

# Small Business Innovation Research and Small Business Technology Transfer Programs Phase I Solicitation FY-2005 (SBIR/STTR)

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## Program Solicitation

NSF 04-604

Replaces Document NSF-04-551



**National Science Foundation**

Directorate for Engineering

Division of Design, Manufacture and Industrial Innovation

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

December 08, 2004

Topic: Manufacturing Innovation (in response to Executive Order 13329). Do not submit proposals prior to November 8, 2004; proposals submitted prior to November 8, 2004 will be returned without review.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Small Business Innovation Research and Small Business Technology Transfer Programs Phase I Solicitation FY-2005 (SBIR/STTR)

#### Synopsis of Program:

The SBIR/STTR Programs stimulate 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 persons and women-owned small businesses.

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

- 47.041 --- Engineering

#### Eligibility Information

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- **Organization Limit:** Only companies meeting the definition of a small business concern may submit proposals. See definition for a small business concern <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#sbc/>. For an SBIR Proposal, a minimum of two-thirds of the research, as measured by the budget, must be performed by the small business concern and the balance may be out-sourced to a consultant or subcontract or a combination of the two. For an STTR Proposal, a minimum 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 research institution.
- **PI Eligibility Limit:** The Principal Investigator's (PI) primary employment must be with the small business concern at the time of an award. (See definition for a PI <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#PI>.) A PI must spend a minimum of 1-calendar month on an SBIR Phase I project and a minimum of 2-calendar months on an STTR Phase I project. Employment releases and certifications of intent shall be required prior to award.
- **Limit on Number of Proposals:** 4. (Only 4 Phase I proposals per company and its affiliates will be accepted per solicitation.)

#### Award Information

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- **Anticipated Type of Award:** Other - Fixed Amount Awards
- **Estimated Number of Awards:** 150 awards of which approximately 25 will be STTR awards (pending availability of funds)
- **Anticipated Funding Amount:** \$17,500,000 with approximately \$15,000,000 for SBIR Phase I and approximately \$2,500,000 for STTR (pending availability of funds)

#### Proposal Preparation and Submission Instructions

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##### A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further

information.

## B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

## C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):  
December 08, 2004  
Topic: Manufacturing Innovation (in response to Executive Order 13329). Do not submit proposals prior to November 8, 2004; proposals submitted prior to November 8, 2004 will be returned without review.

## Proposal Review Information

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- **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

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- **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**

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The National Science Foundation (NSF), an independent agency of the Federal Government, invites eligible small business concerns to submit Phase I proposals for its 2005 Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. NSF will support high quality projects on important scientific, engineering, or science/engineering education problems and opportunities that could lead to significant commercial and public benefit if the research is successful.

The significant difference between the SBIR and STTR programs is that STTR requires researchers at universities and other research institutions to play a significant intellectual role in the conduct of each STTR project. These university-based 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 SBIR/STTR solicitation is issued pursuant to the authority contained in Public Law 106-554. SBIR policy is provided by the Small Business Administration (SBA) through the SBA Policy Directive.

### **II. PROGRAM DESCRIPTION**

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

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

1. Result in commercial application of a product, process or device concept in a 3-5 year time frame or,
2. Greatly enhance the ability of scientists and engineers to conduct fundamental or applied research in a laboratory, field or research facility, or,
3. Meet an important social need.

Projects should have the following:

- High potential commercial payback;
- High-risk efforts;
- Research tools which meet significant commercial market needs; and,
- Applications that result in multipurpose commercially viable functions.

For more in-depth program information please reference the following web site: (<http://www.eng.nsf.gov/sbirspecc/>)

### III. ELIGIBILITY INFORMATION

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Only firms qualifying as small business concerns are eligible to participate in the SBIR/STTR programs (see definition at <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#sbc>). Socially and economically disadvantaged small business concerns and women-owned small business concerns are particularly encouraged to participate.

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.

**Organization Limit:** Only companies meeting the definition of a small business concern may submit proposals. See definition <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#sbc/>. For an SBIR Proposal, a minimum of two-thirds of the research, as measured by the budget, must be performed by the small business concern and the balance may be outsourced to a consultant or subcontract or a combination of the two. For an STTR Proposal, a minimum 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 research institution.

