NSF Small Business Innovation Research Phase II (SBIR)/Small Business Technology Transfer (STTR) Programs Phase II (SBIR/STTR Phase II)

PROGRAM SOLICITATION
NSF 22-552

REPLACES DOCUMENT(S):
NSF 21-565, NSF 21-566

National Science Foundation

Directorate for Technology, Innovation and Partnerships
Translational Impacts

Submission Window Date(s) (due by 5 p.m. submitter's local time):

January 11, 2022 - March 03, 2022

March 04, 2022 - June 30, 2022

July 01, 2022 - October 26, 2022

IMPORTANT INFORMATION AND REVISION NOTES

A small business may apply for a National Science Foundation (NSF) Phase II Small Business Innovation Research (SBIR) or Small Business Technology Transfer (STTR) award only if it has received an NSF SBIR/STTR Phase I award, and only for continued research toward commercialization of the technology developed under the Phase I award.

Small businesses are eligible to submit a Phase II proposal between 6 and 24 months after the start date of their relevant NSF SBIR/STTR Phase I award. Reference the Phase I award notice for the exact start date of the Phase I award. Proposals submitted outside of their eligible Phase II time-frame will be Returned Without Review.

To extend flexibility to small businesses during the COVID-19 crisis, NSF has extended the Phase II submission deadline (typically 6-24 months from the start date of their award) for the eligible NSF SBIR/STTR Phase I awardees:

- *All NSF SBIR/STTR Phase I awardees with Phase I start dates between **September 4, 2019 and December 4, 2020** will have a three-month extension to submit their Phase II proposal.*

Proposers may submit only one Phase II proposal to the NSF SBIR/STTR programs. SBIR and STTR proposals are nearly identical but differ in the amount of work performed by the small business (as noted in the budget). Proposers must note whether they are applying for SBIR or STTR on the NSF proposal Cover Sheet. More details regarding the Cover Sheet and how to submit an NSF SBIR/STTR proposal can be found in section V.A of this document.

The Authorized Organizational Representative (AOR) must sign the Cover Sheet at the time of proposal submission. Proposals cannot be accepted without the signature of the AOR.

NSF SBIR Phase II proposals submitted to this solicitation that meet all the requirements of an NSF STTR Phase II proposal may, at NSF's discretion, be considered for award as an NSF STTR Phase II. If recommended for an STTR Phase II award, the small business proposer will need to complete a Cooperative Research Agreement (CRA) between the small business and the research institution prior to award. NSF may also, at its discretion, convert NSF STTR Phase II proposals to NSF SBIR Phase II proposals; the award mechanism for either will be a fixed amount cooperative agreement.

The NSF SBIR/STTR programs have **three submission windows.** Unlike deadlines, submission windows allow small businesses the flexibility to submit a full proposal at any time *during the specific dates listed at the top of this document. The proposal submission system (FastLane) will shut down at 5:00 p.m. proposer's time on each submission window closing date, but, with the exception of the final submission window which closes in October, the system will then reopen for new submissions the following morning. After the final submission window closes in October, it is anticipated that a new or updated solicitation will be posted shortly thereafter.*

The NSF SBIR/STTR programs provide non-dilutive funding for the **development of deep technologies, based on discoveries in fundamental science and engineering** for societal and economic impacts, and welcome the submission of proposals in nearly all technical areas.

NSF proposals are confidential and will only be shared with a small number of reviewers and NSF staff (as appropriate). All of these individuals have agreed to maintain the confidentiality of the proposal content. Proposals to NSF do not constitute a public disclosure. If selected for a Phase II award, a company will be prompted to write a publicly available project summary and an abstract that summarizes the intellectual merit and broader impact of the project.

NSF requires that all proposals include Biographical Sketches and Current and Pending Support documents using a new format specific for NSF SBIR/STTR proposals. For SBIR or STTR proposals, follow the guidance provided in Section V.A of this solicitation (Proposal Preparation and Submission

Instructions). Step-by-step guidance can also be found here.

Significant Revisions Made Since the Last Solicitation:

- The NSF SBIR and STTR Phase II solicitations have been combined into a single document.
- The new, combined solicitation presents three Phase II submission windows rather than four.
- A new required format has been instituted for Biographical Sketches and Current & Pending Support documents in NSF SBIR/STTR proposals.
- Letters of commitment from consultants and subawardees should be included in the "Other Supplementary Documents" section, rather than the Budget Justification.
- The project Budget Justification and subaward Budget Justifications are now limited to five pages.

For the purpose of this solicitation, the following definitions apply:

- ***Funding Agreement:*** As used in this solicitation, the funding agreement is a Fixed Amount Cooperative Agreement – a legal instrument of financial assistance between NSF and an awardee, consistent with 31 USC 6302-6305 and as noted in the NSF Proposal & Award Policies Guide (PAPPG) Introduction, Section D ("Definitions & NSF-Grantee Relationships").
- ***Small Business Concerns (SBCs):*** SBCs are independently owned and operated businesses that are not dominant in the field of operation. For this solicitation, firms qualifying as a small business concern are eligible to participate in the SBIR/STTR program (see Section IV. "Eligibility Information" of this solicitation for more details). Please note that the size limit of 500 employees includes affiliates. The firm must be in compliance with the SBA SBIR/STTR Policy Directive and the Code of Federal Regulations (13 CFR 121).
- ***SBIR/STTR Data:*** As defined by the SBA SBIR/STTR Policy Directive, SBIR/STTR Data is all Data developed or generated in the performance of an SBIR or STTR award, including Technical Data and Computer Software developed or generated in the performance of an SBIR or STTR award. The term does not include information incidental to contract or grant administration, such as financial, administrative, cost or pricing or management information.
- ***SBIR/STTR Data Rights:*** As noted in the SBA SBIR/STTR Policy Directive, the Federal Government may, use, modify, reproduce, perform, display, release, or disclose SBIR/STTR Data that are Technical Data within the Government; however, the Government shall not use, release, or disclose the data for procurement, manufacturing, or commercial purposes; or release or disclose the SBIR/STTR Data outside the Government except as permitted by paragraph 10(B) of the SBIR/STTR Policy Directive's Data Rights Clause or by written permission of the Awardee.
- ***Research and Development (R&D):*** broadly defined in 2 CFR § 200.8, but specified for the NSF SBIR/STTR program as follows:
  - the application of creative, original and potentially transformative concepts to systematically study, create, adapt, or manipulate the structure and behavior of the natural or man-made worlds;
  - the use of the scientific method to propose well-reasoned, well-organized activities based on sound theory, computation, measurement, observation, experiment, or modeling;
  - the demonstration of a well-qualified individual, team, or organization ready to deploy novel methods of creating, acquiring, processing, manipulating, storing, or disseminating data or metadata; and/or
  - the novel integration of new theories, analysis, data, or methods regarding cognition, heuristics, and related phenomena.
- ***Deep Technologies:*** technologies based on discoveries in fundamental science and engineering.
- ***Non-Dilutive Funding:*** financing that does not involve equity, debt, or other elements of the business ownership structure.
- ***Technical Risk:*** Technical risk assumes that the possibility of technical failure exists for an envisioned product, service, or solution to be successfully developed. This risk is present even to those suitably skilled in the art of the component, subsystem, method, technique, tool, or algorithm in question. If the new product, service, or solution is successfully realized and brought to the market, it would be difficult for a well-qualified, competing firm to reverse-engineer or otherwise neutralize the competitive advantage generated by leveraging fundamental science or engineering research techniques.
- ***Technological Innovation*** indicates that the new product or service is differentiated from current products or services; that is, the new technology holds the potential to result in a product or service with a substantial and durable advantage over competing solutions on the market. It also generally provides a barrier to entry for competitors.

Effective February 28, 2022, NSF will transition from DUNS numbers to the New System for Award Management (SAM) Unique Entity Identifier (UEI) in NSF systems. See the forthcoming NSF Advisory Page for more details.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) Programs Phase II (SBIR/STTR Phase II)

Synopsis of Program:

Introduction to the Program:

The NSF SBIR/STTR programs focus on transforming scientific discovery into products and services with commercial potential and/or societal benefit. Unlike fundamental or basic research activities that focus on scientific and engineering discovery itself, the NSF SBIR/STTR programs support the creation of opportunities to move fundamental science and engineering out of the lab and into the market or other use at scale, through startups and small businesses representing deep technology ventures.

The NSF SBIR/STTR programs fund advanced research and development. The programs are designed to provide non-dilutive funding at the earliest stages of technology development.

Synopsis of Program:

The NSF SBIR/STTR programs support moving scientific excellence and technological innovation from the lab to the market. By investing federal research and development funds into startups and small businesses, NSF hopes to build a strong national economy and stimulate the creation of novel products, services, and solutions in the private sector; strengthen the role of small business in meeting federal research and development needs; increase the commercial application of federally supported research results; and develop and increase the US workforce, especially by fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

The SBIR/STTR programs at NSF solicit proposals based on groundbreaking scientific discoveries or significant engineering breakthroughs from the small businesses consistent with NSF's mission to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

The programs are governed by Public Law 114-328 (SBIR/STTR Reauthorization Act of 2017). SBIR/STTR policy is provided by the Small Business Administration (SBA) through the SBA Policy Directive.

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.

- Contact Your NSF Phase I Program Officer, telephone: (703) 292-8050, email: sbir@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)
- 47.084 --- NSF Technology, Innovation and Partnerships

Award Information

Anticipated Type of Award: Fixed Amount Cooperative Agreement

Estimated Number of Awards: 10 to 120

- Approximately 100 to 120 estimated awards for SBIR Phase II per year, pending the availability of funds.
- Approximately 10 estimated awards for STTR Phase II per year, pending the availability of funds.

Anticipated Funding Amount: $10,000,000 to $110,000,000

- Approximately $110,000,000 for SBIR Phase II.
- Approximately $10,000,000 to $15,000,000 for STTR Phase II.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the SBIR/STTR program (see Eligibility Guide for more information). The size limit of 500 employees ***includes affiliates***. The firm must be in compliance with the SBIR/STTR Policy Directive(s) and 13 CFR 121.
- Proposers must have received a Phase I SBIR or STTR Award from NSF to be eligible to submit an NSF SBIR/STTR Phase II proposal to the current windows. NSF SBIR/STTR Phase I awardees may submit their NSF SBIR/STTR Phase II proposal 6 to 24 months from their NSF SBIR/STTR Phase I award start date. Please reference your NSF SBIR/STTR Phase I award notice for award start date. *** *Please see "Important Information and Revision Notes" section for a Phase II submission extension for eligible Phase I awardees.****
- Proposers may submit an NSF Phase II SBIR proposal based on an NSF Phase I STTR award, and vice-versa. Please contact your cognizant NSF Phase I Program Officer for additional proposal submission instructions.

Who May Serve as PI:

The primary employment of the Principal Investigator (PI) must be with the small business concern at the time of award and for the duration of the award, unless a new PI is named. "Primary employment" is defined as at least 51 percent employment by the small business. NSF normally considers a full-time work week to be 40 hours and considers employment elsewhere of greater than 19.6 hours per week to be in conflict with this requirement. A PI may be primarily employed at another organization at the time of *submission*, as long as he or she is primarily employed at the proposing small business at the time of award. The PI must have a legal right to work for the proposing company in the US, as evidenced by citizenship, permanent residency or an appropriate visa. The PI does not need to be associated with an academic institution. There are no PI degree requirements (i.e., the PI is not required to hold a Ph.D. or any other degree). The PI for the Phase II project does not need to be the same person who served as PI for the associated Phase I award. A PI must devote a minimum of one calendar month of effort per each six months of award duration to an NSF SBIR or STTR Phase II project.

Limit on Number of Proposals per Organization: 1

>per Phase I award.

