Small Business Technology Transfer Program Phase I Solicitation FY-2013 (STTR)

Release: 2

PROGRAM SOLICITATION
NSF 13-501

REPLACES DOCUMENT(S):
NSF 11-561

National Science Foundation

Directorate for Engineering
Industrial Innovation and Partnerships

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

January 08, 2013

The submission of a LOI is required in order to submit a full proposal.

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

February 06, 2013

Proposals submitted outside the window of January 6, 2013 - February 6, 2013 will be returned without review.
The submission of a LOI is required in order to submit a full proposal.

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the ***NSF Proposal & Award Policies & Procedures Guide*** (PAPPG)**,** NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in NSF 13-1.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

Proposals failing to address the items outlined in Section A.4 Administrative and Technical Screening will be considered non-responsive and will be returned without review.

A Letter of Intent (LOI) must be submitted on or before the deadline stated above in order to submit a Full Proposal.

SBIR/STTR Funding Agreement Certification is a requirement and will be required upon notification of an award recommendation. (See the Special Award Conditions section of this solicitation.)

Fraud, Waste, and Abuse (FWA) Notification is a requirement. (See the Special Award Conditions section of this solicitation.)

Registration in the System for Award Management (SAM) is a requirement. (See Additional Eligibility Info section of this solicitation.)

A WEBINAR will be held within 6 weeks of the release date of this solicitation to answer any questions about the solicitation. Details will be posted on the SBIR/STTR website: http://www.nsf.gov/eng/iip/sbir/index.jsp as they become available.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Small Business Technology Transfer Program Phase I Solicitation FY-2013 (STTR)
Release: 2

Synopsis of Program:

The Small Business Technology Transfer 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 Small Business Technology Transfer Program (STTR) requires researchers at universities 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. The program is governed by Public Law 112-81 (SBIR/STTR Reauthorization Act of 2011).

A sustainable world is one in which human needs are met equitably without harm to the environment, and without sacrificing the ability of future generations to meet their needs. Meeting this formidable challenge requires a substantial increase in our understanding of the integrated system of society, the natural world, and the alterations humans bring to Earth. Such understanding should inform the development and adoption of innovations that sustain and improve the quality of life for humankind within a healthy Earth system. The STTR research topic for this solicitation is Accelerating Sustainability using Enabling Technologies (ASET). For additional information see section A.10.

WEBINAR: A webinar will be held within 6 weeks of the release date of this solicitation to answer any questions about the solicitation. Details will be posted on the SBIR/STTR website: http://www.nsf.gov/eng/iip/sbir/index.jsp as they become available.

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.

- Jesus V. Soriano, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-7795, email: jsoriano@nsf.gov
- Prakash Balan, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Ni-Bin Chang, Program Director, Hydrotechnology and Information Systems, GEO/EAR, telephone: (703) 292-8549, email: nchang@nsf.gov
- Juan E. Figueroa, SBIR/STTR Program Director, Electronics, Information and Communication Technologies (EI), telephone: (703) 292-7054, email: jfiguero@nsf.gov
- Tobias Fischer, Program Director, Instrumentation & Facilities, GEO/EAR, telephone: (703) 292-4742, email: tfischer@nsf.gov
- Richard J. Fragaszy, Program Director, Geotechnical Engineering, ENG/CMMI, telephone: (703) 292-7011, email: rfragasz@nsf.gov
- Ram B. Gupta, Program Director, Energy for Sustainability, ENG/CBET, telephone: (703) 292-2407, email: ragupta@nsf.gov
- Bruce K. Hamilton, Director, Environmental Sustainability, ENG/CBET, telephone: (703) 292-7066, email: bhamilto@nsf.gov
- Grace Yick Hsuan, Program Director, Structural Materials and Mechanics, ENG/CMMI, telephone: (703) 292-7014, email: yhsuan@nsf.gov
- Krishna Kant, Program Director, Computer Systems Research, CISE/CNS, telephone: (703) 292-8950, email: kkant@nsf.gov
- Barbara P. Karn, Program Director, Environment, Health, Safety of Nanotechnology, ENG/CBET, telephone: (703) 292-7949, email: bkarn@nsf.gov
- Bruce M. Kramer, Senior Advisor for Interdisciplinary and Cross-Directorate Programs, ENG/CMMI, telephone: (703) 292-5348, email: bkramer@nsf.gov
- Glenn H. Larsen, SBIR/STTR Program Director, Education Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, SBIR/STTR Program Director, Nanotechnology, Advanced Materials and Manufacturing (NM), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Raffaella Montelli, Program Director, Geophysics and Topic Specific I-Corps, GEO/EAR, telephone: (703) 292-4361, email: rmontell@nsf.gov
- Muralidharan S. Nair, SBIR/STTR Program Director, Electronics, Information and Communication Technologies (EI), telephone: (703) 292-7059, email: mnair@nsf.gov
- Debra R. Reinhart, Program Director, Environmental Engineering, ENG/CBET, telephone: (703) 292-5356, email: dreinhar@nsf.gov

