Phase I applicant must have realized from its prior Phase II awards in order to be eligible to receive a new DHS Phase I award. The Commercialization Rate benchmark establishes the commercialization results it is required to achieve from work it performed under its prior Phase II awards in order to be eligible to receive a new Phase I award.

**The Commercialization Rate benchmark is not yet in effect.** DHS will apply its Commercialization Rate benchmark in future solicitations.

### 3.11 Questions

General questions pertaining to the S&T's SBIR Program should be submitted to [STSBIR.PROGRAM@hq.dhs.gov](mailto:STSBIR.PROGRAM@hq.dhs.gov).

General questions pertaining to the DNDO's SBIR Program should be submitted to [dndosbir@hq.dhs.gov](mailto:dndosbir@hq.dhs.gov).

Technical questions concerning the topics in this Solicitation during the pre-release period from **April 1, 2014 through April 16, 2014** should be directed towards the Technical Point of Contact for each topic listed in **Section 7.0**. During the pre-release period, potential Offerors have an

opportunity to contact topic authors by telephone and/or email to ask technical questions about specific technical topics contained in this Solicitation. Questions should be limited to specific information related to improving the understanding of a particular topic's requirements. Potential Offerors are prohibited from seeking advice or guidance on its solution approach, or submitting any materials. No further direct contact between Offerors and Technical Points of Contact shall occur after 5:00 pm ET on April 16, 2014.

On or after April 17, 2014, no further direct contact between Offerors and topic authors is permitted; however, Offerors may submit questions to [STSBIR.PROPOSALS@hq.dhs.gov](mailto:STSBIR.PROPOSALS@hq.dhs.gov). Questions must be limited to technical information related to improving the understanding of a particular topic's requirements. Any other questions or inquiries seeking advice or guidance on a solution approach are unacceptable and will not receive a response. Responses to questions received by May 7, 2014 by 2:00 p.m. ET will be posted on FedBizOpps.gov as an amendment to the Solicitation and will be posted on the DHS SBIR Program website at <https://sbir2.st.dhs.gov>. DHS will not respond to technical questions related to the technical topics if received after the last day to submit questions.

All Offerors are advised to monitor both the FedBizOpps website and the DHS SBIR Program website during the Solicitations period for questions and answers, and other information relevant to the topic in this Solicitation.

Questions about the electronic submission of proposals should be submitted to the Help Desk at (703) 480-7676, or via email to [dhssbir@reisystems.com](mailto:dhssbir@reisystems.com). The Help Desk may be contacted from 9:00 a.m. to 5:00 p.m. ET, Monday through Friday.

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

All Phase I and II proposals will be evaluated on a competitive basis. Each proposal will be evaluated on its own merit and the relevance of the specific concept as it relates to the SBIR topic rather than against other proposals submitted for the same topic area. DHS is under no obligation to fund any proposal or any specific number of proposals in a given topic. DHS may elect to fund several or none of the proposed approaches to the same topic or subtopic.

##### **4.1 Evaluation Criteria, Factors and Ratings**

The Phase I evaluation criteria, listed in decreasing order of importance, are as follows:

- a. Technical Merit – the soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution. The following elements will be considered:
  - Soundness of the technical concept and the likelihood the research is achievable as proposed;
  - Demonstrated understanding of the scope of the problem, research objectives, and performance goals;

- Degree of innovation and potential to offer a significant increase in capability or a significant reduction in cost commensurate with the potential risk of the innovative (i.e., not incremental) proposed approach; and
  - Details of the technology development strategy to be followed for the proposed concept. Clarity, fidelity, and completeness of the proposed work plan to achieve research objectives, to include: identification of a schedule and milestones, identification of risks and mitigation strategies, and method for assessing technical progress.
- b. Staff Qualifications and Capability – the qualifications of the proposed principal investigator, key personnel, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability of the company to commercialize the results. The following elements will be considered:
- Team’s understanding of past scientific and technical accomplishments, and the current state-of-the-art of knowledge or technology in the field; and
  - Quality of the proposed team (i.e., key personnel and partners identified have the breadth/range of competencies to execute the proposed effort).
- c. Potential for Commercialization – the potential for commercial application, either in the Government or private sector, and the benefits expected to accrue from this commercialization. The following element will be considered:
- Commercialization Strategy, as stated in the Solicitation.
- d. Cost/Price – the appropriateness of the elements of the cost proposal for the proposed effort. The following elements will be considered:
- Level of effort proposed, as appropriate for Phase I; and
  - Completeness of the proposed level of effort.

The Phase II evaluation criteria, listed in decreasing order of importance, are as follows:

- a. Technical Merit – the soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution. The following elements will be considered:
- Soundness of the technical concept and the likelihood the research is achievable as proposed;
  - Understanding the scope of the problem, research objectives, and performance goals;
  - Degree of innovation and potential to offer a significant increase in capability or a significant reduction in cost commensurate with the potential risk of the innovative (i.e., not incremental) proposed approach; and
  - Details of the technology development strategy to be followed for the proposed concept. Clarity, fidelity, and completeness of the proposed work plan to achieve research objectives, to include identification of risks and mitigation strategies, and method for assessing technical progress.

- b. Potential for Commercialization – the potential for commercial application, either in the Government or private sector, and the benefits expected to accrue from this commercialization. The following element will be considered:
  - Completeness of the Commercialization Plan, as stated in the Solicitation.  
*The lack of a Company Commercialization Report, due to the offeror having no prior Phase II awards, will not affect its ability to receive an award.*
- c. Staff Qualifications and Capability – the qualifications of the proposed principal investigator, key personnel, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability of the company to commercialize the results. The following elements will be considered:
  - Teams understanding of past scientific and technical accomplishments, and the current state-of-the-art of knowledge or technology in the field; and
  - Quality of the proposed team (i.e., key personnel and partners identified have the breadth/range of competencies to execute the proposed effort).
- d. Cost/Price – the appropriateness of the elements of the cost proposal for the proposed effort. The following elements will be considered:
  - Level of effort proposed, as appropriate for Phase II; and
  - Completeness of the proposed level of effort.

Evaluators will assess the strengths, weaknesses, and deficiencies of the above criteria using the following definitions:

- a. Strength – An aspect of the proposal that benefits the Government in terms of the quality of the Offeror’s performance, cost effectiveness, or reduced risk towards successful contract performance. Note: an Offeror’s approach may offer more than what the solicitation/topic description requires; however, the Government may not benefit from such approach and will not include such in its evaluation.
- b. Weakness – A flaw in the proposal that decreases the likelihood successful contract performance. A “significant weakness” is a flaw that dramatically increases the risk of unsuccessful contract performance. When weaknesses are identified, the Government will provide comment(s) on the significance of the weakness.
- c. Deficiency – A material failure of a proposal that would result in an unacceptable level of contractor performance.

Evaluators will use one of the following adjectival ratings for each of the Technical Merit, Staff Qualifications and Capability, and Potential for Commercialization criterion:

- a. Excellent – Offeror’s proposed approach is highly likely to satisfy and/or exceed all topic objectives and shows the highest probability of successful contract performance. Offeror’s proposal has strengths that will significantly benefit the Government and no weaknesses.
- b. Very Good – Offeror’s proposed approach is likely to satisfy most of the topic objectives and shows a high probability of successful contract performance. Offeror’s proposal has

strengths that will benefit the Government and one or more weaknesses, but no significant weaknesses.

- c. Good – Offeror’s proposed approach has a reasonable likelihood of satisfying the topic objectives and shows a good probability of successful contract performance. Offeror’s proposal has some strengths that will benefit the Government, and some weaknesses.
- d. Fair – Offeror’s proposed approach is unlikely meet the topic objectives and shows a low probability of successful contract performance. Offeror’s proposal has weaknesses, some that may be significant, and few strengths, if any, that will benefit the Government.
- e. Unacceptable – The Offeror’s proposed approach fails to meet the topic objectives and requirements.

The Cost/Price criterion is not adjectively rated as outlined above; rather, the evaluation team will determine if the cost proposal is either acceptable or unacceptable as defined below:

- a. Acceptable - The proposed cost elements, including labor mix, labor hours, material, special testing, special equipment, travel, subcontracts, if applicable, are appropriate for the proposed effort.
- b. Unacceptable - The proposed cost elements, including labor mix, labor hours, material, special testing, special equipment, travel, subcontracts, if applicable, are not appropriate for the proposed effort.