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

>For NSF SBIR – 1 PI, co-PIs are not allowed

>For NSF STTR - 1 PI, 1 co-PI required (must be part of the partner research institution)

>No person may be listed as the Principal Investigator for more than one proposal submitted to this NSF SBIR/STTR Phase II solicitation. SBIR proposals submitted to NSF, by definition, do not have co-PIs. For STTR proposals submitted to NSF, a person may act as the co-PI on an unlimited number of proposals.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposal Submission:** Not required

- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) 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:**

  Not Applicable

- **Other Budgetary Limitations:**

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

C. Due Dates

- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):

  January 11, 2022 - March 03, 2022

  March 04, 2022 - June 30, 2022

  July 01, 2022 - October 26, 2022

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

The NSF SBIR/STTR programs focus on transforming scientific discovery into commercial potential and/or societal benefit through the development of products or services. Unlike fundamental or basic research activities which focus on scientific and engineering discovery itself, the NSF SBIR/STTR programs support startups and small businesses in technological innovation, that is, the creation of opportunities to move fundamental science and engineering out of the lab and into the market.

The NSF SBIR/STTR programs fund research and development. The program is designed to provide non-dilutive funding to support startups or entrepreneurs with technologies at the earliest stages of research and development. NSF SBIR/STTR awards are not government contracts. The NSF does not use the SBIR/STTR programs to procure goods or services for the government, nor does the NSF receive any stake or interest in an awardee firm. By investing federal research and development funds into startups and small businesses, NSF hopes to build a strong national economy and stimulate the creation of novel products, services, and solutions in the private sector; strengthen the role of small business in meeting federal research and development needs; increase the commercial application of federally supported research results; and develop and increase the US workforce, especially by fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

The NSF SBIR/STTR programs do not have a specific topical focus. Generally, the topics included in the NSF SBIR/STTR solicitation are intended to be broad enough to permit startups with science- and engineering-based innovations to compete for funding, transforming science and engineering discovery and innovation into both societal and economic impact. NSF encourages people from all backgrounds and geographic areas to apply for funding. At the conclusion of the project, an awardee company must submit a final report to NSF to ensure that the company properly spent NSF funds on approved activities, as originally proposed. NSF does not purchase these project reports and does not benefit from these reports, beyond an oversight function. NSF does not test, verify, or otherwise use the technology developed under its SBIR/STTR awards.

The NSF SBIR/STTR programs are highly competitive. While success rates vary year-to-year, only a fraction of proposals submitted are selected for an award. Thus, there are many qualified businesses applying to the program each year that do not receive funding.

II. PROGRAM DESCRIPTION

Building upon the primary objectives of the NSF-funded Phase I effort to (i) determine whether the innovation has sufficient intellectual merit and broader/commercial impact for proceeding into a Phase II project and (ii) to assess commercial feasibility of the proposed innovation, the aim of the Phase II project is to continue the research and development (R&D) efforts initiated in Phase I and advance the technology and associated product or service aggressively toward commercial deployment.*

While startups and small businesses face many types of challenges, the NSF SBIR/STTR funding is intended to specifically focus on challenges associated with technological innovation; that is, on the creation of new products, services, and other scalable solutions based on fundamental science or engineering.

NSF seeks SBIR/STTR proposals that represent success in three distinct, but related merit review criteria: Intellectual Merit, Broader Impacts and Commercialization Potential.

The **Intellectual Merit** criterion encompasses the potential to advance knowledge and leverages fundamental science or engineering research techniques to overcoming technical risk. This can be conveyed through the **Research and Development (R&D)** of the project. R&D is broadly defined in 2 CFR § 200.8, but specified for the NSF SBIR/STTR program as follows:

- the application of *creative, original and potentially transformative concepts* to systematically study, create, adapt, or manipulate the structure and behavior of the natural or man-made worlds;
- the use of the scientific method to propose *well-reasoned, well-organized activities based on sound theory, computation, measurement, observation, experiment, or modeling*;
- the demonstration of a *well-qualified individual, team, or organization* ready to deploy novel methods of creating, acquiring, processing, manipulating, storing, or disseminating data or metadata; and/or
- the novel integration of new theories, analysis, data, or methods regarding cognition, heuristics, and related phenomena.

NSF SBIR/STTR proposals are often evaluated via the concepts of **Technical Risk and Technological Innovation**. Technical risk assumes that the possibility of technical failure exists for an envisioned product, service, or solution to be successfully developed. This risk is present even to those suitably skilled in the art of the component, subsystem, method, technique, tool, or algorithm in question. **Technological Innovation** indicates that the new product or service is differentiated from current products or services; that is, the new technology holds the potential to result in a product or service with a substantial and durable

advantage over competing solutions on the market. It also generally provides a barrier to entry for competitors. This means that if the new product, service, or solution is successfully realized and brought to the market, it should be difficult for a well-qualified, competing firm to reverse-engineer or otherwise neutralize the competitive advantage generated by leveraging fundamental science or engineering research techniques.

The **Broader Impacts** criterion encompasses the potential benefit to society and contribution to the achievement of specific, desired societal outcomes as outlined in the NSF PAPPG Merit Review Broader Impacts Criteria .

The NSF SBIR/STTR programs fund the development of new, high-risk technology innovations intended to generate positive societal and economic outcomes. Proposers should also consider the American Innovation and Competitiveness Act (P.L. 114- 329, Section 102) Broader Impacts Review Criterion Update:

- Increasing the economic competitiveness of the United States.
- Advancing of the health and welfare of the American public.
- Supporting the national defense of the United States.
- Enhancing partnerships between academia and industry in the United States.
- Developing an American STEM workforce that is globally competitive through improved pre-kindergarten through grade 12 STEM education and teacher development, and improved undergraduate STEM education and instruction.
- Improving public scientific literacy and engagement with science and technology in the United States.
- Expanding participation of women and individuals from underrepresented groups in STEM.

The **Commercialization Potential** of the proposed product or service is the potential for the resulting technology to disrupt the targeted market segment by way of a strong and durable value proposition for the customers or users.

- The proposed product or service addresses an unmet, important, and scalable need for the target customer base.
- The proposed small business is structured and staffed to focus on aggressive commercialization of the product/service.
- The proposed small business can provide evidence of good product-market fit (as validated by direct and significant interaction with customers and related stakeholders).