**PI Eligibility Limit:** The Principal Investigator's primary employment must be with the small business concern at the time of an award. (See definition for a PI <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#PI>.) A PI must spend a minimum of 1-calendar month on an SBIR Phase I project and a minimum of 2-calendar months on an STTR Phase I project. Employment releases and certifications of intent shall be required prior to award.

**Limit on Number of Proposals:** 4. (Only 4 Phase I proposals per company and its affiliates will be accepted per solicitation).

**DUNS Number:** A DUNS number is a nine-digit number assigned by Dun and Bradstreet Information Services. If the proposer does not have a DUNS number, they must contact Dun and Bradstreet by telephone at (800) 333-0505 or by email <http://smallbusiness.dnb.com/default.asp>. A DUNS number is issued at no charge and is a required data element for submission of a proposal.

**Unacceptable objectives:** Proposed efforts directed toward systems studies; market research; commercial development of existing products or proven concepts; straightforward engineering design for packaging or adaptation to specific applications; studies; laboratory evaluations; incremental product/process improvements; and modifications of existing products without innovative changes are examples of projects that are not acceptable for SBIR/STTR. Projects determined unacceptable will be returned to the proposer without further consideration.

### IV. AWARD INFORMATION

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Under this solicitation, proposals may be submitted for funding up to \$100,000. SBIR projects run for 6 months and STTR projects for 12 months. The program expects to make approximately 150 fixed amount awards (approximately 150 Phase I grants, including STTR). Anticipated funding amount is \$17,500,000 with approximately \$15,000,000 for SBIR Phase I and approximately \$2,500,000 for STTR Phase I (pending availability of funds and quality of proposals). Award notification is typically four to six months from the proposal submission deadline date. All awards will have an effective date of July 1, 2005.

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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#### Full Proposal Instructions:

**A.1. Responsiveness to NSF Topics.** Designate one, and only one, of the topics, keeping in mind that a firm cannot submit more than 4 proposals per solicitation (which includes affiliates). The topic name and the appropriate subtopic letter, **MUST** be identified on the cover sheet. A firm may submit separate proposals on different topics or different proposals on the same topic under this solicitation. Proposals found to be non-responsive to the solicitation topics will be returned to the proposer without further consideration.

**A.2. Phase I Proposal Objectives.** A Phase I proposal must describe the research effort needed to investigate the feasibility of the proposed scientific or technical innovation. The objective of the Phase I effort is to determine whether the innovation has sufficient technical merit for proceeding into a Phase II project.

**A.3. Phase I Project Requirements.** The deliverable at the end of an SBIR/STTR Phase I grant is a technical report that summarizes the experimental and theoretical accomplishments vs. the proposed research. 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.

#### **Administrative Items:**

- A proposal submitted after 5:00 p.m. (proposer's local time) on the deadline date.
- A Project Summary without all required information (reference section A.9.2).
- A Project Description that exceeds 15 pages and does not have all parts (reference section A.9.3).
- A proposal missing consultant letters (if applicable) (reference section A.9.3 Part 6)
- A proposal submitted with a budget exceeding \$100,000 (reference section A.9.6)
- A proposal submitted without a subaward budget (reference section A.9.3 Part 6)
- A proposal missing letter(s) of Technology Support (reference section A.9.9.1)
- A Company Commercialization History if the company has certified that it has received previous SBIR/STTR Phase II awards -- **ALL QUESTIONS MUST BE ANSWERED** --(reference Certification Question on the cover sheet).
- A proposal that has documents in the "**Additional**" Single Copy Documents" module in FastLane (vs. Single Copy Documents).

#### **Technical Issues:**

- A proposal must have sufficient technical substance to enable review.
- A proposal must fall within the scope of the topic/subtopic as delineated in the topic/subtopic description.
- A proposal must have research proposed in science, engineering, and/or education.

**A.5. Marking Proprietary Information.** To the extent permitted by law, the Government will not release "properly" identified and "marked" technical data. Clearly identify technical data by marking the information and then providing a legend. An entire proposal cannot be "marked" proprietary.