- Sarah L. Ruth, Program Director, Dynamics of Coupled Natural and Human Systems, GEO/AGS, telephone: (703) 292-8521, email: sruth@nsf.gov
- Linda S. Sapochak, Program Director, Solid State and Materials Chemistry, MPS/DMR, telephone: (703) 292-4932, email: lsapocha@nsf.gov
- Benaiah Schrag, SBIR/STTR Program Director, Nanotechnology, Advanced Materials and Manufacturing (NM), telephone: (703) 292-8323, email: bschrag@nsf.gov
- Ruth M. Shuman, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-2160, email: rshuman@nsf.gov

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

- 47.041 --- Engineering

Award Information

Anticipated Type of Award: Fixed Amount Awards

Estimated Number of Awards: 25 (pending availability of funds).

Anticipated Funding Amount: $5,625,000 (pending availability of funds).

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the STTR program. Socially and economically disadvantaged small business concerns and women-owned small business concerns are particularly 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 in accordance with this solicitation. 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.

PI Limit:

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. Employment releases and certifications of intent shall be required prior to award.

Primary employment is defined as 51% employed by the small business. NSF considers a fulltime 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 not submit more than two (2) proposals. If more than two (2) proposals are submitted, the additional proposals will be returned without review.

Limit on Number of Proposals per PI: 1

No person may participate as the principal investigator (PI) or Co-PI for more than one (1) proposal submitted to this solicitation. It is the responsibility of the submitting organization to ensure that no person is listed as the PI or Co-PI on more than one (1) proposal submitted to this solicitation.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- 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 are limited to an effective rate of 150% of salaries and wages. (See Section V.A.9.6)

- Other Budgetary Limitations: Not Applicable

C. Due Dates

- Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

  January 08, 2013

  The submission of a LOI is required in order to submit a full proposal.

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

  February 06, 2013

  Proposals submitted outside the window of January 6, 2013 - February 6, 2013 will be returned without review. The submission of a LOI is required in order to submit a full proposal.

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: Standard NSF reporting requirements apply.

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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 FY 2013 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

The primary objective of the STTR Program is to increase the incentive and opportunity for small firms to undertake cutting-edge, high-risk, high-quality scientific, engineering, or science and engineering education research that would have a high-potential economic payoff if the research is successful. The STTR program expands the public and private partnership to include collaborative opportunities for small businesses and non-profit research institutions. A team approach is required in an STTR project where at least one research investigator is employed by the small business concern and at least one investigator is employed by a collaborating research institution.

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, NSF encourages and supports a wide range of proposals from the research and education community and also from the private small business sector. 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 STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 112-81. 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 the NSF and the purpose of the STTR legislation by transforming scientific discoveries into both societal and economic benefit, and by emphasizing private sector commercialization. Accordingly, NSF has formulated an STTR solicitation topic: Accelerating Sustainability using Enabling Technologies (ASET). (See section A.10 for the full topic description.)

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

1. Provide evidence of a commercially viable product, process, or service, and
2. Meet an important social or economic need.

Projects should have the following:

- High potential commercial payback, and
- High-risk efforts.

Projects may also address:

- Research tools that meet significant commercial market needs, or,
- Applications that result in multipurpose commercially viable functions.

For more in-depth program information, please reference the following web site: http://www.nsf.gov/eng/iip/sbir/program_reqs.jsp.

III. AWARD INFORMATION

STTR Phase I proposals may be submitted for funding up to $225,000. STTR Phase I projects are for 12 months. The program expects to make approximately 25 fixed amount awards. Anticipated funding amount is approximately $5,625,000 (subject to the availability of funds and the quality of proposals). Award notification is typically within five months from the proposal submission deadline date. All awards will have an effective date of July 1, 2013.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the STTR program. Socially and economically disadvantaged small business concerns and women-owned small business concerns are particularly 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 in accordance with this solicitation. 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.

PI Limit:

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. Employment releases and certifications of intent shall be required prior to award.

Primary employment is defined as 51% employed by the small business. NSF considers a fulltime 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 not submit more than two (2) proposals. If more than two (2) proposals are submitted, the additional proposals will be returned without review.

Limit on Number of Proposals per PI: 1

No person may participate as the principal investigator (PI) or Co-PI for more than one (1) proposal submitted to this solicitation. It is the responsibility of the submitting organization to ensure that no person is listed as the PI or Co-PI on more than one (1) proposal submitted to this solicitation.

