Small Business Technology Transfer Program Phase I Solicitation (STTR)

June 2014 Submission

PROGRAM SOLICITATION
NSF 14-540

REPLACES DOCUMENT(S):
NSF 13-598

National Science Foundation

Directorate for Engineering
Industrial Innovation and
Partnerships

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

June 11, 2014

Proposals submitted outside the window of May 11, 2014 - June 11, 2014 will be returned without review. Proposer's time is defined as the time zone associated with the ***COMPANY'S ADDRESS AS REGISTERED WITH NSF*** at the time of proposal submission.

IMPORTANT INFORMATION AND REVISION NOTES

NSF's STTR program provides non-dilutive funds for early-stage research and development (R&D) at small businesses. This R&D should be based on innovative, transformational technology with potential for great commercial and/or societal benefits. The program invites proposals from small businesses across a broad range of science and engineering disciplines. If you are successful, you will receive a grant of up to $225,000 for a 12-month development/feasibility project. You can then compete for a second grant of up to $750,000 over a 2 year period, with the aim of advancing the technology toward commercial deployment.

This solicitation asks for information about your "track record" of commercialization in various ways. However, we encourage proposals from a diversity of entrepreneurs -- new and seasoned. What is most important is that you have a transformative idea or innovation and that your team's primary goal is the commercialization of the technology.

Video resources on the STTR website provide a general program description, solicitation-specific information, and helpful proposal preparation advice. **A follow-up series of Q&A webinars** hosted by SBIR/STTR Program Directors will be held in the months leading up to the deadline date. The video link and webinar schedule can be found on the **SBIR/STTR webinar page**.

Required Registrations. Start Now- These registrations take time, and if left to the last minute could jeopardize your proposal submission! Register the same information in the same way in each of these systems to avoid troubles later. See the Additional Eligibility section for more details.

- Dun and Bradstreet Data Universal Numbering System (DUNS)
- System for Award Management (SAM)
- Small Business Administration (SBA) Company Registry
- NSF FastLane

This solicitation details reasons for which your proposal will be **Returned Without Review**. Please visit this list to ensure that your proposal is able to be reviewed by commercial and technical experts in the field from across the country. Additionally, please ensure that you meet the eligibility requirements, including the new commercialization benchmark.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Small Business Technology Transfer Program (STTR)

Synopsis of Program:

The Small Business Technology Transfer (STTR) Program stimulates technological innovation in the private sector by strengthening the role of small business concerns in meeting Federal research and development needs, increasing the commercial application of federally supported research results, and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

The STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 112-81 (SBIR/STTR Reauthorization Act of 2011). A main purpose of the legislation is to

stimulate technological innovation and increase private sector commercialization. The NSF STTR program is therefore in a unique position to meet both the goals of NSF and the purpose of the SBIR/STTR legislation by transforming scientific discovery into both social and economic benefit, and by emphasizing private sector commercialization.

The STTR Program requires researchers at universities, Federally-Funded Research and Development Centers (FFRDCs), and other non-profit research institutions to play a significant intellectual role in the conduct of each STTR project. These researchers, by joining forces with a small company, can spin-off their commercially promising ideas while they remain primarily employed at the research institution.

This STTR Phase I solicitation aims at encouraging the commercialization of previously NSF-funded fundamental research (NSF funding lineage). It is highly desirable that the core innovation described in the submitted proposals can in some manner be linked to fundamental research funded by the NSF. **This lineage must be documented in the Project Description section of the proposal here).**

Please note: It is NOT required that investigators of the original NSF-funded fundamental research be directly affiliated with the proposed STTR project or personnel.

NSF has formulated broad solicitation topics for SBIR/STTR that conform to the high-technology investment sector's interests. The topics are detailed on the SBIR/STTR topics homepage.

Note: The submission of the same project idea to both this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation is strongly discouraged.

More information about the NSF STTR Program can be found on the Program Homepage.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Peter Atherton, Information and Communication Technologies (IC), telephone: (703) 292-8772, email: patherto@nsf.gov
- Prakash Balan, Chemical and Environmental Technologies (CT), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Steven Konsek, Semiconductors (S) and Photonic (PH) Devices and Materials, telephone: (703) 292-7021, email: skonsek@nsf.gov
- Glenn H. Larsen, Educational Technologies and Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, Advanced Manufacturing and Nanotechnology (MN), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Muralidharan S. Nair, Electronic Hardware, Robotics and Wireless Technologies (EW), telephone: (703) 292-7059, email: mnair@nsf.gov
- Benaiah Schrag, Advanced Materials and Instrumentation (MI), telephone: (703) 292-8323, email: bschrag@nsf.gov
- Ruth M. Shuman, Biological Technologies (BT), telephone: (703) 292-2160, email: rshuman@nsf.gov
- Jesus V. Soriano, Smart Health (SH) and Biomedical (BM) Technologies, telephone: (703) 292-7795, email: jsoriano@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering

Award Information

Anticipated Type of Award: Fixed Award Amount

Estimated Number of Awards: 47

(pending availability of funds)

Anticipated Funding Amount: $10,575,000

for Phase I (pending availability of funds)

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the STTR program (see Eligibility Guide for more information). The firm must be in compliance with the SBIR /STTR Policy Directive(s) and 13 CFR 121.
    - Please note that NSF has elected not to use the authority given under 15 U.S.C. § 638(dd)(1) (also §5107 of the SBIR/STTR Reauthorization Act). Hence, small businesses that are majority-owned by one or more venture capital operating companies (VCOCs), hedge funds or private equity firms are NOT eligible to submit proposals or receive awards from the NSF SBIR/STTR program.
    - Socially and economically disadvantaged small business concerns and women-owned small business concerns are encouraged to participate.
    - For an STTR Phase I Proposal, a minimum of 40% of the research, as measured by the budget, must be performed by the small business concern and a minimum of 30% of the research, as measured by the budget, must be performed by the collaborating research institution.