**A.6. Human Subjects.** All research involving human subjects must comply with Federal regulations for human subject protection reference <http://www.nsf.gov/bfa/dias/policy/guidance.htm#human>

**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 by NSF are **NOT** eligible for reconsideration under the same Program Solicitation; however, they can be resubmitted after suitable revisions under subsequent solicitations.

#### **A.8. General Requirements**

**A.8.1 Page Limitation.** A Phase I SBIR/STTR proposal has page limitations based on the following:

**Project Description - this section shall not exceed 15 pages (contains 7 Parts).** Samples, videotapes, slides, 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 Type Size and Spacing.** The minimum font size shall be 10 point. The margins shall be a minimum of 2.54.cm (1 inch). Proposals prepared with smaller font sizes will be rejected and returned without further consideration. 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 SBIR/STTR program will use the following FastLane Forms.

Cover Sheet

Project Summary

Table of Contents (automatically generated)

Project Description

References Cited

Biographical Sketches

Budgets (also required for each subaward(s))

Current and Pending Support

Facilities, Equipment and Other Resources

Supplementary Docs: (placeholder for the following documents -- if applicable)

1. Letter(s) of Technology Support
2. Company Commercialization History (if applicable)
3. Cooperative Research Agreement (for STTR proposals only)

Single Copy Documents - List of Suggested 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 Home Page (<http://www.fastlane.nsf.gov>).

**A.9.2. Project Summary.** The Project Summary should be written in the third person and shall begin as follows: "This Small Business Innovation Research Phase I project...." or "This Small Business Technology Transfer Phase I project...". The summary must have the following components:

- 1) a summary 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.

2) a summary limited to 200 words addressing the Broader Impacts of the proposed activity. Include information on the potential commercial value, societal impact and/or enhanced scientific and technological understanding.

3) a listing of "Key" words. The key words/phrases should 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.

4) the topic name and subtopic name(s).

An edited version of the Project Summary will be available to the public if a proposal is awarded.

**A.9.3 Project Description** (Cannot exceed 15 pages). The project description shall contain the following parts in the following order.

**Part 1: Identification and Significance of the Innovation.** The first paragraph shall contain (1) a clear and succinct statement of the specific innovation research proposed and (2) 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 in the course of 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 the potential customer needs will be met if the research is successful. Therefore, Phase I proposers are strongly encouraged to consider commercial potential of their research at the same depth as the research problems.

**Part 3: Phase I Research Plan.** This section must provide a detailed description of the Phase I research approach. The description should 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.
- The sequence of experiments, tests, and computations involved in the measurement of those objectives.

**Part 4. Company Information.**

This section must briefly describe the following:

- The origin of the company.
- The company's mission and objectives.
- The company's vision and plan to grow/maintain a sustainable business.
- The present size of the company, which includes the following:
  - Annual revenues.
  - Number and types of employees (administrative, management, technical, manufacturing and/or marketing personnel).
  - The anticipated impact of the proposed innovation on the company.

**Part 5. Commercial Potential.**

This section must provide information on the commercial potential of the proposed innovation and should address the following:

- The Market, Customer and Competition - describe the market and/or market segments you will be targeting and provide a brief profile of the potential customer. Briefly, describe the advantages your innovation will bring to the



- market (for example: better performance; lower cost; faster, more efficient or effective, new capability).
- Intellectual Property (IP) - describe how you are going to protect the IP that results from your innovation.
- Financing - describe how you plan to finance (other than SBIR funds) to bring your innovation to market.

**Part 6. Consultants and Subawards/Subcontracts.** Keep in mind that an SBIR Phase I project requires a minimum of two-thirds of the research, as measured by the budget, to be performed by the small business concern. The 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 research institution. The remaining percentage can be allocated as appropriate to achieve the objectives of the project.

**Consultant:** The services of each consultant must be justified within the context of the proposal. Information must be provided on each consultant's expertise, organizational affiliation, and contribution to the project. In addition, each consultant must provide a signed statement, whether paid or unpaid, that confirms availability, time commitment, role in the project, and the agreed consulting rate (not to exceed the NSF daily maximum rate established annually). The NSF maximum consultant rate per day can be located at <http://www.nsf.gov/bfa/dias/policy/start.htm>. This rate is exclusive of any indirect costs, travel, per diem, clerical services, fringe benefits, and supplies.