#### 4.2 Proposal Review Feedback

DHS will make award decisions, and notify applicants of its decisions, within 90 calendar days from the closing date of this Solicitation. Specific instructions on requesting feedback will be provided to each Offeror upon notification that their proposal was not selected for award. Requests for proposal feedback must be received within three (3) business days of the notification and will only be provided to Offerors upon request.

#### 4.3 Contractor Support Services In Support of the Selection Process

Offerors are advised that non-federal, contract support personnel will be used to carryout administrative functions for the SBIR Program Office and topic program managers. The contract support personnel will have access to proposals. Administrative duties may include, but are not limited to, making and distributing copies of proposal, scheduling and attending meeting, taking and compiling notes, etc.

### 5.0 CONSIDERATIONS

#### 5.1 Awards

Each proposal selected for funding in the DHS SBIR Program will be awarded a negotiated contract. No contracts will be awarded until all relevant proposals submitted in response to a

specific topic have been evaluated and an award decision rendered. The number of S&T SBIR Phase I and Phase II awards will be consistent with the S&T SBIR budget. All DHS SBIR awards resulting from this Solicitation will be posted at <https://sbir2.st.dhs.gov>.

A firm-fixed price (FFP) contract will be awarded for all Phase I awards. Phase II contracts can either be awarded as a cost-plus fixed-fee (CPFF) contract or firm-fixed price contract; however, in accordance with FAR 16.301-3, in order to award a CPFF contract, Offerors must have an accounting system that is adequate for determining cost applicable to the contract. Additionally, certified cost and pricing data may be required for Phase II or Phase III contracts over \$700,000.00. Fee and profit may be included in the Cost Proposal (see **Section 5.6**).

The anticipated time between the date that this Solicitation closes and the award of the Phase I contracts is approximately four (4) months. In general, Phase II awards will be awarded as quickly as possible after proposal selection to maintain the momentum of the Phase I effort. Phase II contracts are typically awarded within 90 – 120 days after the proposal due date.

## 5.2 Reports and Deliverables

Monthly reports and a final comprehensive report will be required in all resultant Phase I and Phase II contracts. Additionally, Phase II awards may require an interim report at the end of 12 month of performance. Phase I and II awardees will be required to submit the *SBIR Funding Agreement Certification – Life Cycle Certification (Attachment 2)* during the contract period of performance. Other deliverables specific to the topic description may also be required.

## 5.3 Invoice Instructions

The specific invoicing instructions 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 submit invoices monthly in accordance with the negotiated price and invoice instructions.

## 5.4 Innovations, Inventions and Patents

Proprietary Information. Information contained in unsuccessful proposals will remain the property of the applicant. The Government will, 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 an applicant in a proposal, which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence, to the extent permitted by law. This information must be clearly marked by the applicant with the term “proprietary information” (see the Marking of Proprietary section below) and the “Proposal Contains

Proprietary Information” box on the DHS SBIR Cover Sheet must be checked “Yes”. This will automatically electronically place the following statement on the proposal:

“These data, except the proposal Cover Sheet data, shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than evaluation of this proposal. If a funding agreement is awarded to this applicant as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement and pursuant to applicable law. 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 are contained on pages appropriately marked in this proposal.”

DHS assumes no liability for inadvertent disclosure or use of unmarked data. The Government will limit dissemination of such proprietary information to within official channels.

Marking of Proprietary Information. Identify all proposal data deemed proprietary by the Offeror by an asterisk (\*) in the right and left margins. If all information on a page is deemed proprietary by the Offeror, the words “Entire page is proprietary” should be included in both the header and footer on that page. Do not label the entire proposal “proprietary”. **Do not use the “Company Confidential” marking or any other such marking.**

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

To preserve the SBIR data rights of the awardee, the legend (or statements) used in the SBIR Data Rights clause included in the SBIR award must be affixed to any submissions of technical data developed under that SBIR award. If no Data Rights clause is included in the SBIR award, the following legend, at a minimum, should be affixed to any submissions of technical data developed under that SBIR award.

“These SBIR data are furnished with SBIR rights under Contract Number \_\_\_\_\_ (and subcontract Number \_\_\_\_\_ if appropriate), Awardee Name \_\_\_\_\_, Address, Expiration Period of SBIR Data Rights \_\_\_\_\_. The Government

may not use, modify, reproduce, release, perform, display, or disclose technical data or computer software marked with this legend for four (4) years. After expiration of the 4-year period, the Government has a royalty-free license to use, and to authorize others to use on its behalf, these data for Government purposes, and is relieved of all disclosure prohibitions and assumes no liability for unauthorized use of these data by third parties, except that any such data that is also protected and referenced under a subsequent SBIR award shall remain protected through the protection period of that subsequent SBIR award. Reproductions of these data or software must include this legend.”

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

Patents. Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Government support. In such circumstances, the Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and may require that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a minimum 4-year period (that may be extended by subsequent SBIR funding agreements) to allow the awardee a reasonable time to pursue a patent.

Invention Reporting. SBIR awardees must report inventions to the awarding agency within 2 months of the inventor's report to the awardee. Awardees may report inventions to DHS through the NIH iEdison Invention Reporting Systems at [www.iedison.gov](http://www.iedison.gov). Use of the iEdison System satisfies all invention reporting requirements mandated by 37 CFR Part 401, with particular emphasis on the Standard Patent Rights Clauses, 37 CFR 401.14.

## 5.5 Cost-Sharing

Cost-sharing is permitted for proposals under this program solicitation; however, cost-sharing is not required and will not be an evaluation factor in consideration of the proposal.

## 5.6 Profit or Fee

In accordance with FAR 15.404-4, Offerors may include a reasonable fee or profit consistent with R/R&D work.

## 5.7 Joint Ventures or Limited Partnerships

Joint ventures and limited partnerships are eligible provided that the entity created qualifies as a small business in accordance with the Small Business Act, 15 U.S.C. 631.

## 5.8 Research and Analytical Work

For Phase I, a minimum of two-thirds (66%) of the research and/or analytical work must be performed by the proposing small business concern. For Phase II, a minimum of one-half (50%) the research and/or analytical work must be performed by the proposing small business concern. Subcontract cost will be calculated as a percentage of the total contract value.

## 5.9 Awardee Commitments and Summary Statements

Upon award of an SBIR contract, the awardee will be required to make certain legal commitments through acceptance of numerous clauses in the Phase I and Phase II contracts. The outline that follows is illustrative of the types of clauses to which the contractor would be committed. This list is not a complete list of clauses to be included in Phase I funding agreements, and is not the specific wording of such clauses. Copies of complete terms and conditions are available upon request.

- a. *Standards of Work.* Work performed under the funding agreement must conform to high professional standards.
- b. *Inspection.* Work performed under the funding agreement is subject to Government inspection and evaluation at all times.
- c. *Examination of Records.* The Comptroller General (or a duly authorized representative) must have the right to examine any pertinent records of the awardee involving transactions related to this funding agreement.
- d. *Default.* The Government may terminate the funding agreement if the contractor fails to perform the work contracted.
- e. *Termination for Convenience.* The funding agreement may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the awardee will be compensated for work performed and for reasonable termination costs.
- f. *Disputes.* Any dispute concerning the funding agreement that cannot be resolved by agreement must be decided by the contracting officer with right of appeal.
- g. *Contract Work Hours.* The awardee may not require an employee to work more than 8 hours a day or 40 hours a week unless the employee is compensated accordingly (for example, overtime pay).
- h. *Equal Opportunity.* The awardee 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 awardee will not discriminate against any employee or application for employment because he or she is a disabled veteran or veteran of the Vietnam era.