The Phase II proposal requires a report describing the technical accomplishments of the NSF SBIR/STTR Phase I award and how these results support the underlying commercial opportunity.

The small business concern must also include a Commercialization Plan that clearly outlines how it plans to generate profits from the innovation research conducted in Phase I and II. This document should represent a compelling vision that describes a business opportunity that could be addressed, in part, with continued NSF support via Phase II funding. The depth and quality of the analysis within the Commercialization Plan is a critical element of the NSF SBIR/STTR proposal review.

For more in-depth program information please reference the NSF SBIR/STTR website and the solicitation-specific Merit Review Criteria in Section VI.

* The NSF SBIR/STTR programs do not support clinical trials or proposals from companies whose commercialization pathway involves the production, distribution or sale by the company of chemical components, natural or synthetic variations thereof, or other derivatives related to Schedule I controlled substances.

III. AWARD INFORMATION

NSF SBIR/STTR Phase II proposals may be submitted for funding up to $1,000,000. This amount is inclusive of all direct and indirect costs as well as the small business fee and Technical and Business Assistance (TABA) funding. NSF SBIR/STTR Phase II projects typically run for 24 months, though deviations are possible depending on the circumstances of the proposer and the research project (potential proposers are encouraged to contact their cognizant NSF SBIR/STTR Phase I Program Officer to discuss).

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Only firms qualifying as a small business concern are eligible to participate in the SBIR/STTR program (see Eligibility Guide for more information). The size limit of 500 employees **includes affiliates**. The firm must be in compliance with the SBIR/STTR Policy Directive(s) and 13 CFR 121.
- Proposers must have received a Phase I SBIR or STTR Award from NSF to be eligible to submit an NSF SBIR/STTR Phase II proposal to the current windows. NSF SBIR/STTR Phase I awardees may submit their NSF SBIR/STTR Phase II proposal 6 to 24 months from their NSF SBIR/STTR Phase I award start date. Please reference your NSF SBIR/STTR Phase I award notice for award start date. ****** Please see "Important Information and Revision Notes" section for a Phase II submission extension for eligible Phase I awardees.******
- Proposers may submit an NSF Phase II SBIR proposal based on an NSF Phase I STTR award, and vice-versa. Please contact your cognizant NSF Phase I Program Officer for additional proposal submission instructions.

Who May Serve as PI:

The primary employment of the Principal Investigator (PI) must be with the small business concern at the time of award and for the duration of the award, unless a new PI is named. "Primary employment" is defined as at least 51 percent employment by the small business. NSF normally considers a full-time work week to be 40 hours and considers employment elsewhere of greater than 19.6 hours per week to be in conflict with this requirement. A PI may be primarily employed at another organization at the time of *submission*, as long as he or she is

primarily employed at the proposing small business at the time of award. The PI must have a legal right to work for the proposing company in the US, as evidenced by citizenship, permanent residency or an appropriate visa. The PI does not need to be associated with an academic institution. There are no PI degree requirements (i.e., the PI is not required to hold a Ph.D. or any other degree). The PI for the Phase II project does not need to be the same person who served as PI for the associated Phase I award. A PI must devote a minimum of one calendar month of effort per each six months of award duration to an NSF SBIR or STTR Phase II project.

Limit on Number of Proposals per Organization: 1

per Phase I award.

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

For NSF SBIR – 1 PI, co-PIs are not allowed

For NSF STTR - 1 PI, 1 co-PI required (must be part of the partner research institution)

No person may be listed as the Principal Investigator for more than one proposal submitted to this NSF SBIR/STTR Phase II solicitation. SBIR proposals submitted to NSF, by definition, do not have co-PIs. For STTR proposals submitted to NSF, a person may act as the co-PI on an unlimited number of proposals.

Additional Eligibility Info:

All NSF SBIR/STTR Phase II proposal submissions must reference the corresponding NSF SBIR/STTR Phase I award number on the proposal Cover Sheet.

A company awarded an NSF *STTR* Phase I award may elect to submit a Phase II proposal to the NSF *SBIR* program and vice versa. See the relevant Dear Colleague Letter for details. Please also contact your cognizant NSF SBIR/STTR Phase I Program Officer for additional proposal submission instructions.

Ownership and Venture Capital, Joint Ventures. NSF has elected not to use the authority given under 15 U.S.C. § 638(dd)(1) (also §5107 of the SBIR/STTR Reauthorization Act). Hence, small businesses that are majority-owned by one or more venture capital operating companies (VCOCs), hedge funds or private equity firms are NOT eligible to submit proposals or receive awards from the NSF SBIR/STTR programs. Proposals from joint ventures and partnerships are permitted, provided the proposing entity qualifies as a small business concern (see Eligibility Guide for more information).

Broad Participation. Socially and economically disadvantaged small business concerns and women-owned small business concerns are encouraged to participate in the SBIR/STTR programs.

STTR Research Institution. The SBIR/STTR Policy Directive requires that STTR Phase II proposals include an eligible research institution as a subawardee on the project budget. The STTR partner research institution is typically either a not-for-profit institution focused on scientific or educational goals (such as a college or university), or a Federally-funded research and development center (FFRDC). For an STTR Phase II 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% must be performed by the partner research institution, with the balance permitted to be allocated to either of these, or to other subawards or consultants.

REQUIRED REGISTRATIONS: The information provided for the four registrations below should match exactly to avoid processing complications. All registrations need to be active during the lifecycle of the award. Please contact your cognizant NSF SBIR/STTR Phase I Program Officer if you are changing business name or transferring rights to another entity.