- Proposals from joint ventures and partnerships are permitted, provided the entity created qualifies as a small business concern (see Eligibility Guide for more information).
- Proposing firms are also encouraged to take advantage of research expertise and facilities that may be available to them at colleges, universities, national laboratories, and from other research providers. Such collaborations may include research subcontracts, consulting agreements or the employment of faculty as senior personnel and of graduate or undergraduate students as assistants by the small business.

Who May Serve as PI:

The primary employment of the Principal Investigator (PI) must be with the small business concern at the time of the award. A PI must spend a minimum of **two calendar months** on an STTR Phase I project. Primary employment is defined as 51% employed by the small business for the duration of the award. NSF considers a full time work week to be normally 40 hours and considers employment elsewhere of greater than 19.6 hours to be in conflict with this requirement.

Limit on Number of Proposals per Organization: 2

An organization may submit no more than two Phase I proposals in total during this cycle, which is defined as this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation. For example, an organization may submit one (1) SBIR Phase I and one (1) STTR Phase I proposal, two (2) SBIR Phase I proposals, or two (2) STTR Phase I proposals during this cycle.

These eligibility constraints will be strictly enforced. In the event that an organization exceeds this limit, the first two proposals received will be accepted, and the remainder will be returned without review). No exceptions will be made.

The submission of the same project idea to both this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation is strongly discouraged.

Limit on Number of Proposals per PI or Co-PI: 1

No person may participate as the principal investigator (PI) or Co-PI for more than one proposal submitted to this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation. It is the responsibility of the submitting organization to ensure that no person is listed as the PI or Co-PI for more than one proposal submitted to this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Indirect costs plus fringe benefits are limited to a maximum rate of 150% of direct salaries and wages. (See the Budget Section). This limitation may entail mandatory committed cost sharing by the organization. In such cases, it constitutes an exception to NSF's cost sharing policy.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  June 11, 2014

  Proposals submitted outside the window of May 11, 2014 - June 11, 2014 will be returned without review. Proposer's time is defined as the time zone associated with the ***COMPANY'S ADDRESS AS REGISTERED WITH NSF*** at the time of proposal submission.

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The National Science Foundation (NSF), an independent agency of the Federal Government, invites eligible small business concerns to submit Phase I proposals for its Small Business Technology Transfer (STTR) program. NSF will support high-quality projects on important scientific, engineering, or science and engineering education problems and opportunities that could lead to significant commercial and public benefit if the research is successful.

The STTR solicitation is issued pursuant to the authority contained in Public Law 112-81 (SBIR/STTR Reauthorization Act of 2011). STTR policy is provided by the Small Business Administration (SBA) through the SBA Policy Directive.

II. PROGRAM DESCRIPTION

By increasing the incentive and opportunity for small firms to undertake cutting-edge, high-risk, high-quality scientific, engineering, or science and engineering education research, the NSF STTR program seeks to **transform scientific discovery into both social and economic benefit by emphasizing private sector commercialization.**

The fundamental mission of NSF is to promote discoveries and to advance education across the frontiers of knowledge in science and engineering. Consistent with that mission, the NSF STTR Program encourages and supports a wide range of proposals. These proposals are reviewed under NSF's merit review criteria, which cover both the quality of research (intellectual or technical merit) and its potential impact on society (broader/commercial impacts).

The emphasis of this STTR Phase I solicitation is the commercialization of previously NSF-funded fundamental research (NSF funding lineage). It is highly desirable that the core innovation described in the submitted proposals can in some manner be linked to fundamental research funded by the NSF. This lineage must be documented in the Project Description section of the proposal.

The following broad solicitation topics for STTR conform to the high-technology investment sector's interests. The topics, listed below, are detailed on the **SBIR/STTR topics homepage**:

- **Educational Technologies and Applications (EA)**
- **Information and Communication Technologies (IC)**
- **Semiconductors (S) and Photonic (PH) Devices and Materials**
- **Electronic Hardware, Robotics and Wireless Technologies (EW)**
- **Advanced Manufacturing and Nanotechnology (MN)**
- **Advanced Materials and Instrumentation (MI)**
- **Chemical and Environmental Technologies (CT)**
- **Biological Technologies (BT)**
- **Smart Health (SH) and Biomedical (BM) Technologies**

Certain innovative technologies with high commercial potential may not appear to fit under any of the nine current solicitation topics or their associated subtopics. In that case, you may seek advice from the relevant Program Director (as detailed on the topic pages), or you may submit the proposal under the topic and subtopic that is the closest match. The SBIR/STTR Program Directors ensure that proposals are appropriately grouped into panels for review by experts in the field, and the review process is facilitated by a Program Director. The topics and subtopics help facilitate the merit review process but are not used as a consideration in making award decisions.