- j. *Affirmative Action for Handicapped.* The awardee 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 Government official must benefit personally from the SBIR funding agreement.
- l. *Covenant Against Contingent Fees.* No person or agency has been employed to solicit or secure the funding agreement upon an understanding for compensation except bona fide employees or commercial agencies maintained by the awardee for the purpose of securing business.
- m. *Gratuities.* The funding agreement may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the award.
- n. *Patent Infringement.* The awardee must report each notice or claim of patent infringement based on the performance of the funding agreement.
- o. *American Made Equipment and Products.* When purchasing equipment or a product under the SBIR funding agreement, purchase only American-made items whenever possible.
- p. *Advertisements, Publicizing Awards, and News Releases.* All press releases or announcements about agency programs, projects, and contract awards must be cleared by the Contracting Officer's Representative (COR) and the Contracting Officer. Under no circumstances shall the Contractor, or anyone acting on behalf of the Contractor, refer to the supplies, services, or equipment furnished pursuant to the provisions of this contract in any publicity news release or commercial advertising without first obtaining explicit written consent to do so from the Program Manager/COR and the Contracting Officer. The Contractor agrees not to refer to awards in commercial advertising in such a manner as to state or imply that the product or service provided is endorsed or preferred by the Federal Government or is considered by the Government to be superior to other products or services.
- q. *E-Verify.* Contracts exceeding the simplified acquisition threshold may include the FAR clause 52.222-54 "Employment Eligibility Verification" unless exempted by the conditions listed at FAR 22.1803.
- r. *Prohibition on Contracting with Inverted Domestic Corporation.* Section 835 of the Homeland Security Act, 6 U.S.C. 395, prohibits the Department of Homeland Security from entering into any contract with a foreign incorporated entity which is treated as an inverted domestic corporation as defined in HSAR 3052.209-70. The Prohibition on Contracting with Inverted Domestic Corporation clause will be incorporated into awards resulting from this solicitation.

#### 5.10 Release of Proposal Information

In submitting a proposal, the offeror agrees to permit the Government to publicly disclose basic company information upon award. Other proposal data is considered to be the property of the Offeror, and DHS will protect it from public disclosure to the extent permitted by law including the Freedom of Information Act. Please note, in accordance with the Small Business

Administration's SBIR Policy Directive dated August 6, 2012, as amended on January 8, 2014, the DHS SBIR Office will provide the basic proposal information to the Small Business Administration's Application Information database at [www.SBIR.gov](http://www.SBIR.gov), as identified in the Policy Directive.

In an effort to increase the transition of SBIR technologies and facilitate partnerships between small businesses, large integrators, and program offices, the DHS SBIR Program Office may provide proposal information to the Department of the Navy's SBIR Program Office for inclusion in its Navy SBIR/STTR search database at [www.navysbirsearch.com](http://www.navysbirsearch.com). Awardees who do not want their proposal to be included in this database must opt out by answering "No" on the Cover Sheet.

#### 5.11 Discretionary Technical Assistance

DHS SBIR may provide up to \$5,000.00 per year for technical assistance to a SBIR awardee. Technical Assistance funds are in addition to the maximum award amount stated in **Section 3.4**. The purpose of Technical Assistance is to assist SBIR awardees in: (1) making better technical decisions on SBIR projects; (2) solving technical problems that arise during SBIR projects; (3) minimizing technical risks associated with SBIR projects; and (4) commercializing the SBIR products or processes.

Small business concerns can receive Technical Assistance in two ways:

1. Awardees can receive Technical Assistance through the DHS SBIR Program Office. The SBIR Program Office is under contract with a company that can provide technical assistance to Phase I or Phase II awardees. Awardees will receive notification from the DHS SBIR Office on what services are available and how to obtain these services at no cost to the small business. If an Offeror would like to receive Technical Assistance through the DHS SBIR Program Office, Technical Assistance costs should not be included in the Cost Proposal.
2. Awardees can also receive Technical Assistance outside of the SBIR Program Office. To do so, Offerors must enter into an agreement with a subcontractor for up to \$5,000.00 per year in Technical Assistance. (For example – Offerors can propose up to \$5,000 for a Phase I and up to \$10,000 for a 24 month Phase II effort). These subcontract costs must be accounted for in the Cost Proposal; however, profit or fee should not be applied to Technical Assistance costs. Offerors must provide a budget justification, an outline of the specific services technical assistance to be provided, and the detailed qualifications and experience of the proposed subcontractor/consultant being requested. Further, the Offeror must demonstrate in the Technical Proposal that the outside vendor selected can provide the specific technical services needed. Reimbursement is limited to services received that comply with 15 U.S.C. 638(q). Note, unspent funds for technical assistance services cannot be budgeted for other project costs. If all of the Technical Assistance funds are not spent, the balance will be de-obligated from the resultant contract. If an Offeror receives Technical Assistance from a vendor of its

choice, they will not be eligible to receive assistance from the DHS Technical Assistance contractor on the Phase I or Phase II contract.

#### 5.12 Classified and Unsolicited Proposals

Classified proposals are not accepted under the DHS SBIR Program. Classified proposals will be appropriately destroyed upon receipt.

The DHS SBIR Program is not a substitute for existing unsolicited proposal submissions and does not accept unsolicited proposals. The DHS SBIR Program is a competitive program designed to meet the needs of the DHS. If a proposal does not meet the objectives of the topics listed in this Solicitation, the proposal will be determined “non-responsive” to the topic area.

#### 5.13 Animal and/or Human Subjects

Funds cannot be released or used for any portion of the project involving animal and/or human subjects until all of the proper approvals have been obtained in accordance with applicable regulations. See **Appendix B** for more details concerning the use of Animal and/or Human Subjects.

#### 5.14 Export Control

Offerors are advised that the export of any goods or technical data from the United States, and the disclosure of technical data to foreign nationals, may require some form of export license from the U.S. Government. Failure to obtain necessary export licenses may result in criminal liability of offerors under U.S. laws.

Offerors are responsible for ensuring compliance with the International Traffic in Arms Regulations administered by the U.S. Department of State (22 C.F.R. Parts 120 to 130), Export Administration Regulations administered by the U.S. Department of Commerce (15 C.F.R. Parts 730 to 774), and Foreign Assets Control Regulations administered by the U.S. Department of Treasury (31 C.F.R. Parts 501 to 598), as warranted, and with compliance with all recordkeeping requirements under U.S. export regulations. Offerors are responsible for compliance with any applicable export license, reporting, or other preapproval requirements by the U.S. Government. DHS neither represents that a license or preapproval shall not be required nor that, if required, it shall be issued. Nothing granted herein to offerors provides any such export license or other preapproval.

Offerors are asked to identify any anticipated export compliance issues in their response to this solicitation. Specifically, offerors are advised to include information in their response regarding any known equipment, software or technical data that will be developed as a result of work to be performed under this solicitation that is subject to export control restrictions.

To the extent that export-controlled information may be provided to DHS by offerors in response to a solicitation, offerors are responsible for ensuring that such information is appropriately marked, and are responsible for complying with all applicable export controls and regulations in the process of providing such information.

#### 5.15 DHS SBIR Phase II Enhancement Programs

To further encourage the transition of SBIR-funded research into DHS acquisition programs as well as to the private sector, the DHS SBIR Program offers several opportunities for an SBIR Phase II awardee to receive additional funding. Specifically, the DHS SBIR Program Office offers Cost Match, and the SBIR Commercialization Readiness Pilot Program (CRPP) award.

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

Outside investors may include such entities as another company, a venture capital firm, an individual investor, or a non-SBIR government program; they do not include the owners of the small business, their family members, and/or affiliates of the small business. In order to be considered for DHS SBIR cost match, the outside investors must commit a minimum of \$100,000 up to a maximum of \$500,000. DHS will, at its discretion and subject to availability of funds, match up to 50% of funds received.

The additional work proposed for the Cost Match feature 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.

For more information about Cost Match visit <https://sbir2.st.dhs.gov>.

Commercialization Readiness Pilot Program (CRPP) Award. The SBIR/STTR Reauthorization Act of 2011 established the Civilian Commercialization Readiness Pilot Program (CRPP). The purpose of this program is to address the basic issues involved in transitioning any new product to the open market: (1) technology maturation, (2) business maturation, and (3) end-user product knowledge. The DHS SBIR Program received approval for its FY2014 CRPP plan from the SBA on August 29, 2013.

At the discretion of DHS, a separate SBIR CRPP award may be issued to continue funding Phase II activities. A 24-month CRPP award will further mature the technology for inclusion into a larger DHS Program or DHS acquisition program. A project's inclusion in the CRPP is selective and at the discretion of DHS. If selected, contractors will be contacted during the SBIR Phase II period of performance.

## 5.16 Additional Information

This 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 funding agreement, the terms of the funding agreement are controlling.

Before award of an SBIR funding agreement, the Government may request the applicant to submit certain organizational, management, personnel, and financial information to assure responsibility of the applicant.

DHS shall not be liable for any costs incurred by the Offerors prior to award of any SBIR contract.

This Solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under the SBIR Program are contingent upon the availability of funds.