Additional Eligibility Info:

Requirements Relating to Data Universal Numbering System (DUNS) Numbers and Registration in the System for Award Management (SAM)

The Office of Management and Budget (OMB) issued a policy directive (September 14, 2010, 75 FR 22706) which requires applicants to provide a Dun and Bradstreet Data Universal Numbering System (DUNS) number when applying for a new award or renewal of an award under Federal grants or cooperative agreements. In accordance with this mandate, 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.

In addition, each proposer also must be registered in the System for Award Management (SAM) database prior to submission of the proposal. Subawardees named in the proposal, however, do not need to be registered in the SAM. The SAM is the primary registrant database for the U.S. Government. The SAM collects, validates, stores, and disseminates data in support of agency acquisition missions, including Federal agency contract and assistance awards. 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/. Proposers are advised that it takes approximately three-to-five business days to complete the registration process.

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 deemed 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

Letters of Intent***(required):***

A Letter of intent (LOI) must be submitted via FastLane at http://fastlane.nsf.gov/. The LOI, which is a prerequisite to proposal submission, will be used to assist NSF program staff in gauging the number and range of proposals, to enable early selection and better management of reviewers and panels, and to allow NSF to preview proposals with respect to eligibility requirements.

The LOI provides several data fields to capture the description of the proposed project. Please note that the *Synopsis* and *Other Comments* data fields provide a maximum of 2,500 characters to convey important aspects of the project. There are three *Additional Information* data fields as follows:

- *Designation of Subtopic and Key Words.* Provide the name of the subtopic *(see* section A.10 for the subtopic descriptions) and up to five key words.
- *Description of the Commercial Opportunity.* Provide a short description of the problem addressed by the proposed technology that includes the commercial outcome and impact (limited to 255 characters).
- *List of Partners/Collaborators.* Provide a list of partners and collaborators who will participate on the project, and a brief indication of their role or expertise (limited to 255 characters).

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is not required when submitting Letters of Intent
- Designation of Subtopic and Key Words is required when submitting Letters of Intent
- Description of the Commercial Opportunity is required when submitting Letters of Intent
- List of Partners/Collaborators is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

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.

The following instructions supplement the GPG guidelines.

A.1. Responsiveness to NSF STTR Program and Topic.

A.1.1 Communication with the NSF Program Manager: A company planning to submit a proposal in response to this solicitation is encouraged to describe the innovation and business opportunity to the cognizant program manager via email and receive feedback prior to proposal submission. You may contact the program officer at any time before the submission deadline. Note, however, the communication with the program manager will become increasingly difficult as the deadline approaches.

A.1.2 Designation of Topic and Subtopics. This STTR solicitation has only one topic; therefore designate Accelerating Sustainability using Enabling Technologies (ASET). (See section A.10 for the full topic description.)

A.2. Phase I Proposal 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 merit for proceeding into a Phase II project. A secondary objective is to assess potential commercial feasibility of the proposed work.

A.3. Phase I Project Requirements. 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.

A.4. Administrative and Technical Screening. All proposals that fail to address the following items will be considered non-responsive and will be returned without review:

1. A proposal submitted after 5:00 p.m. (proposer's/submitter's local time) on the deadline date. The "proposer's time" is the time zone associated with the company's address, as registered with NSF at the time of proposal submission.

2. 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. All proposals must have each of the items listed below, without exception.

A complete proposal consists of the following:

A. Project Summary (reference section A.9.2)

B. Project Description (15 page limit) and all 6 parts (reference section A.9.3)

C. References Cited (reference section A.9.4) - required by NSF for all proposals

D. Biographical Sketches (reference section A.9.5) - required by NSF for all proposals

E. Budget and Subcontract budgets (reference section A.9.6)

F. Current and Pending Support - the proposal being submitted is considered "pending support" by NSF and must be listed (reference section A.9.7). This means that ALL submitted proposals MUST contain this document, without exception.

G. Facilities, Equipment and Other Resources (reference section A.9.8) - required by NSF for all proposals

H. Supplementary Documents (reference section A.9.9)

3. Unallowable items uploaded to the Supplementary Documents section *other than the following*:

A. Letters of Support for Technology (no more than 3 letters; reference section A.9.9.1)

B. Post Doc Mentoring Plan (required if funds are included on line "B.1 Post Doctoral Scholars" on the proposer's budget or a subaward budget; reference section A.9.9.2)

C. Company Commercialization History must be provided using the NSF template if Phase II SBIR/STTR awards have been received previously (reference section A.9.9.3)

D. Cooperative Research Agreement (reference section A.9.9.4)

E. Data Management Plan (reference section A.9.9.5) - required by NSF for all proposals

F. Letters regarding Use of Human or Animal subjects e.g. Institutional Review Board (IRB) or institutional Animal Care and Use Committee (IACUC) approval of animal use (if applicable; reference section A.9.9.6)

4. A STTR proposal with a budget exceeding $225,000.

5. A proposal missing a Company Commercialization History, if the company certified on the Cover Page that it has previously received SBIR/STTR Phase II funding. The Company Commercialization History must be submitted using the NSF template (reference section A.9.9.3).