Successful proposers will conduct Research and Development (R&D) on projects that:

- Provide evidence of a commercially viable product, process, device, or system, and/or
- Meet an important social or economic need.

Projects should have the following:

- High potential commercial payback, and
- A high degree of technical risk.

For more in-depth program information please reference the following web site: **STTR Homepage.**

III. AWARD INFORMATION

STTR Phase I proposals may be submitted for funding up to $225,000. STTR Phase I projects run for twelve months. Award notification is typically four to six months from the proposal submission deadline date. Awards will have an effective date of January 1, 2015 for proposals submitted to this solicitation.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the STTR program (see Eligibility Guide for more information). The firm must be in compliance with the SBIR /STTR Policy Directive(s) and 13 CFR 121.
    - Please note that NSF has elected not to use the authority given under 15 U.S.C. § 638(dd)(1) (also §5107 of the SBIR/STTR Reauthorization Act). Hence, small businesses that are majority-owned by one or more venture capital operating companies (VCOCs), hedge funds or private equity firms are NOT eligible to submit proposals or receive awards from the NSF SBIR/STTR program.
    - Socially and economically disadvantaged small business concerns and women-owned small business concerns are encouraged to participate.
    - For an STTR Phase I Proposal, a minimum of 40% of the research, as measured by the budget, must be performed by the small business concern and a minimum of 30% of the research, as measured by the budget, must be performed by the collaborating research institution.
    - Proposals from joint ventures and partnerships are permitted, provided the entity created qualifies as a small business concern (see Eligibility Guide for more information).
    - Proposing firms are also encouraged to take advantage of research expertise and facilities that may be available to them at colleges, universities, national laboratories, and from other research providers. Such collaborations may include research subcontracts, consulting agreements or the employment of faculty as senior personnel and of graduate or undergraduate students as assistants by the small business.

Who May Serve as PI:

The primary employment of the Principal Investigator (PI) must be with the small business concern at the time of the award. A PI must spend a minimum of **two calendar months** on an STTR Phase I project. Primary employment is defined as 51% employed by the small business for the duration of the award. NSF considers a full time work week to be normally 40 hours and considers employment elsewhere of greater than 19.6 hours to be in conflict with this requirement.

Limit on Number of Proposals per Organization: 2

An organization may submit no more than two Phase I proposals in total during this cycle, which is defined as this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation. For example, an organization may submit one (1) SBIR Phase I and one (1) STTR Phase I proposal, two (2) SBIR Phase I proposals, or two (2) STTR Phase I proposals during this cycle.

These eligibility constraints will be strictly enforced. In the event that an organization exceeds this limit, the first two proposals received will be accepted, and the remainder will be returned without review). No exceptions will be made.

The submission of the same project idea to both this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation is strongly discouraged.

Limit on Number of Proposals per PI or Co-PI: 1

No person may participate as the principal investigator (PI) or Co-PI for more than one proposal submitted to this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation. It is the responsibility of the submitting organization to ensure that no person is listed as the PI or Co-PI for more than one proposal submitted to this STTR Phase I solicitation and the concurrent SBIR Phase I solicitation.

Additional Eligibility Info:

NOTICE: The information provided for the 3 registrations below should match exactly to avoid processing complications.

DUNS Number. In accordance with the Office of Management and Budget policy directive 75 FR 22706, each proposer must have a DUNS number prior to submission of a proposal to NSF. Any subawardees named in the proposal must be registered in FastLane, which requires that they obtain a DUNS number (http://www.dnb.com/)

System for Award Management (SAM) Registration. Each proposer (excluding subawardees) must be registered in the SAM database prior to submission of the proposal. The SAM is the primary registrant database for the U.S. Government. This SAM registration must be maintained with current information at all times during which the organization has an active award or a proposal under consideration by NSF. Failure to comply with the SAM registration requirement prior to proposal submission may impact the processing of the proposal. To register in the SAM, go to https://www.sam.gov/.

Small Business Administration (SBA) Company Registration is required prior to submission of the proposal. SBA maintains and manages a Company Registry at sbir.gov/registration to track ownership and affiliation requirements for all companies applying to the STTR Program. The SBIR/STTR policy directive requires each small business concern (SBC) applying for a Phase I or Phase II award to register in the Company Registry prior to submitting an application. All SBCs must report and/or update ownership information to SBA prior to each STTR application submission or if any information changes prior to award. *Please see Section V.A.9.b for SBA registration documentation submission instructions.*

Phase I to Phase II Transition Rate Benchmark. The Phase I to Phase II Transition Rate benchmark required by the SBIR/STTR Reauthorization Act of 2011 is implemented. For Phase I applicants that have received more than 20 Phase I federal SBIR/STTR awards over the past 5 fiscal years, the minimum Phase I to Phase II Transition Rate is 0.25 over those 5 fiscal years. Small businesses who fail to meet this transition requirement will be notified by SBA and will not be eligible for an NSF Phase I award in this submission cycle. Further information: Commercialization Benchmark.