If an award is made pursuant to a proposal submitted under this Solicitation, a representative of the contractor or grantee or party to a cooperative agreement will be required to certify that the concern has not previously been, nor is currently being, paid for essentially equivalent work by any Federal agency.

In the event that DHS has a need to share sensitive information with the SBIR awardee, the contractor must clear DHS suitability.

## 6.0 SUBMISSION OF PROPOSALS

**Proposals are due no later than 2:00 pm ET on May 21, 2014.** The DHS SBIR Programs use an electronic online proposal submission system located at <https://sbir2.st.dhs.gov>. All Offerors must submit proposals through this online system. Paper submissions and proposals received by any other means will not be accepted, evaluated, or considered for award.

Offerors are strongly encouraged to read the *Portal Registration and Submissions Training Guide* and follow the instructions for proposal submission. This guide can be found at <https://sbir2.st.dhs.gov> under "Reference Materials." The Guide provides step-by-step instructions for company registration and proposal submission.

Questions about the electronic submission of proposals should be submitted to the Help Desk. The Help Desk may be contacted at (703) 480-7676, or [dhssbir@reisystems.com](mailto:dhssbir@reisystems.com) from 9:00 a.m. to 5:00 p.m. ET, Monday through Friday.

Late proposals will not be accepted or evaluated. Note: As the close of the solicitation approaches, heavy traffic on the web servers 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 the FAR clause 52.215-1, Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the Solicitation by the time specified in the Solicitation. FAR clause 52.215-1, Instructions to Offerors – Competitive Acquisition (Jan 2004) is hereby incorporated in this Solicitation by reference.

## **7.0 RESEARCH TOPICS**

### **7.1 S&T Directorate Topics**

The following are the topics for the FY14.2 S&T Directorate’s SBIR Program:

<b>H-SB014.2-001</b>	Decontamination Technologies for Biological Agents
<b>H-SB014.2-002</b>	Automatic Detection and Patching of Vulnerabilities in Embedded Systems
<b>H-SB014.2-003</b>	Development of Cost-Effective Iterative Reconstruction Computing Platforms for Computed Tomography (CT)-based Explosive Detection Equipment
<b>H-SB014.2-004</b>	Radiant Laser Exposure Monitoring for Nominal Hazard Zone (NHZ) Evaluation
<b>H-SB014.2-005</b>	Status Indicator for Downed Power Lines
<b>H-SB014.2-006</b>	Field Detection and Analysis for Fire Gases and Particulates

Specific details for each topic are included in this **Appendix A**.

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

**SBIR TOPIC NUMBER:** H-SB014.2-001

**TITLE:** Decontamination Technologies for Biological Agents

**TECHNOLOGY AREAS:** Biological Warfare Agent, Response and Recovery, Decontamination, Remediation

**OBJECTIVE:** Demonstrate a novel technology platform that is non-destructive to common environmental surfaces but capable of destroying a range of biological agents.

**DESCRIPTION:** Following the release of a virulent biological agent that demonstrates persistence in the environment, thereby posing a continuing exposure risk to the public, harsh chemical technologies are typically employed to decontaminate (destroy) the hazard. The decontamination process is known as remediation. Currently available approaches to remediation may involve the use of acidic, caustic or other hazardous substances such as chlorine dioxide, sodium hydroxide, bleach, metal ion alkoxides, or formaldehyde. An example of the use of such technology was the large-scale decontamination of government properties using chlorine dioxide gas following the 2001 anthrax letter events. Vaporous hydrogen peroxide (VHP) and methyl bromide, while generally having good material compatibility characteristics, are also options for decontamination of biological agents although each demonstrates limitations. For example, high loadings of indigenous bacteria or the presence of reactive surfaces can consume hydrogen peroxide and complicate the decontamination process, while methyl bromide is an EPA-regulated gaseous chemical that depletes ozone in the atmosphere. Enzymatic technologies also have been developed and applied for decontamination purposes. Limitations with enzymatic processes include less than satisfactory turnover rates of a substrate molecule or enzyme deactivation when used in an operational environment. As a result of the drawbacks or limitations to the use of the aforementioned technologies, recovery of affected areas becomes more costly and resumption of normal activities can be delayed, due to the need for extensive restoration or renovation activities. The DHS Science and Technology Directorate seeks innovative technical approaches for the safe, efficacious, selective and environmentally-friendly destruction of persistent biological agents that can overcome the limitations of current decontamination technologies and exhibit good material compatibility characteristics. For a biological agent, the required level of decontamination efficacy is a 6-log reduction in viable agent (99.9999% destruction) on three or more of the following environmental surfaces (e.g., concrete, wood, soil, galvanized metal, glass, plastic, painted wallboard).

**PHASE I:** Develop, demonstrate and show material compatibility for an innovative, low-cost, environmentally-friendly concept for 6-log reduction of a non-hazardous, biological agent simulant (e.g., *Bacillus thuringiensis* or other spore-forming bacteria) on three environmental surfaces such as concrete, wood, soil, galvanized metal, glass, plastic, and painted wallboard. Deliverables include a detailed project report showing material compatibility for a low cost and environmentally friendly solution as outlined above, as well as a project plan for Phase II, including costs, schedule and proposed subcontract arrangements, if any.

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**PHASE II:** Optimize the innovative technical approach and demonstrate 6-log reduction in viable biological agent simulant such as *Bacillus anthracis* – Sterne strain on the following environmental surfaces: concrete, wood, soil, galvanized metal, glass, plastic, and painted wallboard. Demonstrate required efficacy can be achieved under the following three different environmental conditions: low temperature/low humidity, room temperature/40-50% relative humidity, and high temperature/high humidity. Demonstrate the ability to deliver the decontamination technology using commercial devices that are compatible with standard decontamination operations. Demonstrate a small pilot-scale production process that can produce the innovative decontamination product in a safe and cost-effective manner that can be readily scaled by a qualified manufacturer for cost-effective production of large, commercial quantities. Deliverables also include 0.5 – 1.0 kilogram of innovative decontamination technology product for independent government evaluation and a project and business plan for commercialization during Phase III, including costs, schedule and any proposed subcontract or toll manufacturing (license) arrangements.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** The innovative decontamination technology can be produced and supplied to the government for decontamination of public health hazards involving virulent biological agents. Other potential and significant applications and market opportunities in the commercial sector may include pest control, mold and fungus removal, sterilization of medical facilities and sensitive equipment, water purification.

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**KEY WORDS:** decontamination, remediation, biological agent, environmentally-friendly, material compatibility, clearance, consequence management

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**SBIR TOPIC NUMBER:** H-SB014.2-002

**TITLE:** Automatic Detection and Patching of Vulnerabilities in Embedded Systems

**TECHNOLOGY AREAS:** Resilient Systems, Embedded System Security

**OBJECTIVE:** Develop innovative techniques to automatically detect and automatically patch vulnerabilities in networked, embedded systems.

**DESCRIPTION:** Embedded systems form a ubiquitous, networked, computing substrate that underlies much of modern technological society. Examples include supervisory control and data acquisition (SCADA) systems, medical devices, computer peripherals, communication devices, and vehicles, and the many consumer devices that make up the “Internet of Things”. A report in January of 2014 by Proofpoint [1] indicated that about 25% of a spamming botnet was from the Internet of Things, everyday common gadgets including at least one refrigerator. Networking these embedded systems enables remote retrieval of diagnostic information, permits software updates, and provides access to innovative features, but it also introduces vulnerabilities to the system via remote attack.

A study by Cui and Stolfo [2] showed that an extensive number of unsecured, embedded, networked devices exist that are trivially vulnerable to exploitation by remote attackers. Furthermore, a 2012 report by McAfee Labs [3] predicted that in 2012, industrial threats to SCADA systems and industrial controller systems (ICS) would mature and that embedded hardware attacks would widen and deepen. Operational availability has taken precedence over security in this community. This state of SCADA systems was confirmed in the 2013 report by Secunia [4]. The state of the practice of security for traditional IT systems is anti-virus scanning, intrusion detection systems, and a patching infrastructure. This approach does not work well for embedded systems for a variety of reasons, including its focus on known vulnerabilities and

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

the fact that security code can itself introduce new vulnerabilities. Embedded systems impose additional difficulties, such as strict resource constraints, hard real-time performance requirements, reliability over long periods of time, and the need for extensive verification and validation before patches can be installed [5].