6. A proposal with documents placed in the "Additional Single Copy Documents" module in FastLane (other than Suggested Reviewers and/or Proprietary Information). Items placed in this module are not accessible to reviewers.

7. A collaborative proposal of any kind is prohibited. A collaborative proposal is defined as simultaneous proposal submissions from different organizations.

8. A proposal lacking sufficient technical/commercial potential substance to justify review.

9. A proposal that does not fall within the scope of the topic or subtopic as delineated in the topic or subtopic description.

10. A proposal not containing research proposed in science, engineering, or education.

11. Unacceptable objectives as defined in Section IV.

A.5. Marking Proprietary Information. To the extent permitted by law, the Government will not release properly identified and

marked technical 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 providing a legend or footnote. 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.

A.6. Human Subjects and Animal Use. 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). Note that in some cases, product testing involves human subjects. In addition to the information in the GPG, please refer to http://www.hhs.gov/ohrp. Look for federal-wide assurances under the Office of Human Research Protection website.

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: 1) establish your own IRB (see Office for Human Research Protections (OHRP) at Health and Human Services (HHS) http://www.hhs.gov/ohrp/assurances/; 2) 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; or 3) use a commercial company.

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/animal_welfare/rig.shtml for additional information.

A.7. 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 revision, conditional upon their falling within the scope of the subsequent topic or subtopic offerings.

A.8. General Requirements

A.8.1 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.

A.8.2 Page Format. Multiple column formats are not accepted.

A.9. Required Format.

The required format of a Phase I proposal is described in the following paragraphs. Each proposal submitted to the NSF STTR program will use the following FastLane Forms:

Cover Sheet
Project Summary
Table of Contents (automatically generated)
Project Description
References Cited
Biographical Sketches
Budgets and Budget Justification (also required for each subaward)
Current and Pending Support
Facilities, Equipment and Other Resources

Supplementary Docs (do not upload additional documents besides the following when applicable):

1. Letter(s) of Support for Technology or Market Opportunity (3 maximum),
2. Post Doc Mentoring Plan (if applicable),
3. Company Commercialization History on the NSF Template (if applicable),
4. Cooperative Research Agreement,
5. Data Management Plan, and
6. Letter(s) regarding human subjects Institutional Review Board or Institutional Animal Care and Use Committee (IACUC) approval of animal use (if applicable).

Single Copy Documents - Suggested Reviewers and/or Proprietary Info are the only items permitted. Documents uploaded here are not accessible to reviewers.

A.9.1. Cover Sheet and Certification. Complete topic and subtopic fields must be included on the cover sheet. All proposals must be electronically signed. For information regarding electronic signature, reference the FastLane webpage.

A.9.2. Project Summary. Each proposal must contain a summary of the proposed project not more than one page in length. The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader/commercial impacts of the proposed activity. 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.

Provide an overview of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to produce commercial value or benefit society and contribute to the achievement of specific, desired societal outcomes.

Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review. Additional instructions for preparation of the Project Summary are available in FastLane.

Box 1: Overview, Key Words, and Subtopic Name: A summary paragraph limited to 200 words describing 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 in science, engineering, or education which are 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: A summary paragraph limited to 200 words addressing the intellectual merits of the proposed activity. No proprietary information should be included 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: A summary paragraph limited to 200 words addressing the broader impacts/commercial potential of the proposed activity. Include information on the potential commercial value, societal impact, and enhanced scientific and technological understanding

A.9.3 Project Description. The project description shall contain the following parts in the following order and must not exceed 15 pages.

Part 1: Identification and Significance of the Innovation. The first paragraph shall contain a clear and succinct statement specifying the research innovation proposed, and a brief explanation of how the innovation is relevant to meeting a need described in the subtopic narrative.

Part 2: Background and Phase I Technical Objectives. List and explain 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. It is important to show how potential customer needs will be met if the research is successful. Therefore, Phase I proposers are strongly encouraged to consider commercial potential as well as the technical challenges of their research.

Part 3: Phase I Research Plan. This section must provide a detailed description of the Phase I research approach. The description must include the following:

- A technical discussion of the proposed concept,
- What is planned and how the research will be carried out,
- The plan to achieve each objective, and
- The sequence of experiments, tests, and computations involved in the measurement of those objectives.