Commercialization Benchmark. The commercialization benchmark required by the SBIR/STTR Reauthorization Act of 2011 only applies to Phase I applicants that have received more than 15 Phase II federal SBIR/STTR awards over the past 10 fiscal years, excluding the last two years. These companies must have achieved the minimum required commercialization activity in order to be eligible to receive a Phase I award, as determined by the information entered in the company registry at SBIR.gov. Firms for which the commercialization benchmark applies should consult SBIR.gov for more information: Commercialization Benchmark.

Unacceptable Objectives. Proposed efforts directed toward systems studies; market research; commercial development of existing products or proven concepts; straightforward engineering design for packaging; laboratory evaluations; incremental product or process improvements; evolutionary optimization of existing products; and evolutionary modifications to broaden the scope of an existing product or application are examples of projects that are not acceptable for STTR. Projects determined unacceptable will be returned without review to the proposer. Phase I proposals returned without review by NSF are NOT eligible for reconsideration under the same program solicitation; however, proposals may be resubmitted under a subsequent solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-PUBS (7827) or by e-mail from nsfpubs@nsf.gov.

Important Proposal Preparation Information: FastLane will check for required sections of the full proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. Unless otherwise specified in this solicitation, you can decide where to include this section within the Project Description.

♦ ♦ ♦ ♦ ♦ IMPORTANT GENERAL INFORMATION ABOUT PROPOSALS ♦ ♦ ♦ ♦ ♦

Communication with an SBIR/STTR Program Director. A company considering proposal submission may **(but is NOT required to)** communicate with an SBIR/STTR Program Director to help gauge whether a project meets the program's intellectual merit and commercial impact criteria. These proposers should email the Program Director associated with the topic that most closely matches the proposed research (see the Topic Pages links in the Program Description section of this solicitation). The email should consist of a 1-2 page executive summary discussing the following aspects of the project: 1) the company and team, 2) the market opportunity, value proposition, and customers, 3) the technology/innovation, and 4) the competition. *Please note that responsiveness of Program Directors to executive summaries will likely be limited in the 2 weeks leading up to the solicitation deadline.*

Phase I Proposal and Program Objectives. An STTR Phase I proposal must describe the research effort needed to investigate the feasibility of the proposed scientific or technical innovation. The primary objective of the Phase I effort is to determine whether the innovation has sufficient technical and commercial merit for proceeding into a Phase II project. A secondary objective is to assess potential commercial feasibility of the proposed work. The deliverable at the end of an STTR Phase I grant is a technical report that summarizes the experimental and theoretical accomplishments of the research proposed. This report serves as the basis for a Phase II proposal.

Marking Proprietary Information. To the extent permitted by law, the Government will not release properly identified and marked technical and commercially sensitive data. If the proposal contains proprietary information, check the box at the bottom of the proposal cover page and identify proprietary technical data in the proposal by clearly marking the information and also providing a legend. Typically, proprietary information is marked in the text either with an asterisk at the beginning and end of the proprietary paragraph,

underlining the proprietary sections, or choosing a different font type. An entire proposal should not be marked proprietary.

Debriefing on Unsuccessful Proposals. When a proposal is declined, verbatim copies of reviews, excluding the names of the reviewers, summaries of review panel deliberations, if any, and a description of the process by which the proposal was reviewed will be available electronically. Phase I proposals that have been declined or returned without review by NSF are **NOT** eligible for reconsideration under the same program solicitation; however, proposals may be resubmitted under a subsequent solicitation, after suitable revisions have been made, conditional upon their falling within the scope of the subsequent topic or subtopic offerings.

♦ ♦ ♦ ♦ ♦ STRUCTURE AND CONTENT OF THE PROPOSAL ♦ ♦ ♦ ♦ ♦

Notes:

- **Sample Limitations**. Samples, videotapes, slides, appendices, or other ancillary items will not be accepted. Websites containing demonstrations, etc., may be cited in the proposal, but reviewers are not required to access them.
- **Page Format.** Multiple column formats are not accepted. Use the NSF required fonts; reference the GPG - Chapter II Proposal Preparation Instructions (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
- ***More detailed about the mechanics of preparing and submitting a proposal via the NSF FastLane system can be found here: SBIR/STTR FastLane Submission Guide.***

Each NSF STTR Phase I proposal shall have the following components.

1. Cover Sheet and Certification. Complete topic and subtopic fields must be included on the cover sheet. Designate one, and only one, topic and subtopic. All proposals must be electronically signed. For information regarding electronic signature, reference the FastLane webpage. **If a proposer fails to disclose on the proposal cover page whether another Federal Agency has received this proposal (or an equivalent or overlapping proposal), the proposer could be liable for administrative, civil or criminal sanctions.** NSF will not make awards that duplicate research funded or expected to be funded by other agencies, although in some cases NSF may fund portions of work described in an overlapping proposal provided that the budgets appropriately reduce costs and allocate costs among the various sponsors.

2. Project Summary. The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

Proposals that do not contain a complete Project Summary will not be accepted by FastLane or will be returned without review. The Project Summary is completed in FastLane by entering information into 3 text boxes; the aggregate of the 3 text boxes cannot exceed 4,600 characters:

Box 1: Overview, Key Words, and Subtopic Name:

- Describe the potential outcome(s) of the proposed activity. Provide a statement of objectives and methods to be employed.
- Provide a list of key words or phrases that identify the areas of technical expertise to be invoked in reviewing the proposal; and the areas of application that are the initial target of the technology.
- Provide the subtopic name.