Embedded system research has lagged behind general IT security research [6]. Some progress has been made in the last few years, but the situation is essentially unchanged. DHS seeks to develop novel technology for automatically detecting and automatically patching vulnerabilities in networked, embedded systems. The technology should represent practical and effective techniques that can be applied to a wide-range of embedded system platforms. In addition, the techniques should be versatile such that it can be implemented on systems externally networked by various mechanisms, including, Bluetooth, Wi-Fi, radios, etc. This technology will lead to more resilient and secure embedded systems used in critical infrastructure, medical, transportation and other sectors. Manual techniques for detecting and patching vulnerabilities are not within the scope of this topic and should not be submitted for consideration.

**PHASE I:** Develop novel techniques for automatic detection and automatic patching of vulnerabilities in networked, embedded systems for one or more applications. The Phase I final report must include details of the proposed techniques, the type and level of vulnerability expected to be mitigated by the proposed techniques, and the anticipated amount of software development required.

**PHASE II:** Demonstrate that the techniques from Phase I can be practically and effectively applied to any general networked, embedded system connected by any external means, such as, Bluetooth, Wi-Fi, radios, etc. Required Phase II deliverables include all documentation for the developed techniques; software or prototype(s) that will be demonstrated on multiple networked, embedded system platforms; and a final report that describes the effort, including a description of remaining work to commercialize the prototype.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** The technology will be demonstrated in one or more commercial applications, such as SCADA systems, medical devices, computer peripherals, communication devices, or vehicles. Required deliverables include a commercial service or a technology product that can be commercialized in the private sector. For example, this technology can be integrated into a larger commercially available security software product suite and would represent a specialized tool that can be applied specifically on networked, embedded systems, as opposed to current security tools designed specifically for traditional IT systems.

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**KEY WORDS:** vulnerabilities of embedded systems, automatic detection, automatic patching, resilient systems, Internet of Things

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**SBIR TOPIC NUMBER:** H-SB014.2-003

**TITLE:** Development of Cost-Effective Iterative Computing Platforms for Computed Tomography (CT)-based Explosive Detection Equipment

**TECHNOLOGY AREAS:** Explosive Detection Systems, Passenger Checkpoint, Checked Baggage

**OBJECTIVE:** Develop a cost-effective reconstruction computing platform to perform iterative reconstruction for computed tomography (CT)-based explosive detection systems.

**DESCRIPTION:** All fielded computed tomography (CT)-based explosive detection systems (EDS) in the United States create images using analytic reconstruction methods such as filtered back-projection or the direct Fourier method. The reconstruction computing platforms (RCP) for these systems reconstruct images in real-time, meaning that systems are able to continuously scan bags without having to wait for the RCP to complete a bag. Recent research using data from EDS equipment has shown that iterative reconstruction techniques (IRT) yield improved image quality (IQ) compared to the analytic reconstruction methods. The improved IQ will lead to improved automated threat recognition (ATR) with increased probability of detection (PD) and decreased probability of false alarms (PFA). That, in turn, may accommodate further expansion of the detection envelope (new threats or reduced mass quantities). However, IRT

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requires thousands of times more computational operations and memory access than analytic reconstruction methods. Therefore a RCP that supports real-time reconstruction using IRT will need more hardware and software capability, or algorithm compromises that may degrade IQ. In order to advance the deployment of IRT, the DHS Science and Technology Directorate is seeking to investigate methods to develop a cost-effective RCP for implementing IRT. The following three methods may be considered for this project: (1) reducing the of number of mathematical operations and memory accesses in IRT; (2) developing methods to achieve equivalent IQ as IRT using other reconstruction methods such as raw data processing or image processing; and (3) applying IRT to selective regions of bags or only on bags that are sent to secondary inspection such as on-screen resolution. Techniques other than these three methods may be used. In Phase I of the project, an IRT method shall be implemented based on publically available descriptions of algorithms that may have been used to reconstruct data from EDS systems. Research shall be performed to identify possible methods to develop the cost-effective RCP that preserves most of the IQ of the publically available version of IRT.

**PHASE I:** Implement a version of IRT, which has shown to improve the IQ of scans of bags, based on algorithm descriptions in the public domain. Investigate methods to develop a cost-effective RCP based on software, algorithmic and hardware solutions. The deliverables include a technical report that describes methods to develop a cost-effective RCP.

**PHASE II:** Design and implement a cost-effective RCP and associated IRT. The implementation may include software, algorithmic and hardware solutions. Deliverables include a technical report providing proof that a cost-effective RCP can be implemented that preserves most of the IQ of the publically available version of IRT.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** The RCP can be sourced by vendors of EDS equipment or the associated technologies can be transferred to the vendors on the payment of royalties.

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**KEY WORDS:** computerized tomography, CT, filtered back-projection, iterative reconstruction, model-based iterative reconstruction

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**SBIR TOPIC NUMBER: H-SB014.2-004**

**TITLE:** Radiant Laser Exposure Monitoring for Nominal Hazard Zone (NHZ) Evaluation

**TECHNOLOGY AREAS:** Lasers, Sensors, Monitors, Eye Safety

**OBJECTIVE:** Develop a portable monitoring system that directly measures laser exposure relative to Maximum Permissible Exposure (MPE) limits for the evaluation of established Normal Hazard Zones (NHZs) for eye safety considerations.

**DESCRIPTION:** The safe use of laser-based technologies to solve numerous challenges faced by the Department of Defense (DoD) and the Department of Homeland Security (DHS) is of immense interest. The American National Standards Institute's (ANSI), Z136.1-2007 consensus standard, provides recommendations for the safe use of lasers and laser systems that operate at wavelengths between 0.18 micrometers ( $\mu\text{m}$ ) and 1 millimeter (mm). It provides guidance on how to derive NHZs based on specific laser parameters. Laser exposure levels beyond the boundaries of the NHZ are sufficiently low (below MPE limits) that an unprotected person may be exposed without adverse biological changes in the eye or skin. However, prior knowledge of specific laser characteristics such as: emitted wavelength(s), power level, pulse length/repetition rates and beam geometry in addition to having someone capable of calculating the boundaries of an NHZ is required. Having a monitoring system that could either validate a calculated NHZ or even automatically derive the NHZ based on direct measurements would provide significant assurance that a fielded technology can be safely operated.

DHS is seeking a system that can directly measure the radiant laser exposure of a laser beam, derive MPE limits based on those measurements and be used to evaluate the boundaries of an NHZ. The interrogation of an incident laser beam shall provide all the necessary laser characteristics such as spectral, temporal, geometric and radiant exposure levels for the system to automatically derive MPEs consistent with the ANSI Z136.1-2007 standard. DHS is seeking a single system capable of evaluating laser beams with wavelengths between 0.213  $\mu\text{m}$  and 1 mm. Higher priority will be given to system proposals covering broader wavelength ranges within these boundaries. For example, a single system operating between 0.213  $\mu\text{m}$  and 1.2  $\mu\text{m}$  would be considered more desirable than a similar system operating between 0.213  $\mu\text{m}$  and 0.8  $\mu\text{m}$ .

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

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

**PHASE II:** Develop and deliver two prototypes for third party testing on mutually acceptable lasers within the 0.213  $\mu\text{m}$  to 1 mm spectral range. Mutually acceptable lasers may operate with pulsed and/or continuous wave (CW) emissions, with average and peak powers (or pulse energies) that are commercially available.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** In addition to the numerous homeland security and defense applications, this capability can be directly utilized to evaluate the safety of laser systems used in academic research and more broadly in private industry.

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**KEY WORDS:** Eye safety, laser, MPE, NHZ, radiant exposure, incident beam, ANSI Z136.1

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### SBIR TOPIC NUMBER: H-SB014.2-005

**TITLE:** Status Indicator for Downed Power Lines

**TECHNOLOGY AREAS:** Agile Disaster Response, Infrastructure Resiliency, Electric Power, Situational Awareness

**OBJECTIVE:** Develop an indicator, visual or otherwise, for electric power distribution cables that allow nearby personnel to determine whether a downed power line is energized or not, creating a safer environment and facilitating a more rapid recovery following an event.

**DESCRIPTION:** The impact of severe weather events on critical infrastructure can have devastating impacts. With regard to the electricity subsector, 90% of all power outages occur on the distribution system. Severe storms and natural disasters can cause a variety of safety hazards including downed power lines which create a dangerous environment for those working to recover from the damages of a weather event. To assist in restoration and recovery efforts and reduce the number of lives lost, the DHS Science and Technology Directorate is looking for ways to minimize hazards and enable rapid recovery.