Part 4. Commercial Potential. Proposals must describe the business opportunity to be enabled by the proposed innovation. The information contained within the Commercial Potential section should convey the scope and nature of this business opportunity. This section should briefly describe the current as well as the anticipated market landscape and the resources required to address the opportunity. The goal of this section is to justify, from a market-opportunity perspective, why a Phase I feasibility study should be undertaken.

In preparing the description of the commercial potential, you are strongly encouraged to address the following four sections: market opportunity, company/team, product/competition, and revenue/finance. A well crafted Commercial Potential section is typically 3-5 pages in order to fully address the four sections referenced below.

- The market opportunity - Describe the anticipated target market or market segments and provide a brief profile of the potential customer. What customer needs will be addressed with the innovation? Estimated size of the market being addressed? What barriers to entry exist?
- The Company/Team - What are the origins of the company/team? How many current employees are there? What is the revenue history, if any, for the past three years? Give a brief description of the experience and credentials of the personnel responsible for taking the innovation to market. How does the background and experience of the team enhance the credibility of the effort; have they previously taken similar products/services to market? Does proposed research mesh with company objectives? How does the proposed technology sit within the company mission?
- Product or technology and competition - How does your product or service sit within the competitive landscape? What is the main competition? What is the value proposition for the product or service enabled by the innovation? How do you plan to protect any IP generated from the proposed innovation? What critical milestones must be met to get the product or service to market?
- Financing and revenue model - based upon revenue assumptions, describe how you plan to finance your innovation.

Part 5. Consultants and Subawards/Subcontracts. Keep in mind that an STTR Phase I project requires a minimum of 40% of the research, as measured by the budget, to be performed by the small business concern, and a minimum of 30% of the research, as measured by the budget, by the collaborating research institution. The remaining 30% may be allocated as appropriate to achieve the objectives of the proposed STTR Phase I project.

Consultant: The services of each consultant must be justified within the context of the proposal. In this section of the proposal, information must be provided on each consultant's expertise, organizational affiliation, and contribution to the project. In addition, 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). The maximum consulting rate under this solicitation is $600 per day (NSF defines a day as 8 hours). This rate is exclusive of any indirect costs, travel, per diem, clerical services, fringe benefits, and supplies.

The signed consultant statements (with the required stated number of days at $600 per day) must be uploaded as part of the proposal budget justification.

Subaward (also known as the subcontract): Subawards (including contracts, subcontracts, and other arrangements) are used for research; describe the tasks to be performed and how these are related to the overall project. A minimum of 30% of the research (as measured by the budget) must be performed by a research institution. A Co-PI from the research institution must be identified on the subaward proposal budget.

Each subaward must use a separate proposal budget and budget justification, and provide details of subaward costs by cost category. Each subawardee budget must be prepared in FastLane.

Purchases of analytical or other routine services from commercial sources and the acquisition of fabricated components from commercial sources are not regarded as reportable subaward activity. Such items -- routine analytical or other routine services -- should be reported on the Budget under Other Direct Costs/Other (Line G.6 on the budget form).

All research, including subawards and consultancies, must be carried out in the U.S. (See definition of Place of Performance.)

Note: If a subawardee lists Post Docs as part of the subaward budget, a Post Doc Mentoring Plan must be provided. For more information on what is required, see Chapter II.C.2.j of the GPG: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Upload the mentoring plan into the supplemental docs module of FastLane. A Post Doc Mentoring plan template can be obtained at: http://www.nsf.gov/eng/iip/sbir/Sample_Postdoc_Mentoring_Plan.doc

Part 6. Equivalent or Overlapping Proposals to Other Federal Agencies. A firm may elect to submit proposals for equivalent or overlapping work under other Federal solicitations or may have received or expect to receive other Federal awards for

equivalent or overlapping work. The firm must certify on the proposal cover page whether another Federal Agency has received this proposal (or an equivalent or overlapping proposal). In addition, the proposer must inform NSF of overlapping or equivalent proposals and awards as follows: (a) related federal awards (ongoing or completed); (b) proposals that have been submitted under other government solicitations; and (c) anticipated submissions (within the upcoming calendar year) to other agencies of related proposals. For all such cases, the following information is required:

- The name, address and telephone contact of the sponsoring agency to which the proposal was or will be submitted,
- Date(s) of proposal submission(s),
- Title, number, and date of solicitation under which the proposal was submitted or will be submitted,
- Title and performance period of the proposal, and
- Name and title of principal investigator, annual person-months (calendar-months) devoted by any personnel on the equivalent or overlapping project who are participating as PI or senior personnel on this proposal.

If no equivalent or overlapping proposals are under consideration, explicitly state: NONE. 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. If a proposer fails to disclose equivalent or overlapping proposals as provided in this section, the proposer could be liable for administrative, civil, or criminal sanctions.