Box 2: Intellectual Merit: This section MUST begin with *"This Small Business Innovation Research Phase I project"*. Address the intellectual merits of the proposed activity. Do not include proprietary information in the summary. Include a brief identification of the problem or opportunity, the research objectives, a description of the research, and the anticipated results.

Box 3: Broader/Commercial Impact: Address the broader impacts/commercial potential of the proposed activity. Include information on the potential commercial value, societal impact, and enhanced scientific and technological understanding.

3. Project Description. The project description is the core of the proposal document, where you convince the SBIR/STTR Program Director and the expert reviewers that your proposed project meets the intellectual merit and broader/commercial impact criteria of the program. Present evidence that the proposed technology is innovative and entails high technical risk. Convince the reviewers that the company and the project team have the necessary expertise, resources, and support to carry out the project, and that they are committed to building a viable business around the product/service being developed. Finally, present a compelling case that the NSF STTR project objectives will significantly advance the readiness of the technology and strengthen and validate its commercial position.

Summary (no more than one page)

- The Customer. Describe the expected customer for the innovation. What customer needs or market pain points are you addressing?
- The Value Proposition. What are the benefits to the customer of your proposed innovation? What is the key differentiator of your company or technology?
- The Innovation: Succinctly describe your innovation. What aspects are original, unusual, novel, disruptive, or transformative compared to the current state of the art?

The Market Opportunity (recommended length: 2 to 4 pages)

- Describe the market and addressable market for the innovation. Discuss the business economics and market drivers in this industry.
- How has the market opportunity been validated?
- Describe your customers and your basic business model.
- Describe the competition. How will the competitive landscape change by the time your product/service enters the market?
- What are the key market risks in bringing your innovation to market?
- What support or resources do you envision needing from outside partners, in order to bring this innovation to market? What is the timeline and plan to secure this support?

The Innovation (recommended length: 1-3 pages)

- Briefly describe the innovation. At what stage of technical development is the innovation? (A more detailed description can be provided in the Technical Discussion and R&D Plan, as described below).
- Describe the key technical challenges and risks in bringing the innovation to market. Which of these will be your focus in a 12-month phase I project?
- Describe the status of your intellectual property associated with this project and how you plan to protect it.
- **The emphasis of this STTR Phase I solicitation is NSF funding lineage.** It is highly desirable that the core innovation

described in the submitted proposals can in some manner be linked to fundamental research funded by the NSF. Please note: It is NOT required that investigators of the original NSF-funded fundamental research be directly affiliated with the proposed STTR project or personnel. Does your project have roots in non-SBIR/STTR NSF funding, either to the company or other organizations/institutions? If possible, please list the NSF award number and division.

The Company/Team (recommended length: 1-3 pages)

- Describe the company founders or key participants in this proposed SBIR/STTR project. What is the level of effort of these persons to company activities? How does the background and experience of the team enhance the credibility of the effort; have they previously taken similar products/services to market? (You will be asked to upload resumes in the senior personnel section of the FastLane submission.)
- Describe your vision for the company and its impact in the next five years.
- If the company has existing operations, describe how this SBIR/STTR effort would fit into these activities.
- Describe the revenue history, if any, for the past three years. Include government funding and private investment in this discussion.
- Will you have consultants or subawardees working on this project? If so, what is their expertise, affiliation, and contribution to the project? Please see the budget section for important information. A Co-PI from the research institution must be identified on the subaward proposal budget of an STTR proposal.

Technical Discussion and R&D Plan (minimum length: 5 pages, recommended length: 5 to 7 pages)

- Describe the innovation in more technical depth and with any necessary background information.
- Describe the key objectives to be accomplished during the Phase I research, including the questions that must be answered to determine the technical AND commercial feasibility of the proposed concept.
- Describe the critical technical milestones must be met to get the product or service to market.
- Describe the R&D plan. What are the objectives, and what experiments, computations, etc. are planned to reach those objectives?

4. References Cited. Provide a comprehensive listing of relevant references, including patent numbers and other relevant intellectual property citations. A list of References Cited must be uploaded into the system. ***If there are no references cited in the proposal,*** please indicate this by putting the statement "No References Cited" into this module.

5. Biographical Sketches. Provide a resume for the Principal Investigator (PI) and key personnel (including consultants and key members of the subaward team)**.** Maximum of two pages per person.

6. Budget, Sub-budgets, and Budget Justification. Detailed documentation of all budget line items is required and ***MUST*** be documented on the budget justification page.

6.a. Total budget. The total budget shall not exceed $225,000 for the STTR Phase I proposal. Budget line items must be shown in detail in the budget justification.

6.b. Personnel. List the principal investigator and senior personnel by name with their time commitments budgeted in person-months and the dollar amount for the performance period. The PI must be budgeted for a minimum of one month to the proposed project. Do ***NOT*** list company employees under B.1. Post-Doctoral Scholars.

6.c. Subawards/Consultants.