- **Dun and Bradstreet Data Universal Numbering System (DUNS).** *Effective February 28, 2022, NSF will transition from DUNS numbers to the New System for Award Management (SAM) Unique Entity Identifier (UEI) in NSF systems. Please refer to "Important Information and Revision Notes" for more details*
- **System for Award Management (SAM) Registration.**
- **Small Business Administration (SBA) Company Registration.**
- **Research.gov (NSF's online grant management system).**

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

This solicitation does contain MANY instructions that deviate from the standard NSF PAPPG proposal preparation instructions. This solicitation contains the information needed to prepare and submit an NSF SBIR/STTR Phase II proposal and refers to specific sections of the PAPPG ONLY when necessary (and noted throughout the solicitation). In the event of conflict between the instructions in this solicitation and the PAPPG, use this solicitation's instructions as a guide.

Phase II Proposal and Program Objectives. An SBIR/STTR Phase II proposal must describe the research effort needed to continue the research and

development efforts initiated in the Phase I award.

Unacceptable Objectives. Examples of project objectives that are not acceptable for SBIR/STTR Phase II proposals include efforts that do not directly support commercial development of the technologies or concepts demonstrated during Phase I, or which are unrelated to the Phase I project objectives. Proposers are encouraged to consult with their NSF SBIR/STTR Phase I Program Officer to discuss what objectives might be appropriate for the Phase II project.

Marking Proprietary Information. To the extent permitted by law, the Government will not release properly identified and marked technical and commercially sensitive data. If the proposal contains proprietary information, check the box at the bottom of the proposal Cover Sheet and identify proprietary technical data in the proposal by clearly marking the information and also providing a legend. Typically, proprietary information is marked in the text either with an asterisk at the beginning and end of the proprietary paragraph, underlining the proprietary sections, or choosing a different font type. An entire proposal should not be marked proprietary.

Debriefing on Unsuccessful Proposals. When a proposal is declined, verbatim copies of reviews (excluding identities 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. The cognizant NSF SBIR/STTR Program Officer may be contacted for an oral debrief if there are additional questions regarding the review process or the outcome.

Proposal Format and 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. Please reference the NSF PAPPG (Chapter II, Section B) and Section V.C of this solicitation for more details on accepted proposal fonts and format.

DO's and DON'Ts of NSF SBIR/STTR Phase II Proposal Submission:

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

The following list shows the **DO's and DON'Ts** of proposal submission. Failure to comply with this list means that a proposal may be returned without review.

- ***Do include your NSF SBIR/STTR Phase I award number on the Cover Sheet,*** under the "Show Previous Award" field.
- ***DO INCLUDE ALL REQUIRED ELEMENTS.*** Submit a proposal that is complete. Even if the FastLane system allows a proposal to be submitted without these items, ALL proposals must address each of the items listed below, WITHOUT EXCEPTION.
  - Project Summary
  - Project Description
  - References Cited
  - Biographical Sketches
  - Budget and Budget Justification
  - Current and Pending Support
  - Facilities, Equipment and Other Resources
  - Supplementary Documents (all that are applicable)
  - Single Copy Documents (including Collaborators and Other Affiliations)
- **DO NOT submit late.** Small businesses should submit their Phase II proposal between 6 and 24 months after the start date of their relevant NSF SBIR/STTR Phase I award *(please see "Important Information and Revision Notes" section for a Phase II submission extension for eligible Phase I awardees).* Additionally, the proposal submission system will not permit submissions after 5:00 p.m. "proposer's time" on the submission window closing date. **Proposer's time is determined by the time zone of the company's address as registered with NSF.** After this time, proposals will need to be submitted to a subsequent window.
- **DO NOT** submit a Project Description that is more than 15 pages long.
- **DO NOT** submit a Budget exceeding $1,000,000. This amount is inclusive of all direct and indirect costs as well as the small business fee and Technical and Business Assistance (TABA) funding.
- **DO NOT** submit a "Collaborative Proposal" (a special proposal type in FastLane). Collaboration with institutions of higher education (IHEs) is encouraged; however, only one proposal submitted by the company and with subawards to the IHE(s), should result.
- **DO NOT** submit a proposal that lacks sufficient technical/commercial potential substance to justify review; does not contain research and development proposed in science, engineering, or education; or contains unacceptable objectives as described above in the beginning of section V.A.
- **DO NOT** upload additional information, beyond what is specifically required and permitted, into the proposal (marketing materials, research results/academic papers, patent applications, etc.).
- **DO NOT** upload documents to Supplementary Documents except those listed in the Supplementary Documents section below.

Detailed Instructions on Proposal Preparation:

Cover Sheet

The Cover Sheet is automatically generated by FastLane based on information entered into the "Cover Sheet" module and consists of the NSF Cover sheet, Certification, and SBIR/STTR Addendum pages. NSF SBIR and STTR Phase II proposers must include their associated NSF Phase I award number on the Cover Sheet, under the "Show Previous Award" field.

Table of Contents

The table of contents is automatically generated by FastLane.

1. Project Summary [One (1) page MAXIMUM]

The Project Summary should be informative to other persons working in the same or related fields, and, insofar as possible, understandable to a broad audience within the scientific domain. It should not be an abstract of the proposal. Do not include proprietary information in the summary.

The NSF SBIR/STTR Phase II Project Summary has three required sections:

- Overview
- Intellectual Merit
- Broader/Commercial Impact

Proposals that do not contain a complete Project Summary will not be accepted by FastLane or will be returned without review. The Project Summary is completed in FastLane by entering information into the three text boxes in the Project Summary module. Information MUST be entered into all three text boxes,

or the proposal will not be accepted. Do not upload your Project Summary as a PDF file.

- **Box 1: Overview, Key Words, and Subtopic Name.**
  - 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 to be invoked in reviewing the proposal; and the areas of application that are the initial target of the technology.
  - State the topic name and subtopic letter(s) to which the Phase I proposal was submitted.
- **Box 2: Intellectual Merit.** A summary paragraph addressing the intellectual merits of the proposed activity. The first paragraph of the Intellectual Merit MUST begin with the name of the Program (i.e. "This Small Business Innovation Research Phase II project" or "This Small Business Technology Transfer Phase II project"), as appropriate. 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 Impacts/Commercial Potential.** Discuss the expected outcomes in terms of how the proposed project will bring the innovation closer to commercialization under a sustainable business model. In this box, also describe the potential commercial and market impacts that such a commercialization effort would have, if successful. Please also discuss potential broader societal impacts of the innovation (e.g. educational, environmental, scientific, societal, or other impacts on the nation and the world).