Part 7. Lineage of the Innovation. NSF supports basic/fundamental research. A large portion of the research NSF funds finds its way to the market place. Many of the technology/science/education projects that the NSF SBIR/STTR programs supports had origins from previously funded NSF academic/non-profit projects. If the proposed STTR project has connections to previously NSF funded academic/non-profit research, please provide the following information:

Directorate Name:

Division Name:

Award Number:

A.9.4. References Cited. Provide a comprehensive listing of relevant references, including patent numbers and other relevant intellectual property citations. References must be uploaded into the system.

A.9.5. Biographical Sketches. (A maximum of 2 pages per person.) Provide relevant biographical information for the Principal Investigator (PI) and key personnel (including consultants and key members of the subaward team). Biographical Sketches must be uploaded into the system.

A.9.6. Budget. The total budget shall not exceed $225,000 for the STTR Phase I proposal (including all sub-awards). Budget line items must be shown in detail in the budget justification.

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 two (2) months to the project.

Do not list company employees under B.1 Post Doctoral Scholars. If the subawardee institution allocates funds on line B.1 Post Doctoral Scholars, the company is responsible for ensuring that a Post-Doc Mentoring Plan is included with the proposal (see A.9.9.2).

The reimbursement rates for consultants are a direct cost that cannot exceed the daily equivalent rate paid to an Executive Level IV Federal employee. As of January 2009, that rate is $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 expense.

The budget justification should provide a line by line explanation of each budget item (including the signed consultant letter/s).

The proposal 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. Each materials and supplies line item should include an estimated cost for that item.

Letters and supporting documentation from Consultants and Subawardees are NOT considered letters of support and MUST be uploaded with the Budget Justification and not as a Supplemental Document.

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 on the budget for the company and the subawardee.

One domestic 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 officer 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 fee and travel expenses.

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 pool:

- 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

Reasonable fees (estimated profit) 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. The proposal bottom line cannot exceed $225,000 for STTR Phase I proposals.

Detailed documentation of budget line items is required for ALL budget items and must be documented on the budget justification page.

A.9.7. Current and Pending Support of Principal Investigator and Senior Personnel. This section should provide

information about all research to which the principal investigator and other senior personnel either have committed time or have planned to commit time during the STTR Phase I period of performance, whether salary for the person involved is included in the budgets of the various projects. All current project support from whatever source (Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations) must be listed. Current and Pending Support must be uploaded into the system. The proposal being submitted is considered "pending" and therefore MUST appear in the Current and Pending Support module.

For all ongoing or proposed projects or proposals that will be submitted in the near future -- but excluding any proposals already cited above in the Equivalent or Overlapping Proposals to other Federal Agencies section -- that involve the Principal Investigator or senior personnel, provide the following information:

- Name of sponsoring organization,
- 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.

A.9.8. Facilities, Equipment and Other Resources. Provide a description that specifies 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. The description should be narrative in nature and must not include any quantifiable financial information.

Purchase of permanent equipment is not permitted in a Phase I project (reference definition of Permanent Equipment). DO NOT use budget line item D for Phase I proposals. This document must be uploaded into the appropriate module in FastLane for all proposals.

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 leasor 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.*

A.9.9. Supplementary Documents. The items permitted in this module for a Phase I proposal are limited to the following (if applicable):

A.9.9.1. Letters of Support for Technology or Market Opportunity (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 real business opportunity may exist should the technology prove feasible. The letter(s) must contain affiliation and contact information for the signatory stakeholder.

A.9.9.2. Post Doctoral Mentoring Plan. If a proposal requests funding to support postdoctoral researchers, a Post Doc Mentoring Plan must be included as a supplementary document. The plan must provide a description of the mentoring activities that will be provided for such individuals. The mentoring plan must describe the mentoring that will be provided to all postdoctoral researchers supported by the project, irrespective of whether they reside at the submitting organization, or any subawardee organization. Proposers are advised that the mentoring plan may not be used to circumvent the 15-page project description limitation. A template for the Post Doc Mentoring Plan can be obtained at:
http://www.nsf.gov/eng/iip/sbir/Sample_Postdoc_Mentoring_Plan.doc

A.9.9.3. Company Commercialization History. A Company Commercialization History is required for all proposers certifying receipt of previous Phase II awards from any Federal agency. The NSF Commercialization History Template must be used. All items must be addressed in the format outlined in this template. Additional narratives and commercialization history documents from other SBIR/STTR agencies are not permitted.

A.9.9.4. 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 stating that a CRA will be provided upon notification of award recommendation.