- Purchases of analytical services, other services, or fabricated components from commercial sources are not regarded as subaward activity and instead should be reported in the Budget under Other Direct Costs/Other (Line G.6 on the budget form).
- For an STTR Phase I Proposal, a minimum of 40% of the research, as measured by the budget, must be performed by the small business concern, and a minimum of 30% of the research, as measured by the budget, must be performed by the collaborating research institution. The budget justification should provide a **line by line** description of each budget item.
- All research, including subawards and consultancies, must be carried out in the U.S. (See definition of Place of Performance.)
- **Consultant / Subaward Letters.** ***Each consultant, whether paid or unpaid, must provide a signed statement*** that confirms availability, time commitment, role in the project, and the agreed consulting rate (not to exceed $600 per day; see below). Subawardees (the subaward *institution*, as opposed to just the PI) must also provide a commitment letter. Upload the letter(s) in the Budget Justification and NOT as a Supplemental Document.
- **Consultant Rate.** The reimbursement rates for consultants are a direct cost that cannot exceed the daily equivalent of the rate paid to an Executive Level IV Federal employee. As of January 2013, that amount is $600 per day. *The consulting rate under this solicitation can be a maximum of $600 per day* (NSF defines a day as 8 hours). Indicate the number of days proposed per consultant. Consultant travel should be shown under the domestic travel category, E-1, but counts as an outsourcing expenses.

6.d. Materials and Supplies. The proposal budget justification should indicate the specifics of the materials and supplies required. Materials and supplies are defined as tangible personal property, other than equipment, costing less than $5,000, or other lower threshold consistent with the policy established by the proposing organization. Each materials and supplies line item should include an estimated cost for that item.

6.e. Prohibited Expenditures. Permanent equipment, patent expenses, and foreign travel are not allowable expenditures. Tuition costs are not considered research or research and development. Accordingly, they are not acceptable costs and should not be included in the budget.

6.f. Grantees Conference. One domestic travel trip for up to two persons (normally the PI and an individual associated with business operations) is required to attend a two-day grantee workshop in the DC area. The intent of this workshop is to discuss the research program with a program director and to learn the mechanics of preparing a Phase II proposal; therefore, this trip must be included in the Phase I budget. An explicit statement acknowledging attendance at the grantee workshop is required on the budget justification page**.** A good budget estimate is $2,000 per person to cover the conference registration fees and travel expenses.

6.g. Indirect Costs and Fringe Benefits. Indirect costs plus fringe benefits is limited to an effective rate of 150% of salaries and wages; ***i.e., (line C + line I) should not be more than 150% of (line A + line B).***The following expenses will ***NOT*** be funded as part of the indirect cost pools:

- Independent Research and Development (IR&D)

Patent and patent related expenses will not be funded as either a direct or indirect cost
- Sales and marketing expenses
- Business development
- Manufacturing and production expenses

6.h. Reasonable fees (estimated profit). These will be considered under Phase I. The amount of the fee approved by NSF cannot exceed seven percent (7%) of the total indirect and direct project costs.

7. Current and Pending Support of Principal Investigator and Senior Personnel.

- **Types of Support / Activities**. Provide information regarding the following activities, regardless of whether the PI and other senior personnel will receive a salary from these activities:
  - All current and pending support for ongoing projects and proposals (from any source), including continuing grants funding.
  - Proposals submitted. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF.
  - Upcoming submissions that involve the Principal Investigator or senior personnel.
  - **The proposal being submitted is considered "pending" and therefore MUST appear in the Current and Pending Support module.**
- **Information Needed**
  - Name of sponsoring organization,
  - Total award amount (if already awarded) for the entire award period covered (including indirect costs)
  - Title and performance period of the proposal, and
  - Annual person-months (calendar months) devoted to the project by the principal investigator and each of the senior personnel.

8. Facilities, Equipment and Other Resources. Specify the availability and location of significant equipment, instrumentation, computers, and physical facilities necessary to complete the portion of the research that is to be carried out by the proposing firm in Phase I. ***Purchase of permanent equipment is NOT permitted in a Phase I project*****;** i.e., Phase I proposals should NOT contain an entry in budget line item D (reference definition of Permanent Equipment).

If the equipment, instrumentation, computers, and facilities for this research are not the property (owned or leased) of the proposing firm, include a statement signed by the owner or lessor which affirms the availability of these facilities for use in the proposed research, reasonable lease or rental costs for their use, and any other associated costs. *Upload images of the scanned statements into this section.*

9. Supplementary Documents. The supplementary documents permitted in a Phase I proposal are limited to the following (if applicable):

9.a. Letter(s) of Support for Technology (no more than three letters). Letters of support act as an indication of market validation for the proposed innovation and add significant credibility to the proposed effort. Letters of support should demonstrate that the company has initiated dialog with relevant stakeholders (potential customers, strategic partners or investors) for the proposed innovation and that a legitimate business opportunity may exist should the technology prove feasible. The letter(s) must contain affiliation and contact information for the signatory stakeholder. Letters and supporting documents from consultants and subcontractors are NOT considered letters of support and are NOT to be included here. Letters and supporting documents from consultants and subcontractors should be included in the Budget Justification section.

REQUIRED FOR ALL PROPOSALS

9.b. Small Business Administration (SBA) Company Registry Documentation. Registration in the SBA Company Registry is required for all applicants: http://sbir.gov/registration. Once registration is complete, log back in and click on "Company Profile" in the upper right corner. Once you click it, you see "Download SBC Registration" on the right-hand side next to "SBC Control ID". Download this PDF and upload it as a supplementary document to the proposal in FastLane. Proposers are expected to report and/or update ownership information to SBA prior to each STTR application submission or if any information changes prior to award.