**The signed consultant statements must be a part of the proposal and does count toward the 15 pages! The consultant statements *MUST* be scanned into the proposal and placed under Part 6. If a consultant letter is not provided, the proposal will be returned without review.**

**Subaward (also known as subcontract):** If 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. No significant part of the research or substantive effort under an NSF grant may be contracted or otherwise transferred to another organization without prior NSF authorization (this excludes the procurement of items such as commercially available supplies, materials, equipment or general support services allowable under the grant). The intent to enter into such arrangements should be disclosed in the proposal.

**Each subaward shall use a proposal budget, providing 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 in the Budget under Other Direct Costs/Other. All research, including subawards and consultancies, must be carried out in the U.S. (See definition of Place of Performance <http://www.eng.nsf.gov/sbirspecc/Definitions/definitions.htm#place>.)

***Note: In SBIR proposals, the use of Federally Funded Research and Development Centers (FFRDCs) can only be used as subawardees with a waiver from the Small Business Administration; please contact the cognizant SBIR Program Manager for further information on obtaining a waiver.***

**Part 7. Equivalent or Overlapping Proposals to other Federal Agencies.** A firm may elect to submit proposals for essentially equivalent or overlapping work under other Federal program solicitations or may have received or expect to receive other Federal awards for essentially equivalent or overlapping work. In these cases, the proposer **MUST** inform NSF of related proposals and awards and must first certify on the Proposal Cover page whether the proposer (a) has received Federal government awards for related work, or (b) has submitted currently active proposals for similar work under other Federal government program solicitations or (c) intends to submit proposals for such work to other agencies during the year. 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 (person-months (per year) (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 essentially 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.**

**A.9.4. References Cited.** Provide a comprehensive listing of relevant reference sources, including patent numbers and other relevant intellectual property citations.

**A.9.5. Biographical Sketches** (no more than two pages per bio). Provide relevant biographical information for the Principal Investigator (PI) and key personnel (including key members of your subaward team). Include information on present and past employment, education (highest degree and year), and professional experience. Provide a listing of relevant publications and summarize other contributions to the technical literature not directly pertinent to this proposal.

**A.9.6. Budget.** The total budget shall not exceed \$100,000 for the SBIR/STTR Phase I proposal. Budget estimates must be shown in detail on the budget justification. The budget should reflect the cost for work to be done only after the effective date of the award. Note that an awardee may not expend funds for any costs associated with the project before the effective date of the award document signed by the NSF Grants Officer.

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 reimbursement rates for consultants are a direct cost that cannot exceed the NSF maximum consultant rate (obtain the consultant rate at: <http://www.nsf.gov/bfa/dias/policy/start.htm>). Indicate the number of days proposed per consultant. Consultant travel should be shown under the travel category, but count as an outsourcing expense.

The budget justification should indicate the type of expendable materials and supplies required with their estimated costs.

**Permanent equipment, patent expenses, participant costs and foreign travel are not allowable expenditures.**

**One trip to the National Science Foundation to attend a two-day Grantees Workshop and to discuss the research program with a SBIR/STTR Program Manager must be included in the Phase I budget. An explicit statement acknowledging attendance at the Grantees Workshop is required on the budget justification page.**

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 \$100,000.

**Detailed documentation of budget line items is required on ALL budget items and should 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 (in the event that other pending projects are supported during the SBIR/STTR Phase I period of performance), whether or not salary for the person involved is included in the budgets of the various projects. If none, state: **NONE**.

For all on-going 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.
- Person-months (per year) (calendar months) devoted to the project by the Principal Investigator and each of the senior personnel.

**A.9.8. Equipment, Instrumentation, Computers, and Facilities.** Provide a description that specifies the availability and location of significant equipment, instrumentation, computers, and physical facilities necessary to complete that 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** (reference definition: <http://www.eng.nsf.gov/sbirspeccs/Definitions/definitions.htm#PermanentEquip>).