Downed power lines may still carry live, high voltage electricity. Contact with a downed, energized power line can cause severe injury or even lead to fatality. Safety is of utmost

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

concern to the electric utilities and the highest priority is given to calls regarding downed power lines. Utilities also receive substantial calls for downed power lines from the public that turn out to be other types of lines, such as communications lines, that do not pose the same threat; however, they still must respond to all such calls. Crews are immediately dispatched to the affected areas to determine if the downed lines are power lines and if they are energized. If energized, the crew will cut power to the affected area until the lines can be safely restored. This response can drain a utility's resources, particularly after a large event as they must tend to all calls for downed lines, regardless of whether they are energized or not, before they can begin their damage assessment and restoration process for restoring power to the community. Additionally, the first responder's ability to access areas with downed power lines is also hampered until a utility crew can physically come to the site to verify that any downed power lines are de-energized and the site is safe.

The goal is for a status indicator device to determine if a downed line is energized or not and relay that status information to the electric utility as well as provide that information to anyone who may be in the vicinity of the downed line. An example may be a sensor node in conjunction with a visual or aural indicator. The device should capture the status of a downed line and if it is energized, an alarm, message, or notification should be sent to the utility's operations center, in addition to providing an indication of hazardous conditions to anyone in the vicinity of the downed line. If the downed line is not energized, the device must still provide a status both to the utility and to anyone in the vicinity. Therefore the system must operate independently of and with minimum impact to the power line. The device/system should also consider a communication method that is reliable when the power may be out. The device must meet all applicable ANSI/IEEE/NESC industry standards, as well as any applicable safety and environmental standards. The device must be of reasonable cost. It is recommended that interested parties consult or partner with electric utility companies as well as the first responder community to gain further insight into the operational environment and resulting specific requirements.

**PHASE I:** Evaluate the design of the status indicator and the system's functionality and feasibility in an operational environment. Complete and test the prototype subcomponent development to determine the feasibility of the design. The final technical report will document the status indicator design, evaluate subcomponent testing / modeling results, and provide a concept of operations analysis.

**PHASE II:** Fabricate and test the prototype device system under various laboratory scenarios. Revise and finalize the design based on test results. Prepare an installation guide and/or installation toolkit. The final deliverable will be to install the device in an operational environment with a partner utility.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** Potential applications of the status indicator would be applicable for all overhead distribution systems around the country. This solution could also potentially be incorporated in the operations for the first responder community.

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

### REFERENCES:

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- Electrical Safety Then and Now. *Electrical Safety Foundation International (ESFI)*. Retrieved from <http://www.esfi.org/index.cfm/cd/FAP/cdid/12394/pid/10272>.
- Cawley, J. C. and Homce, G. T. Trends in Electrical Injury in the U.S. 1992–2002. *IEEE Transactions On Industry Applications*. Vol. 44, No. 4, July/August, pp. 962-978. <http://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/tieii.pdf>
- NIOSH. (2000). Death in the Line of Duty. *Centers for Disease Control and Prevention*. Retrieved from <http://www.cdc.gov/niosh/fire/reports/face9926.html>.

**KEY WORDS:** utility power distribution, downed power lines, quick restoration, power line safety, energized power lines

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**SBIR TOPIC NUMBER:** H-SB014.2-006

**Title:** Field Detection and Analysis for Fire Gases and Particulates

**TECHNOLOGY AREAS:** Chemical Detection, Particle Counting, HAZMAT, Firefighting

**OBJECTIVE:** Develop a hand-held or "man portable" device that will detect and quantify levels of toxic gases, vapors, and particulates commonly found in the post-fire environment.

**DESCRIPTION:** Fire Investigators and other First Responders involved in a post-fire investigation require the ability to detect, monitor, and analyze the potential hazard fire gases and particulates could pose to the health of the First Responders at the scene. Currently, the technologies most often employed by firefighters to ascertain such risks are the four gas analyzers such as the MiniRAE™<sup>[1]</sup>, and a Gas Chromatography-Mass Spectrometry (GC-MS) such as seen in products like Hapsite™<sup>[2]</sup>. Both technologies have several drawbacks when

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<sup>[1]</sup> MiniRAE™ by RAE Systems.

<sup>[2]</sup> Hapsite™ by INFICON, Inc.

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

applied to fire investigation. For example, the four gas detectors have limited capability (i.e., can only detect four gases), and GC-MS devices tend to be too large (~40 lbs), take too long for analysis (approximately 10 minutes), and are cumbersome for use in a chaotic and disordered fire environment. In addition, the current fieldable GC/MS devices are able to analyze for vapor samples but not particulates without some sort of sample preparation and typically do not currently have in their libraries all the compounds of interest that are potentially present in a post-fire scenario. GC-MS is an analytical method which provides great analytical power. However, these devices, such as Hapsite™, also have a cost disadvantage when considering wide-spread fire department use, with device costs starting at approximately \$110,000. A lightweight, low cost portable instrument that can detect gases and report on particulate load would be very beneficial for First Responder use.

The portable or hand-held device shall be intrinsically safe, small and lightweight with a goal of weighing less than 1 pound with a threshold of less than 3 pounds. It shall be able to work in normal heat and cold conditions; operating from between 140°F to -30°F temperatures, water-resistant, and rugged enough to withstand a drop test of a minimum of 10 feet. The device shall be small (goal of 4" x 3" x 1" with a threshold of 6" x 4" x 2") and ideally be able to be adhered to or integrated with other First Responder Personal Protective Equipment (PPE), such as the Self-contained Breathing Apparatus (SCBA) or the Personal Alert Safety System (PASS). The device shall have a minimum of a 4-hour battery life and the batteries required to operate the system shall be commercially available. If rechargeable batteries are used, there should be an ability to swap out off-the-shelf batteries if there is no time to perform a recharge. In addition, the long-term sustainment for the device's sensors should allow for maintenance to be conducted by the user rather than require manufacturer involvement. The price goal should be less than \$1,500 per unit, with a threshold of less than \$5,000 per unit. The response time goal of the system should be less than 1 minute, with a threshold of less than 5 minutes. The device should provide the capability for the user to immediately know about present dangers, and include clear (preset) audible and visual alarm indicators. The display shall be readable in all light conditions and should display only relevant data such as an indication that the device is operating normally and/or information concerning a specific detection notification. The device should include displays for both current and cumulative exposure levels. The level of detection goal for the device shall be within Permissible Exposure Limits (PEL). The threshold for detection shall be Acute Exposure Guideline Level (AEGL) 2 at a 30-minute exposure.

The device shall, at a minimum, monitor and detect the following gases and particulates:

- Chlorine;
- Methane;
- Carbon Monoxide;
- Carbon Dioxide;
- Hydrogen;
- Hydrogen Sulfide;
- Hydrogen Chloride;

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

- Hydrogen Cyanide;
- Ammonia;
- Oxygen;
- Lower Explosive Limit;
- Sulfur Dioxide;
- Mercury; and
- Detection scheme must include a particle counter with user settable alarm thresholds.

**PHASE I:** The Phase I effort will result in a detailed technical report outlining the proposed field detection and analysis device prototype. The report shall include the system objectives, proposed outputs, and mechanisms for operation and interoperability with present-day incident command processes and systems, as well as with firefighters' self-contained breathing apparatus (SCBA). The report must include how the proposed analytical and logistical (i.e., size, weight, cost, power requirements, etc.) approach is better than the commercially available detection systems. The report must include possible risks to success and mitigation strategies to be deployed if those risks come to fruition. It must also provide preliminary data characterizing the detection capability and observed detection limits of the chosen detection technology for the compounds in the above list.

**PHASE II:** Based on the Phase I technical report, a minimum of three prototypes will be developed that provides timely situational awareness of an on-the-ground emerging threat. These prototypes shall be interoperable with decision support systems so that data can be studied and managed appropriately. The government customer will work with awardee to prepare a test plan for execution during this phase so that sufficient test data is collected to validate detector performance.

**PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:** If a new prototype is developed that can provide a field detection and analysis device for fire gases and particulate detection, this prototype would be made available to manufacturers so that a future tool can be made available for First Responder use.

### REFERENCES:

Guide for the Selection of Chemical Detection Equipment for Emergency First Responders. Department of Homeland Security – Preparedness Directorate Office of Grants and Training, Guide 100-06, January 2007, 3<sup>rd</sup> Edition. [http://www.nist.gov/oles/upload/DHS\\_100-06ChemDetFinReport\\_3-20-07.pdf](http://www.nist.gov/oles/upload/DHS_100-06ChemDetFinReport_3-20-07.pdf).