9.c. Data Management Plan. Proposals *MUST* contain a supplementary document labeled "Data Management Plan", which should include the statement, "All data generated in this STTR Phase I project is considered proprietary." See exceptions: http://nsf.gov/eng/general/ENG_DMP_Policy.pdf

9.d. Cooperative Research Agreement. See the Cooperative Research Agreement (CRA) model. The proposing small business concern must provide a signed written CRA between the small business and the research institution at the time of award. For proposal submission, place a draft of the CRA or a letter that includes the STTR partner stating that a CRA will be provided upon notification of award recommendation.

REQUIRED IF APPLICABLE

9.e. Company Commercialization History. A Company Commercialization History is required for all proposers certifying receipt of previous Phase II awards from any Federal agency on the third page of the Cover Page in question # 11. The NSF Commercialization History Template *MUST* be used. All items must be addressed in the format outlined in this template. Changes to the NSF template, additional narratives and/or commercialization history documents from other SBIR/STTR agencies are not permitted.

9.f. Post Doc Mentoring Plan. If a proposal requests funding to support post-doctoral scholars on line B.1 of the budget and/or a subaward budget, a Post Doc Mentoring Plan ***MUST*** be uploaded to the system**.** The mentoring plan must describe the mentoring activities that will be provided to all postdoctoral researchers supported by the project. Proposers are advised that the mentoring plan may not be used to circumvent the 15-page project description limitation. For more information on what is required for a Post Doc Mentoring Plan reference the GPG. A template for the Post Doc Mentoring Plan can be obtained at:
http://www.nsf.gov/eng/iip/sbir/Sample_Postdoc_Mentoring_Plan.doc

9.g. Human Subjects and Vertebrate Animals. If human subjects Institutional Review Board (IRB) approval is indicated, and it is not in hand at the time of submission, there must be a plan for such approval; a supporting letter regarding IRB approval should be provided under supplementary documents. The approval must be readily attainable within six weeks of informal notification of recommendation for award to ensure continued processing for funding. The small business has three basic options with regard to human subjects review:

- Establish your own IRB (see Office of Human Rights Protection (OHRP) at Health and Human Services

(HHS)http://www.hhs.gov/ohrp/assurances/index.html#registernew
- Use the review board of a (usually local) university or research institution, either via consultants to the project, a project subcontract, or directly through its own contacts
- Use a commercial company.

Please refer to Chapter II, Sections D.6 and D.7 of the GPG(http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg) for information on the necessary supplementary documents. Note that in some cases, product testing involves human subjects. Look for federal-wide assurances under the Office of Human Research Protection website (http://www.hhs.gov/ohrp/index.html).

Animal use in funded projects requires approval of the company or collaborating institutions' Institutional Animal Care and Use Committee (IACUC). Please refer to http://www.aphis.usda.gov/ for additional information.

For more detailed help in preparing and submitting a proposal via the NSF FastLane system, please see the SBIR/STTR FastLane Submission Guide.

♦ ♦ ♦ ♦ ♦ PROPOSALS RETURNED WITHOUT REVIEW ♦ ♦ ♦ ♦ ♦

Please visit this list to ensure that your proposal is able to be reviewed by commercial and technical experts in the field from across the country. Proposals that fail to address the following items may be returned without review.

- A proposal submitted after 5:00 p.m. on the deadline date, "proposer's time", which is determined by the time zone of the **COMPANY'S ADDRESS AS REGISTERED WITH NSF.**
- A proposal that does not contain all the required components uploaded into the appropriate module within FastLane. See the required components below that make up a complete proposal. ***Even if the Fastlane system allows a proposal to be submitted, ALL proposals must have each of the items listed below, WITHOUT EXCEPTION.***
    - Project Summary (section V.A.2)
    - A complete Project Description (15-page limit; section V.A.3)
    - References Cited (section V.A.4)
    - Biographical Sketches (section V.A.5)
    - Budget, Sub-budgets, and Budget Justification (section V.A.6)
    - Current and Pending Support (reference section V.A.7)
    - Facilities, Equipment and Other Resources (section V.A.8)
    - Company Commercialization History (if applicable, see section V.8.9.d)
- A proposal with items in the Supplementary Documents section *other than the following*:
    - Letters of Support for Technology.
    - Post Doc Mentoring Plan.
    - Company Commercialization History (on an NSF template).
    - Data Management Plan.
    - Human Subjects and Vertebrate Animals Documentation
    - SBA Compliance Registration Documentation
    - Cooperative Research Agreement
- A STTR proposal with a budget exceeding $225,000.
- A proposal with documents placed in the "Additional Single Copy Documents" module in FastLane.
- A "Collaborative Proposal" (a proposal type in FastLane, which is defined as simultaneous proposal submissions from different organizations, with each organization requesting a separate award). Note: Small business concerns are encouraged to collaborate with research institutions; however, only one proposal, with subawards, should result.
- A proposal lacking sufficient technical/commercial potential substance to justify review.
- A proposal not containing research proposed in science, engineering, or education.
- Unacceptable objectives as defined in Section IV.