A.9.9.5 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." FastLane will not permit submission of a proposal that is missing a Data Management Plan. For further information on the content of data management plans, see: http://nsf.gov/eng/general/ENG_DMP_Policy.pdf

A.9.9.6. Human Subjects Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC) Approval for Animal Use. Please refer to Chapter II, Sections D.5 and D.6 of the GPG (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Note that in some cases, product testing involves human subjects. In addition to the information in the GPG, please refer to http://www.hhs.gov/ohrp. Look for federal-wide assurances under the Office for Human Research Protections website.

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

A.10. Research Topic - Accelerating Sustainability using Enabling Technologies (ASET)

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, NSF encourages and supports a wide range of proposals from the research and education community and from the private small business sector. 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 impacts or commercial potential).

The STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 112-81. A main purpose of the legislation is to stimulate technological innovation and increase private sector commercialization. The NSF small business program is therefore in a unique position to meet both the goals of NSF and the purpose of the STTR legislation by transforming scientific discovery into both societal and economic benefit, and by emphasizing private sector commercialization. NSF has formulated a solicitation topic for STTR that conforms to the legislation. The STTR Topic for this solicitation is Accelerating Sustainability using Enabling Technologies (ASET). The challenge of sustainability is of global concern and NSF recognizes the growing need and urgency for alternate ways of managing the environment, migrating from finite resources to renewable or inexhaustible resources, and applying technology to improve human well-being.

Proposals submitted to this solicitation must focus on technologies aimed at attaining environmental and economic sustainability. Proposers are encouraged to build partnerships with research institutions that are part of existing sustainability initiatives in the US. In addition, proposers must clearly identify the intended commercial outcome of the research: product, process or service.

Proposals must address one of the subtopics that are outlined below. Proposals that are not responsive to at least one of the subtopics outlined below, or proposals deemed to be basic/fundamental research, will be returned without review.

The subtopics for this solicitation are as follows:

A. Sustainable Energy. Proposed projects may include new critical devices, components, systems and materials for sustainable energy in any of the following areas: energy harvesting and conversion from renewable resources, (including, for example, biological pathways but excluding solar technologies); sustainable energy storage solutions; nature-inspired processes for sustainable energy solutions and carbon storage; reducing carbon and resource intensity of hydrocarbon extraction, energy conversion and use; and new technologies that support smart infrastructures (such as materials, sensors, devices and control systems) to ensure efficient and sustainable energy transmission, distribution, monitoring and management.

B. Sustainable Chemistry. Proposed projects might include new devices, components, or systems for the replacement of rare, expensive, and/or toxic chemicals with earth-abundant, inexpensive, and benign chemicals; recycling of chemicals that cannot be replaced; development of non-petroleum based sources for important materials; new separation technologies that will facilitate recycling; and new chemical processes that include recovering and recycling. Separation of critical metals, monitoring, separation and/or capture of gaseous byproducts from biomass conversion, biocatalysis, water purification techniques, and chemical and industrial processes designed to achieve zero waste.

C. Education for Sustainability. Using digital and other tools and approaches to prepare today's U.S. students, workforce and public to understand sustainability, global climate change and their implications in ways that can lead to informed, evidence-based responses and solutions.

D. Predictive Information Systems. Creating devices, components, systems, algorithms, networks, applications or services that can be used to make reliable global, regional and local predictions of decadal climate variability and change; to support human intervention and to prevent unintended consequences in plant, animal, human, and physical systems. Applications may include the protection of human-built infrastructure and the restoration of ecosystem services that further sustain human well-being in terrestrial and coastal areas.

E. Sustainable Materials and Manufacturing. Proposed projects may include the development and processing of new sustainable materials. Projects may also include new processing or manufacturing devices, components and systems that will result in net preservation and extension of natural resources (such as water, raw materials and energy); the improved durability or lifetime; the replacement or substitution of current materials for a safer and more secure future; a reduction in the use or release of toxic or harmful constituents (such as solvents, carbon emissions, and pollutants); or processes which function under less extreme temperatures or conditions, or which produce less waste.

F. Sustainable Biotechnology Applications: Proposed projects may include biologically-based technologies to protect and enhance biodiversity, or to remove or reduce contaminants from polluted air, water, and soils.

An interdisciplinary and interdependent team approach is encouraged in response to this STTR topic. Proposers should endeavor to bring scientists and engineers from multiple fields and disciplines together to form collaborative teams.

When preparing the Project Summary portion of your proposal, use the subtopic letter and name as the first item in the key words/phrases portion of the Project Summary.

Proposers are reminded to identify the program solicitation number (Populated with NSF Number at Clearance) 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 are limited to an effective rate of 150% of salaries and wages. (See Section V.A.9.6)

C. Due Dates

- Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

  January 08, 2013

  The submission of a LOI is required in order to submit a full proposal.

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

  February 06, 2013

  Proposals submitted outside the window of January 6, 2013 - February 6, 2013 will be returned without review. The submission of a LOI is required in order to submit a full proposal.