Lake, B. (Nov 2012). Firefighter Safety Depends on Gas Detector Accuracy. *FireEngineering*. Retrieved from <http://www.fireengineering.com/articles/print/volume-165/issue-11/features/firefighter-safety-depends-on-gas-detector-accuracy.html>. (NOTE: You will need to create a user account in order to access this reference.)

## APPENDIX A – RESEARCH TOPIC DESCRIPTIONS

Smallest Four Gas Confined Space Monitor. *RKI, Gas Detection for Life*. Retrieved from <http://www.rkiinstruments.com/pages/gx2009.htm>.

Weber, C. (2012). Tips for Understanding & Using Your Gas-Detection Equipment. *FirefighterNation*. Retrieved from <http://www.firefighternation.com/article/hazardous-material-cbrn/understanding-using-your-gas-detection-equipment>

**KEY WORDS:** First Responders, gas detection, environmental monitoring, chemical contaminants, fire investigation, breathable air, IDLH (immediate danger to life and health), atmosphere

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## APPENDIX B - DEFINITIONS

Commercialization. The processes of developing products, processes, technologies, or services and the production and delivery (whether by the originating party or others) of products, processes, technologies, or services for sale to or use by the Federal Government or commercial markets.

Conflicts of Interest. Contract awards made to small business concerns owned by or employing current or previous Federal Government employees could create conflicts of interest for those employees, which may be a violation of federal law of FAR Part 3.601 and the Ethics in Government Act of 1978, as amended. Small business Offerors that are owned by or employ current or previous Federal Government employees should seek guidance from the cognizant Ethics Counselor from the employee's Government agency.

Essentially Equivalent Work. Work that is substantially the same research, which is proposed for funding in more than one contract proposal or grant application submitted to the same Federal agency or submitted to two or more different Federal agencies for review and funding consideration; or work where a specific research objective and the research design for accomplishing an objective are the same or closely related to another proposal or award, regardless of the funding source.

Foreign National (Foreign Person). A foreign national (foreign person) means any person who is not:

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

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

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

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

## APPENDIX B - DEFINITIONS

### Fraud, Waste and Abuse.

Fraud – Includes any false representations about a material fact or any intentional deception designed to deprive the United States unlawfully of something of value or to secure from the United States a benefit, privilege, allowance, or consideration to which an individual or business is not entitled.

Waste – Includes extravagant, careless or needless expenditure of Government funds, or the consumption of Government property, that results from deficient practices, systems, controls, or decisions.

Abuse – Includes any intentional or improper use of Government resources, such as misuse of rank, position, or authority or resources.

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

Joint Venture. See 13 CFR 121.103(h).

Key Individual (Key Personnel). The principal investigator/project manager and any other person named as a “key” employee in a proposal submitted in response to this program solicitation.

Principal Investigator/Project Manager. The one individual designated by the Offeror to provide the scientific and technical direction to a project supported by the funding agreement.

Proprietary Information. Proprietary information is information that is provided which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security.

Research or Research and Development (R/R&D). Any activity that is:

- a) A systematic, intensive study directed toward greater knowledge or understanding of the subject studies;
- b) A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
- c) A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

Research Involving Animal Subjects. DHS has adopted the principles of the U.S. Department of Agriculture (USDA) implementation of the Animal Welfare Act, the Public Health Service (PHS) implementation of the Health Care extension Act, and the other related federal principles and guidelines as they represent the ethical foundation for the care and use of animals in research. All research involving the care and use of animals in research shall be conducted in accordance with DHS Management Directive Number 026-01.

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Research Involving Human Subjects. DHS has adopted Department of Health and Human Services (HHS) policies governing human subjects research, as set forth in 45 C.F.R. Part 46 (Subparts A-D). Subpart A of 45 C.F.R. part 46 is HHS' codification of the Federal Policy for the Protection of Human Subjects (also known as The Common Rule) which represents the basic foundation for the protection of human subjects in most research conduct or supported by U.S. Federal departments and agencies. All research involving human subjects shall be conducted in accordance with DHS Management Directive Number 026-04.

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

Offerors submitting proposals in response to this solicitation are encouraged to submit SAFETY Act applications on their existing technologies/products and are invited to contact the Office of SAFETY Act Implementation (OSAI) for more information at 1-866-788-9318 or visit OSAI's website at [www.safetyact.gov](http://www.safetyact.gov).

SBIR Technical Data. All data generated during the performance of an SBIR award.

SBIR Technical Data Rights. The rights an SBIR awardee obtains in data generated during the performance of any SBIR 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.

Small Business Concern. A concern that meets the requirements set forth in 13 C.F.R. 121.702.

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

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

Visit [https://www2.ed.gov/programs/sbir/state\\_awards.html](https://www2.ed.gov/programs/sbir/state_awards.html) for further information.

Subcontract. 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.

## ATTACHMENT 1: SBIR FUNDING CERTIFICATION – TIME OF AWARD

All small businesses that are selected for award of an SBIR funding agreement must complete this certification at the time of award and any other time set forth in the funding agreement that is prior to performance of work under this award. This includes checking all of the boxes and having an authorized officer of the awardee sign and date the certification each time it is requested.

Please read carefully the following certification statements. The Federal government relies on the information to determine whether the business is eligible for a Small Business Innovation Research (SBIR) Program award. A similar certification will be used to ensure continued compliance with specific program requirements during the life of the funding agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, SBA regulations (13 C.F.R. Part 121), the SBIR Policy Directive and also any statutory and regulatory provisions referenced in those authorities.

If the funding agreement officer believes that the business may not meet certain eligibility requirements at the time of award, they are required to file a size protest with the U.S. Small Business Administration (SBA), who will determine eligibility. At that time, SBA will request further clarification and supporting documentation in order to assist in the verification of any of the information provided as part of a protest. If the funding agreement officer believes, after award, that the business is not meeting certain funding agreement requirements, the agency may request further clarification and supporting documentation in order to assist in the verification of any of the information provided.

Even if correct information has been included in other materials submitted to the Federal government, any action taken with respect to this certification does not affect the Government's right to pursue criminal, civil or administrative remedies for incorrect or incomplete information given in the certification. Each person signing this certification may be prosecuted if they have provided false information.

The undersigned has reviewed, verified and certifies that (all boxes must be checked):

1. The business concern meets the ownership and control requirements set forth in 13 C.F.R. §121.702.

Yes No

(2) If a corporation, all corporate documents (articles of incorporation and any amendments, articles of conversion, by-laws and amendments, shareholder meeting minutes showing director elections, shareholder meeting minutes showing officer elections, organizational meeting minutes, all issued stock certificates, stock ledger, buy-sell agreements, stock transfer agreements, voting agreements, and documents relating to stock options, including the right to convert non-voting stock or debentures into voting stock) evidence that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.

Yes No N/A Explain why N/A: \_\_\_\_\_

(3) If a partnership, the partnership agreement evidences that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.

Yes No N/A Explain why N/A: \_\_\_\_\_

(4) If a limited liability company, the articles of organization and any amendments, and operating agreement and amendments, evidence that it meets the ownership and control requirements set forth in 13 C.F.R. §121.702.

Yes No N/A Explain why N/A: \_\_\_\_\_

(5) The birth certificates, naturalization papers, or passports show that any individuals it relies upon to meet the eligibility requirements are U.S. citizens or permanent resident aliens in the United States.

Yes No N/A Explain why N/A: \_\_\_\_\_

(6) It has no more than 500 employees, including the employees of its affiliates.

Yes No

(7) SBA has not issued a size determination currently in effect finding that this business concern exceeds the 500 employee size standard.

Yes No

(8) During the performance of the award, the principal investigator will spend more than one half of his/her time as an employee of the awardee or has requested and received a written deviation from this requirement from the funding agreement officer.

Yes No Deviation approved in writing by funding agreement officer: \_\_\_%

(9) All, essentially equivalent work, or a portion of the work proposed under this project (check the applicable line):

Has not been submitted for funding by another Federal agency.

Has been submitted for funding by another Federal agency but has not been funded under any other Federal grant, contract, subcontract or other transaction.

A portion has been funded by another grant, contract, or subcontract as described in detail in the proposal and approved in writing by the funding agreement officer.