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. **Scan statements into this section.**

**A.9.9. Supplementary Docs.** This section will only contain the following components (if applicable):

**A.9.9.1. Letters of Technology Support.** (Required for all Proposals) Proposals must be market-driven and identify the end users of the proposed technology and its potential for commercialization. The proposed technology must target the private sector (Government and non-profits do not qualify) and one or more letters of support is mandatory.

**A.9.9.2. Company Commercialization History:** (Required for all proposers certifying receipt of Phase II awards on the cover page.) Note this section has been updated. All questions **MUST** be answered. Only firms that have received one or more SBIR/STTR Phase II awards from NSF or any other Federal agency must submit a Company Commercialization History. The following are necessary components for this section:

1. Firm Name
2. Identify any name change your firm has gone through within the past 5 years.
3. List the parent company if you are a subsidiary or a spin-off.
4. Percentage of the firm's revenues for each of the past **THREE Fiscal Years** from Federal SBIR and/or STTR funding (including Phase I and Phase II awards).
5. Number of SBIR/STTR Phase II Awards firm received from the Federal government.
6. Identify each of the Phase II SBIR/STTR awards the firm has received by agency, award amount, and award number.
7. Total revenues to date from the commercialization results of these awards.

**A.9.9.3. Cooperative Research Agreement (For STTR proposals only).** See the Cooperative Research Agreement (CRA) model at [http://www.eng.nsf.gov/sbirspeccs/Phase\\_II/phase\\_ii.htm#cooperativeagreement](http://www.eng.nsf.gov/sbirspeccs/Phase_II/phase_ii.htm#cooperativeagreement)

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

**A.10. List of Suggested Reviewers.** Provide a listing of reviewers that you consider to be experts in the field. Provide complete contact information in the "Suggested Reviewers" text box. Please keep in mind potential conflict-of-interests. Likewise, provide a listing of individuals that you wish not to be considered as reviewers. Provide information in the

"Reviewers not to include" text box.

## A.11. Research Topics

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 new merit review criteria, which cover both the quality of research and its potential impact on society.

The SBIR/STTR program solicits proposals from the small business sector consistent with NSF's mission. The program is governed by Public Law 106-554. A main purpose of the legislation is "to stimulate technological innovation and increase private sector commercialization." The NSF SBIR/STTR program is therefore in a unique position to meet both the goals of NSF and the purpose of the SBIR legislation by emphasizing private sector commercialization and by transforming scientific discovery into social benefits. Accordingly, NSF has formulated broad solicitation topics for SBIR/STTR that conform to the high-technology investment sector's interests:

- [Manufacturing Innovation \(MI\)](#)

Proposers are reminded to identify the program announcement/solicitation number (04-604) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

## B. Budgetary Information

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### Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

### Other Budgetary Limitations:

SBIR/STTR Phase I project budgets cannot exceed \$100,000 (for more information see V. Proposal Preparation and Submission Instructions, Section A.9.6. Budget)

## C. Due Dates

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Proposals must be submitted by the following date(s):

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

December 08, 2004

Topic: Manufacturing Innovation (in response to Executive Order 13329). Do not submit proposals prior to November 8, 2004; proposals submitted prior to November 8, 2004 will be returned without review.

## D. FastLane Requirements

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Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <https://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](mailto: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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

*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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

## VI. PROPOSAL REVIEW INFORMATION

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### A. NSF Proposal Review Process

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Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

#### **What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

#### **What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity,

disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

### ***Integration of Research and Education***

One of the principal strategies in support of NSF's goals 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 diversity of learning perspectives.

### ***Integrating Diversity into NSF Programs, Projects, and Activities***

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- 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.

### **Additional Review Criteria:**

The SBIR/STTR program has **additional criteria** (as listed below) that are associated with the "standard" NSF review criteria.

### **What is the intellectual merit of the proposed activity?**

1. Is the proposed plan a sound approach for establishing technical and commercial feasibility?
2. Does the proposal reflect state-of-the-art in the major research activities proposed?
3. Are advancements in state-of-the-art likely?