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://www.nsf.gov/bfa/dias/policy/meritreview/.

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 which reflect the legislative emphasis of the program and complement the standard NSF review criteria listed above.

SEES Relevance:

1. How does this research support the goals of sustainability?
2. To which extent do the proposed products/services consider social, economic, behavioral and environmental issues (e.g., affordability, deployability in real world, adoption potential, etc.)?

STTR relevance of 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?)

STTR relevance of the broader impacts/commercial potential 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 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 formulate a recommendation to either support or decline each proposal. 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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on

the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, 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.

In all cases, 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 and 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.

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 letter, 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 letter; (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 letter. 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 STTR Phase I or Phase II awards based on a solicitation and may elect to make several or no awards under any specific subtopic. STTR Phase I awards are 12-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 7% of the total direct and indirect costs) will be considered under both phases.

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 Business 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.doc)

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

The Principal Investigator must submit a final project report to the cognizant Program Officer within 15 days after expiration of a grant.

Failure to provide the required final project report will delay NSF review and processing of any pending proposals for that PI. 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 FastLane, for preparation and submission of final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

The Phase I final report will be due to NSF within 15 days of the expiration of the grant. A Phase II proposal requires an approved Phase I Final Report to be uploaded as part of the Phase II proposal package.

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:

- Jesus V. Soriano, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-7795, email: jsoriano@nsf.gov
- Prakash Balan, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-5341, email: pbalan@nsf.gov
- Ni-Bin Chang, Program Director, Hydrotechnology and Information Systems, GEO/EAR, telephone: (703) 292-8549, email: nchang@nsf.gov
- Juan E. Figueroa, SBIR/STTR Program Director, Electronics, Information and Communication Technologies (EI), telephone: (703) 292-7054, email: jfiguero@nsf.gov
- Tobias Fischer, Program Director, Instrumentation & Facilities, GEO/EAR, telephone: (703) 292-4742, email: tfischer@nsf.gov
- Richard J. Fragaszy, Program Director, Geotechnical Engineering, ENG/CMMI, telephone: (703) 292-7011, email: rfragasz@nsf.gov
- Ram B. Gupta, Program Director, Energy for Sustainability, ENG/CBET, telephone: (703) 292-2407, email: ragupta@nsf.gov
- Bruce K. Hamilton, Director, Environmental Sustainability, ENG/CBET, telephone: (703) 292-7066, email: bhamilto@nsf.gov
- Grace Yick Hsuan, Program Director, Structural Materials and Mechanics, ENG/CMMI, telephone: (703) 292-7014, email: yhsuan@nsf.gov
- Krishna Kant, Program Director, Computer Systems Research, CISE/CNS, telephone: (703) 292-8950, email: kkant@nsf.gov
- Barbara P. Karn, Program Director, Environment, Health, Safety of Nanotechnology, ENG/CBET, telephone: (703) 292-7949, email: bkarn@nsf.gov
- Bruce M. Kramer, Senior Advisor for Interdisciplinary and Cross-Directorate Programs, ENG/CMMI, telephone: (703) 292-5348, email: bkramer@nsf.gov
- Glenn H. Larsen, SBIR/STTR Program Director, Education Applications (EA), telephone: (703) 292-4607, email: glarsen@nsf.gov
- Rajesh Mehta, SBIR/STTR Program Director, Nanotechnology, Advanced Materials and Manufacturing (NM), telephone: (703) 292-2174, email: rmehta@nsf.gov
- Raffaella Montelli, Program Director, Geophysics and Topic Specific I-Corps, GEO/EAR, telephone: (703) 292-4361, email: rmontell@nsf.gov
- Muralidharan S. Nair, SBIR/STTR Program Director, Electronics, Information and Communication Technologies (EI), telephone: (703) 292-7059, email: mnair@nsf.gov
- Debra R. Reinhart, Program Director, Environmental Engineering, ENG/CBET, telephone: (703) 292-5356, email: dreinhar@nsf.gov
- Sarah L. Ruth, Program Director, Dynamics of Coupled Natural and Human Systems, GEO/AGS, telephone: (703) 292-8521, email: sruth@nsf.gov
- Linda S. Sapochak, Program Director, Solid State and Materials Chemistry, MPS/DMR, telephone: (703) 292-4932, email: lsapocha@nsf.gov
- Benaiah Schrag, SBIR/STTR Program Director, Nanotechnology, Advanced Materials and Manufacturing (NM), telephone: (703) 292-8323, email: bschrag@nsf.gov
- Ruth M. Shuman, SBIR/STTR Program Director, Biological and Chemical Technologies (BC), telephone: (703) 292-2160, email: rshuman@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, National Science Foundation Update is a free e-mail subscription service 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 Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

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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