(10) During the performance of award, it will perform the applicable percentage of work unless a deviation from this requirement is approved in writing by the funding agreement officer (check the applicable line and fill in if needed):

SBIR Phase I: at least two-thirds (66 2/3%) of the research.

SBIR Phase II: at least half (50%) of the research.

Deviation approved in writing by the funding agreement officer: \_\_\_%

(11) During performance of award, the research/research and development will be performed in the United States unless a deviation is approved in writing by the funding agreement officer.

Yes No Waiver has been granted

(12) During performance of award, the research/research and development will be performed at my facilities with my employees, except as otherwise indicated in the SBIR application and approved in the funding agreement.

Yes No

(13) It has registered itself on SBA's database as majority-owned by venture capital operating companies, hedge funds or private equity firms.

Yes No N/A Explain why N/A: \_\_\_\_\_

(14) It is a Covered Small Business Concern (a small business concern that:

(a) was not majority-owned by multiple venture capital operating companies(VCOs), hedge funds, or private equity firms on the date on which it submitted an application in response to an SBIR solicitation; and (b) on the date of the SBIR award, which is made more than 9 months after the closing date of the solicitation, is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms).

Yes No

It will notify the Federal agency immediately if all or a portion of the work proposed is subsequently funded by another Federal agency.

I understand that the information submitted may be given to Federal, State and local agencies for determining violations of law and other purposes.

I am an officer of the business concern authorized to represent it and sign this certification on its behalf. By signing this certification, I am representing on my own behalf, and on behalf of the business concern that the information provided in this certification, the application, and all other information submitted in connection with this application, is true and correct as of the date of submission. I acknowledge that any intentional or negligent misrepresentation of the information contained in this certification may result in criminal, civil or administrative sanctions, including but not limited to: (1) fines, restitution and/or imprisonment under 18 U.S.C. §1001; (2) treble damages and civil penalties under the False Claims Act (31 U.S.C. §3729 *et seq.*); (3) double damages and civil penalties under the Program Fraud Civil Remedies Act (31 U.S.C. §3801 *et seq.*); (4) civil recovery of award funds, (5) suspension and/or debarment from all Federal procurement and nonprocurement transactions (FAR Subpart 9.4 or 2 C.F.R. part 180); and (6) other administrative penalties including termination of SBIR/STTR awards.

<b><i>Signature</i></b>	<b><i>Date</i></b>
<b><i>Print Name (First, Middle, Last)</i></b>	
<b><i>Title</i></b>	
<b><i>Business Name</i></b>	

## ATTACHMENT 2: SBIR FUNDING CERTIFICATION – LIFE CYCLE CERTIFICATION

All SBIR Phase I and Phase II awardees must complete this certification at all times set forth in the funding agreement (see §8(h) of the SBIR Policy Directive). This includes checking all of the boxes and having an authorized officer of the awardee sign and date the certification each time it is requested.

Please read carefully the following certification statements. The Federal government relies on the information to ensure compliance with specific program requirements during the life of the funding agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, the SBIR Policy Directive, and also any statutory and regulatory provisions referenced in those authorities.

If the funding agreement officer believes that the business is not meeting certain funding agreement requirements, the agency may request further clarification and supporting documentation in order to assist in the verification of any of the information provided.

Even if correct information has been included in other materials submitted to the Federal government, any action taken with respect to this certification does not affect the Government's right to pursue criminal, civil or administrative remedies for incorrect or incomplete information given in the certification. Each person signing this certification may be prosecuted if they have provided false information.

The undersigned has reviewed, verified and certifies that (all boxes must be checked):

(1) The principal investigator spent more than one half of his/her time as an employee of the awardee or the awardee has requested and received a written deviation from this requirement from the funding agreement officer.

Yes No Deviation approved in writing by funding agreement officer: \_\_\_\_%

(2) All, essentially equivalent work, or a portion of the work performed under this project (check the applicable line):

Has not been submitted for funding by another Federal agency.

Has been submitted for funding by another Federal agency but has not been funded under any other Federal grant, contract, subcontract or other transaction.

A portion has been funded by another grant, contract, or subcontract as described in detail in the proposal and approved in writing by the funding agreement officer.

(3) Upon completion of the award it will have performed the applicable percentage of work, unless a deviation from this requirement is approved in writing by the funding agreement officer (check the applicable line and fill in if needed):

SBIR Phase I: at least two-thirds (66 2/3%) of the research.

SBIR Phase II: at least half (50%) of the research.

Deviation approved in writing by the funding agreement officer: \_\_\_\_%

(4) The work is completed and it has performed the applicable percentage of work, unless a deviation from this requirement is approved in writing by the funding agreement officer (check the applicable line and fill in if needed):

- SBIR Phase I: at least two-thirds (66.6%) of the research.
- SBIR Phase II: at least half (50%) of the research.
- Deviation approved in writing by the funding agreement officer: \_\_\_\_\_%
- N/A because work is not completed

(5) The research/research and development is performed in the United States unless a deviation is approved in writing by the funding agreement officer.

- Yes
- No
- Waiver has been granted

(6) The research/research and development is performed at my facilities with my employees, except as otherwise indicated in the SBIR application and approved in the funding agreement.

- Yes
- No
- It will notify the Federal agency immediately if all or a portion of the work proposed is subsequently funded by another Federal agency.
- I understand that the information submitted may be given to Federal, State and local agencies for determining violations of law and other purposes.
- I am an officer of the business concern authorized to represent it and sign this certification on its behalf. By signing this certification, I am representing on my own behalf, and on behalf of the business concern, that the information provided in this certification, the application, and all other information submitted in connection with the award, is true and correct as of the date of submission. I acknowledge that any intentional or negligent misrepresentation of the information contained in this certification may result in criminal, civil or administrative sanctions, including but not limited to: (1) fines, restitution and/or imprisonment under 18 U.S.C. §1001; (2) treble damages and civil penalties under the False Claims Act (31 U.S.C. §3729 *et seq.*); (3) double damages and civil penalties under the Program Fraud Civil Remedies Act (31 U.S.C. §3801 *et seq.*); (4) civil recovery of award funds, (5) suspension and/or debarment from all Federal procurement and nonprocurement transactions (FAR Subpart 9.4 or 2 C.F.R. part 180); and (6) other administrative penalties including termination of SBIR/STTR awards.

<b>Signature</b>	<b>Date</b>
<b>Print Name (First, Middle, Last)</b>	
<b>Title</b>	
<b>Business Name</b>	

**ATTACHMENT 3: BRIEFING CHART TEMPLATE**

<p><b><u>Proposal Title</u></b>  <b><u>Company</u></b>  <b><u>City, State</u></b>  <b><u>Proposal Number:</u></b></p>	
<p>Place a clear photograph, drawing, graphic or diagram of the concept related to innovation here</p> <p><i>Provide a simple, legible, but sufficiently detailed graphic to convey the main concept or idea of the research effort and/or development prototype.</i></p>	<p><b><u>Relevance and Goals and Commercialization</u></b></p> <p>Relevance and Goals:</p> <ul style="list-style-type: none"> <li>• Research goals and desired end state including performance targets</li> <li>• Advantages over other state-of-the-art solutions</li> <li>• Key technical challenges</li> </ul> <p>Commercialization Strategy:</p> <ul style="list-style-type: none"> <li>• Describe the current market potential for product/service development and estimated unit cost of the product</li> <li>• Identify end user interests or agreements</li> </ul>
<p><b><u>Technical Objectives and Work Plan</u></b></p> <p>Address:</p> <ul style="list-style-type: none"> <li>• Technological innovations supporting the approach, as appropriate</li> <li>• How the problem will be addressed</li> <li>• The current status of the proposed effort</li> <li>• The key technical challenges and/or risks</li> <li>• The planned technical accomplishments/key milestones</li> </ul> <p><u>Estimate the Technology Readiness Level (TRL 1 - 9) at beginning and end of contract</u></p>	<p><b><u>Milestones, Deliverables, Schedule and Team</u></b></p> <p>Milestones, Deliverables and Schedule:</p> <ul style="list-style-type: none"> <li>• Provide milestones, primary deliverables, and task durations for Phase I and Phase II, as appropriate</li> </ul> <p>Team:</p> <ul style="list-style-type: none"> <li>• List the proposing organization and principal investigator</li> <li>• List subcontractors</li> </ul>
<p><b>NON-PROPRIETARY, UNCLASSIFIED DATA</b></p>	