2. Project Description

The Project Description cannot exceed 15 pages, and all parts must be labeled as presented below. Upload this section (Parts 1-4) as one file. Proposers must first create this file with an editor that generates Adobe-compatible PDF files. The Project Description should contain subsections labeled in the following manner:

Part 1. Results of the Phase I Project.

Briefly describe how Phase I has established the feasibility of the innovation, provided justification for NSF support and intended commercial applications, and demonstrated the ability of the proposer to conduct R/R&D. Recommended length for this section is 1-4 pages.

Part 2. Phase II Technical Objectives, Approach and Work Plan.

Define the specific technical objectives of the Phase II research and technical approach to meet these objectives; and provide a work plan defining specific tasks, performance schedules, milestones, and deliverables. STTR proposals need to specifically address the amount and type of work to be performed both by the small business concern and by the research institution and describe the necessary cooperation, coordination, and complementarity. Recommended length for this section is 5-10 pages.

Part 3. Broader Impacts: Societal, educational or scientific benefits beyond commercial considerations.

- Describe how the proposed product or service offers the potential for broader societal and economic benefit (through commercialization under a sustainable business model) as outlined in the NSF Merit Review Broader Impacts Criteria.
- The NSF SBIR/STTR program funds the development of new, high-risk technology innovations intended to generate positive societal outcomes. Examples of such outcomes include (but are not limited to) those found in the American Innovation and Competitiveness Act (P.L. 114-329, Section 102) Broader Impacts Review Criterion update:
  - *Increasing the economic competitiveness of the United States.*
  - *Advancing of the health and welfare of the American public.*
  - *Supporting the national defense of the United States.*
  - *Enhancing partnerships between academia and industry in the United States.*
  - *Developing an American STEM workforce that is globally competitive through improved pre-kindergarten through grade 12 STEM education and teacher development, and improved undergraduate STEM education and instruction.*
  - *Improving public scientific literacy and engagement with science and technology in the United States.*
  - *Expanding participation of women and individuals from underrepresented groups in STEM.*
- As you consider this section of the proposal, please keep in mind that enabling commercialization of a deep technology addresses the first bullet above. You are encouraged to discuss this and other elements of the broader impacts that might motivate the company and be relevant to the project.
- The NSF SBIR/STTR programs seek plans to generate these outcomes as well as related societal benefits. Discuss the envisioned broader impacts and the specific implementation plan, including: the relevant metrics and measurement plan; potential partners to enhance the likelihood of success (including an assessment of the value proposition to the partner, their reasons for engaging in this project, and a summary of the engagement to date); potential risks and associated mitigation strategies; and additional anticipated needs for resources and the plan to secure them.

Part 4. Consultants and Subawards.

Consultants. Discuss how the requested consultant effort will contribute to the project. Signed consultant agreements (letters of commitment) must be provided as part of the proposal's Supplementary Documents and should be scanned as a single PDF. (See budget guidance for Consultants.) The consultant agreement should identify the number of days and its associated daily rate.

Subawards (a.k.a. Subcontracts). If subawards or consultants (including contracts, subcontracts and other arrangements) are budgeted for the proposed project, 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 award may be contracted or otherwise transferred to another organization without prior NSF authorization. The intent to enter into such arrangements should be disclosed in the proposal. (See budget guidance for Subawards.) 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 (Item G.6). All research, including subaward and consultant activities, must be conducted in the U.S.

Part 5. Equivalent or Overlapping Proposals to Other Organizations.

A firm may elect to submit proposals for essentially equivalent or overlapping work to other Federal agencies, state or local governments, or non-governmental entities, or may have received or expect to receive other 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 Sheet whether the proposer (a) has received awards for related work, or (b) has submitted currently active proposals for related work under other programs or intends to submit proposals for such work to other entities. 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
- Name and Title of the Principal Investigator
- Level of effort (person-months (per year) devoted to the equivalent or overlapping project, by any personnel who are expected to work on this Phase II project.

If no equivalent or overlapping proposals are under consideration, 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 allocate costs among the various sponsors.

IT IS ILLEGAL TO ACCEPT DUPLICATE FUNDING FOR THE SAME WORK. IF A PROPOSER FAILS TO DISCLOSE EQUIVALENT OR OVERLAPPING PROPOSALS AS PROVIDED IN THIS SECTION, THE PROPOSER COULD BE LIABLE FOR ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL SANCTIONS.

3. References Cited

Provide a comprehensive listing of relevant reference sources, including patent citations. If proposers wish, they may also include citations for other sections of the proposal (such as the commercialization plan) in this section. If there are no references to cite, please include a statement to that effect. Proposers MUST include something in this required module.

4. Biographical Sketches

All SBIR/STTR proposals submitted to NSF are required to include Biographical Sketches for each PI, co-PI (if STTR), and Senior Personnel (individuals with critical expertise who will be working on the project and are employed at the proposing company or at a subaward organization) as well as consultants using the format provided here. Step-by-step guidance can also be found here. Biographical sketches are limited to three pages per person.

5. Budget and Budget Justification

The NSF Summary Proposal Budget is generated in FastLane. Enter budget figures for each project year into Fastlane. The system will automatically generate a cumulative budget for the entire project.

NSF SBIR/STTR Phase II awards are funded up to $1,000,000 for up to 24 months.

Budgets for small businesses will be reviewed against the cost principles of FAR Part 31, as amended by the budget preparation instructions outlined below.

- **NSF Phase II SBIR proposals require that at least 50% of the budget be allocated to the small business.**
- **NSF Phase II STTR proposals require that at least 40% of the budget be allocated to the small business.**

Funds committed to subawards and consultants are not considered funds allocated to the proposing small business.