Proposers are reminded to identify the program solicitation number NSF 14-540 in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Indirect Cost (F&A) Limitations: Indirect costs plus fringe benefits are limited to a maximum rate of 150% of direct salaries and wages. (See the Budget Section). This limitation may entail mandatory committed cost sharing by the organization. In such cases, it constitutes an exception to NSF's cost sharing policy.

Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  June 11, 2014

  Proposals submitted outside the window of May 11, 2014 - June 11, 2014 will be returned without review. Proposer's time is defined as the time zone associated with the ***COMPANY'S ADDRESS AS REGISTERED WITH NSF*** at the time of proposal submission.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this program solicitation through use of the NSF FastLane system. Detailed instructions regarding the technical aspects of proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the

proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

THE STTR PROGRAM HAS ADDITIONAL CRITERIA THAT REFLECT THE LEGISLATIVE EMPHASIS OF THE PROGRAM AND COMPLEMENT THE STANDARD NSF REVIEW CRITERIA LISTED ABOVE.

"What is the intellectual merit of the proposed activity?"

1. Is the proposed plan a sound approach for establishing technical and commercial feasibility?
2. To what extent does the proposal suggest and develop unique or ingenious concepts or applications?
3. How well qualified is the technical team (Principal Investigator, key staff, consultants, and subawardees) to conduct the proposed activity?
4. Is there sufficient access to resources (materials and supplies, analytical services, equipment, facilities, etc.)?
5. Does the proposal reflect state-of-the-art in the major research activities proposed? (Are advancements in state-of-the-art likely?)

"What are the broader impacts of the proposed activity?"

1. What may be the commercial and societal benefits of the proposed activity?
2. Does the outcome of the proposed activity lead to a marketable product or process that warrants significant NSF support?
3. Given the stage of the proposed effort, is the team well-balanced between technical and business skills?
4. Has the proposing firm successfully commercialized SBIR- or STTR-supported technology where prior awards have been made? (Or, has the firm been successful at commercializing technology that has not received SBIR or STTR support?)
5. Has the proposer evaluated the competitive advantage of this technology vs. alternate technologies that can meet the same market needs?
6. Does the proposal lead to enabling technologies (instrumentation, software, etc.) for further innovation?
7. How well is the proposed activity positioned to attract further funding from non-SBIR/STTR sources once the project ends?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

STTR Phase I and Phase II awards are subject to availability of funds. NSF has no obligation to make any specific number of Phase I or Phase II awards based on a solicitation and may elect to make several or no awards under any specific technical topic or subtopic. STTR Phase I awards are twelve month, fixed-price grants and shall not exceed $225,000. The STTR Phase II fixed-priced grants typically will not exceed $750,000 per award. A Phase II award is based on a Phase I award. STTR Phase II awards normally will be made for a 24-month period of performance. (For information on Phase II, reference Phase II proposal preparation found on the SBIR/STTR web site (Phase II Award Information). Reasonable fees for profit (not to exceed seven percent of the total direct and indirect costs) will be considered under both phases.

SBIR/STTR Funding Agreement Certification:

SBIR/STTR prospective grantees will be notified by NSF to provide a signed SBIR/STTR Funding Agreement Certification. The federal government relies on the information provided by grantees to determine whether the business is eligible for a Small Technology Transfer (STTR) Program award. Certification will be used to ensure continued compliance during the life of the funding agreement. (http://www.nsf.gov/eng/iip/sbir/Forms/SBIR_STTR_Funding_Agreement_Cert_Revised_9-12-12.pdf)

Fraud, Waste, and Abuse (FWA) Notification:

If at any time you become aware of fraud or any kind of wrongdoing under any award, please contact the NSF Office of Inspector General.

Internet: http://www.nsf.gov/oig/hotline_form.jsp
E-mail: oig@nsf.gov
Phone: 703-292-7100 (during business hours) or 703-244-4443 (to speak to the duty officer)
Anonymous Hotline: 800-428-2189
Fax: 703-292-9158
Mail: 4201 Wilson Boulevard, Suite 1135
Arlington, VA 22230
ATTN: OIG HOTLINE

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be

prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

The Phase I final report will be due to NSF **within 15 days of the expiration of the grant** and is limited to 15 pages in length. A Phase II proposal requires the approved Phase I Final Report to be uploaded as part of the Phase II proposal package in Fastlane.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Peter Atherton, Information and Communication Technologies (IC), telephone: (703) 292-8772, email: patherto@nsf.gov
- Prakash Balan, Chemical and Environmental Technologies (CT), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Steven Konsek, Semiconductors (S) and Photonic (PH) Devices and Materials, telephone: (703) 292-7021, email: skonsek@nsf.gov
- Glenn H. Larsen, Educational Technologies and Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, Advanced Manufacturing and Nanotechnology (MN), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Muralidharan S. Nair, Electronic Hardware, Robotics and Wireless Technologies (EW), telephone: (703) 292-7059, email: mnair@nsf.gov
- Benaiah Schrag, Advanced Materials and Instrumentation (MI), telephone: (703) 292-8323, email: bschrag@nsf.gov
- Ruth M. Shuman, Biological Technologies (BT), telephone: (703) 292-2160, email: rshuman@nsf.gov
- Jesus V. Soriano, Smart Health (SH) and Biomedical (BM) Technologies, telephone: (703) 292-7795, email: jsoriano@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities

that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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