### **What are the broader impacts of the proposed activity?**

1. What may be the commercial and/or societal benefits of the proposed activity?
2. Does the proposal lead to enabling technologies (instrumentation, software, etc.) for further discoveries?
3. Does the outcome of the proposed activity lead to a marketable product or process? Evaluate the competitive advantage of this technology vs. alternate technologies that can meet the same market needs.
4. How well is the proposed activity positioned to attract further funding from non-SBIR sources once the SBIR project ends?
5. Can the product or process developed in the project advance NSF's goals in research and education?
6. Has the proposing firm successfully commercialized SBIR/STTR supported technology where prior awards have been made?

## **B. Review Protocol and Associated Customer Service Standard**

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All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field



represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc 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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

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### A. Notification of the Award

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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 Division 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.A. for additional information on the review process.)

### B. Award Conditions

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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 (NSF-GC-1); \* or Federal Demonstration Partnership (FDP) Terms and Conditions \* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/home/grants/grants\\_gac.htm](http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

## Special Award Conditions:

SBIR/STTR Phase I and Phase II awards are subject to availability of funds. NSF has no obligation to make any specific number of SBIR/STTR Phase I or Phase II awards based on a solicitation and may elect to make several or no awards in any specific technical topic or subtopic. SBIR/STTR Phase I awards are fixed-price grants and will not exceed \$100,000. The SBIR/STTR Phase II fixed-price grants typically will not exceed \$500,000 per award. SBIR/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. [http://www.eng.nsf.gov/sbirspeccs/Award\\_Req/award\\_req.htm](http://www.eng.nsf.gov/sbirspeccs/Award_Req/award_req.htm)) Reasonable fees for profit (not to exceed 7% of the total direct and indirect costs) will be considered under both phases.

## C. Reporting Requirements

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Within 15 days after the expiration of an award, the PI is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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 annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

## VIII. CONTACTS FOR ADDITIONAL INFORMATION

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General inquiries regarding this program should be made to:

- Cheryl F. Albus, Program Manager and **Solicitation Coordinator**, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 510 N, telephone: (703) 292-7051, fax: (703) 292-9057, email: [calbus@nsf.gov](mailto:calbus@nsf.gov)
- Errol B. Arkilic, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 550 S, telephone: (703) 292-8095, email: [earkilic@nsf.gov](mailto:earkilic@nsf.gov)
- Juan E. Figueroa, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 550 S, telephone: (703) 292-7054, fax: (703) 292-9057, email: [jfiguero@nsf.gov](mailto:jfiguero@nsf.gov)
- Om P. Sahai, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 590 N, telephone: (703) 292-7795, fax: (703) 292-9056, email: [osahai@nsf.gov](mailto:osahai@nsf.gov)
- Rosemarie D. Wesson, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 590 N, telephone: (703) 292-7070, fax: (703) 292-9056, email: [rwesson@nsf.gov](mailto:rwesson@nsf.gov)
- Winslow Sargeant, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 590 N, telephone: (703) 292-7313, fax: (703) 292-9056, email: [wsargean@nsf.gov](mailto:wsargean@nsf.gov)
- Joseph E. Hennessey, Senior Advisor, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 550 S, telephone: (703) 292-7069, fax: (703) 292-9057, email: [jhennes@nsf.gov](mailto:jhennes@nsf.gov)
- T. James Rudd, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 570 S, telephone: (703) 292-4759, fax: (703) 292-9056, email: [tjrudd@nsf.gov](mailto:tjrudd@nsf.gov)



- Sara B. Nerlove, Program Manager, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 590 N, telephone: (703) 292-7077, fax: (703) 292-9057, email: [snerlove@nsf.gov](mailto:snerlove@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 800-673-6188, email: [fastlane@nsf.gov](mailto:fastlane@nsf.gov)

## IX. OTHER PROGRAMS OF INTEREST

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The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF [E-Bulletin](#), which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's [Custom News Service](#) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

*Facilitation Awards for Scientists and Engineers with Disabilities* (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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: [pubs@nsf.gov](mailto:pubs@nsf.gov)
  - or telephone: (703) 292-7827
  
- **To Locate NSF Employees:** (703) 292-5111

#### **PRIVACY ACT AND PUBLIC BURDEN STATEMENTS**

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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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). 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 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

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