The Budget Justification documents and justifies the amounts requested in each category of the Budget. The Budget Justification is uploaded in the Budget Module of FastLane as a single PDF file. Provide details for each non-zero line item of the budget, including a description and cost estimates. Identify each line item by its letter and number (e.g., G.5 - Subawards). Each non-zero line item should be described in the Budget Justification, but several sections also require more specific information as detailed below. There is a five-page limit each for the Budget and Subaward Budget Justification. Any letters of commitment from institutions proposed as subawardees in the effort, or individuals proposed as consultants in the effort, should be included in the "Supplementary Documents" section of the proposal, not in the Budget Justification. You can find a sample budget and subaward budget, with justifications, here: https://seedfund.nsf.gov/fastlane/. The following is budget preparation guidance:

Lines A & B: Salaries and Wages.

Only salaries and wages for employees of the proposing organization should be included on Lines A & B. Consultants and subawardee salaries and wages should be budgeted on Lines G.3 and G.5 of the proposal budget, respectively. Research effort is to be estimated in calendar person-months and entered into the column headed by "CAL" (1 CAL = 173 hours) on the Summary Proposal Budget. CAL effort does not include paid time off and represents actual effort that will be dedicated to the project. *The commitment of the Principal Investigator must be at least 2 months (2 CAL) per year.* Small businesses do not have students or postdoctoral scholars and should not list funds or effort on Lines B.1, B.3 and B.4 of the small business budget. (These classifications can be used in subaward budgets to institutions of higher education.) Secretarial/clerical effort (Line B.5) is generally included as part of indirect costs. Salaries for secretarial/clerical should be budgeted as a direct cost only if this type of cost is consistently treated as a direct cost in like circumstances for all other project and cost objectives. The budget justification should state individual employee names and titles (to the extent known), expected role in the project, effort in person-months, monthly or annual salary for each person, and extended amounts.

Line C: Fringe Benefits. See Instructions for "Line I" Below.

Line D: Equipment.

Equipment is defined as non-expendable, tangible personal property, having a useful life of more than one year and an acquisition cost of $5,000 or more per unit. However, organizations may elect to establish their capitalization threshold as less than $5,000. Equipment should be budgeted consistently with the proposing organization's capitalization policy. Requests should not be made for general purpose or routine equipment that a business conducting research in the field should be expected to have available. The budget justification must explain the need for any equipment and include the item identification/description, vendor identification, quantity, price, and extended amount. The budget justification should also include, as a separate document if needed, pricing documentation (e.g. quotes, invoices, links to online price lists, past purchase orders, etc.) for each budgeted piece of equipment.

Line E: Travel.

NSF requires that the PI budget travel (for the first year of the project) to attend the Phase II Awardee Workshop (pending COVID-19 related travel and social distancing considerations). A good estimate for the Awardee Workshop is $2,000 per person and is limited to $4,000 per year. Other than the Awardee Workshop and funds for technical and business assistance (see below), all budgeted travel must be directly related to the execution of the research effort. Only domestic travel will be considered. The budget justification must include, for each budgeted trip, the destination, purpose of travel, number of days, and the estimated costs for airfare, cab fare, car rental, per diem rates, hotel and other incidentals. No supporting detail is required for attendance at the Awardee Workshop at $2,000 (or less) per person. If the workshop is organized as virtual only, proposers can (if awarded) reallocate these funds towards other project

activities, pending the approval of the NSF SBIR/STTR Program Officer.

Line G.1: Materials and Supplies.

The budget justification must include an itemized listing of materials and supplies to include the item/description, vendor, quantity, price and extended amount. Any single materials or supplies item with a total cost of $5,000 must be further itemized into smaller cost items, or supported by pricing documentation (e.g. quote, link to online pricing list, past purchase order) in the budget justification.

Line G.2: Publication Costs/Documentation/Dissemination.

Proposers should discuss possible publication charges with their cognizant NSF SBIR/STTR Program Officer and should include funds on this line only if given permission by their Program Officer.

Line G.3: Consultants.

The proposal must include a signed agreement (letter of commitment) from each consultant confirming the services to be provided, primary organizational affiliation, number of days committed to the research effort, availability to provide services, and consulting daily rate. The agreement must clearly state the number of days on the project, the consulting daily rate (8 hours/day) and the total dollar amount of the consulting agreement. The consulting daily rate represents the total labor compensation for an 8-hour period and may not exceed $1,000 per day. Any miscellaneous costs, such as travel or supplies, that are not included as part of the daily rate must be identified and justified. Include a copy of the signed letter in the proposal's "Supplementary Documents" section.

Line G.4: Computer Services.

This line can include funds for fee-for-service computing activities or resources (such as supercomputer time, cloud services, etc.). Any extended line item should be accompanied with pricing documentation (e.g. quote, link to online price list, prior purchase order or invoice) in the budget justification.

Line G.5: Subawards (a.k.a. Subcontracts).

A separate Summary Proposal Budget with corresponding budget justification must be submitted by the proposing small business for each subaward proposed. Line G.5, Subawards, of the proposing organization's Summary Proposal Budget should indicate the combined total dollar amount of all proposed subawards for each year.

The proposing organization's budget justification must discuss any organizational relationships (e.g., common ownership or related parties) between the proposing organization and the subawardee, and the type of subaward contemplated (e.g., fixed price or cost reimbursement). *A subawardee research institution (RI) partner is mandatory for STTR proposals. Explicitly list who the research partner will be and provide a brief description of the work they will perform. 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 subawardee research institution. Subawardees are also not permitted to request profit (Line K) as part of their budgets.* It is the responsibility of the proposing organization to confirm that submitted subaward budgets have been approved by an Authorized Organizational Representative at the subawardee organization. Subaward funds do not count as funds spent by the small business and therefore must be allocated subject to the requirement that:

- For NSF SBIR Phase II Projects: 50% of the total budget must be spent by the small business. Therefore, the total amount requested for the aggregated subawards and consultant funds cannot exceed 50% of the total project budget.
- For NSF STTR Phase II Projects: A minimum of 40% of the total budget must be spent by the small business. Therefore, the total amount requested for the aggregated subawards and consultant funds cannot exceed 60% of the total project budget.

Line G.6: Other.

This budget line includes purchases from commercial sources for routine analytical or other services. The budget justification must explain the need for the services, provide a description of the services, and give a detailed cost itemization. Any single "other" item with a total cost of $5,000 must be further itemized into smaller costs or supported by pricing documentation (e.g. quote, link to online pricing list, past purchase order) in the budget justification.

SBIR/STTR Technical and Business Assistance (TABA): Proposers may include up to $50,000 to assist in technology commercialization efforts (as outlined in the current SBIR/STTR Policy Directive and the John S. McCain National Defense Authorization Act for Fiscal Year 2019). Specifically, this funding is for securing the services of one or more third-party service providers that will assist with one or more of the following commercialization activities:

A. the identification and development of customers for the NSF-funded technology;
B. providing advice on financing strategy and fundraising from the private sector;
C. establishing strategic partnerships with relevant stakeholders; and/or
D. the evaluation and protection of intellectual property.

If a proposer is not able to identify what commercial assistance may be required at the time of submission, the proposing small business may block up to $50,000 for TABA activities on Line G.6 ("Other") with the understanding that prior to expending funds for these purposes, the awardee will be required to submit the following documentation for approval from their cognizant NSF SBIR/STTR Program Officer:

- The proposed commercialization-related activities to be undertaken with support from the service provider. These activities should be consistent with the Phase II commercialization plan submitted in the Phase II proposal.
- The expected outcomes of the proposed activities.
- A brief profile of the service provider, including a discussion of the provider's qualifications and track record.
- Letter of commitment or statement of work from the service provider describing the services to be provided, cost for the services, and clearly defined, agreed-upon deliverables with measurable success metrics.

Lines I & C: Fringe and Indirect Costs.

Indirect costs are defined as costs that are necessary and appropriate for the operation of the business, but which are not specifically allocated to the NSF SBIR project. Common indirect cost expenses include legal and accounting expenses, employee health insurance, fringe benefits, rent, and utilities. If the proposing small business has a Federally-negotiated rate, please specify the base and rate and include a copy of the rate agreement. If the proposing business has a history of at least two years of stable operation that reflect the costs expected to occur during the execution of the SBIR/STTR award, please base the indirect rate estimate on this historical data (and provide an explanation if the rate is expected to deviate significantly from the rate used in recent years). Instructions in the submittal of an adequate and complete indirect cost rate (IDC) proposal can be found at: https://www.nsf.gov/bfa/dias/caar/docs/idcsubmissions.pdf.

Awardees without experience and knowledge of Federal indirect cost rate negotiation and Federal Acquisition Regulation (FAR) Part 31 Cost Principles may want to consider engaging professional services in preparing an IDC proposal.

If the proposing small business has no suitable history of financial data from which to extrapolate, it may claim (without requiring a justification) a total amount of indirect costs (inclusive of fringe benefits) equal to either 50% of total budgeted salary and wages on the project or 10% de minimis on MODIFIED total direct costs on the project. *Modified Total Direct Cost (MTDC): MTDC means all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel, and up to the first $25,000 of each subaward (regardless of the period of performance of the subawards under the award). MTDC excludes equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs and the portion of each subaward in excess of $25,000. Other items may only be excluded when necessary to avoid a serious inequity in the distribution of indirect costs, and with the approval of the cognizant agency for indirect costs.*

Note: NSF does not fund Independent Research and Development (IR&D) as part of an indirect cost rate under its awards. See the FAR 31.205-18(a) for more information.

Line K: Fee.

The fee, if requested, is limited to 10% of the total amount on line J. The fee is allowed only for the proposing small business (no fees are allowed in subaward budgets).

The total amount of the budget (including fee) cannot exceed $1,000,000.

Budget Revisions.

Budget revisions may be requested by the NSF SBIR/STTR Program Officer. Revised budgets must contain a revised and complete budget justification as described above. Revised budgets with budget impact statements that only address revisions are not acceptable for Phase II budget processing. (See Budget Revision Instructions).

Note: Should the proposing small business's proposal be considered for funding after it is competitively reviewed, the NSF SBIR/STTR Program Officer will refer them to the Cost Analysis and Pre-Award Review (CAP) Web Site for Phase II Reviews. Proposing small businesses in this category will be given 10 calendar days to provide the underlying supporting documentation for their budget. The proposing organization should review and understand the CAP documentation requirements as it prepares its budget. ***Once NSF requests the underlying supporting documentation for the CAP review, proposers will not be given an opportunity to re-budget unsupported costs.*** Funding will be provided for only the dollar amount that is reasonable and adequately supported. The awarded Phase II budget will reflect the supported dollar amount for the proposed effort. ***Organizations that accept awards at less than the proposed dollar amount may not reduce the effort to be provided; however, organizations may choose to decline award offers.***

6. Current and Pending Support

Information in this module is collected so that reviewers have visibility into the potential availability of company personnel during the period of performance if awarded. All SBIR/STTR proposals submitted to NSF are required to include Current and Pending Support for each PI, co-PI (if STTR), Senior Personnel, and budgeted consultants using the form found here. Step-by-step guidance can also be found here.

Current and Pending Support documentation should include the NSF SBIR/STTR Phase II proposal being submitted, which is pending at the time of submission. Each proposal must include a Current and Pending Support statement.

7. Facilities, Equipment and Other Resources

Discuss the availability of equipment, instrumentation, and facilities required for the Phase II project. This equipment can be located at the proposing small business, or at a partner organization (which should provide a letter in the budget justification indicating that the small business has access to said equipment). If a proposer wants to arrange the use of unique or one-of-a-kind Government facilities, a waiver must be obtained from the Small Business Administration to approve such use. If no equipment, facilities or other resources are required for this project, a statement to that effect should be uploaded here. Every proposal must address Facilities, Equipment and Other Resources.

8. Supplementary Documents

A. Project Schedule (required)

A project schedule is a required component for all NSF SBIR/STTR Phase II proposals and should be uploaded to FastLane. We recommend downloading the template here and uploading a completed version of this form into Fastlane.

The Project Schedule must show the estimated duration and timing of major project tasks that are required to implement the research plan. This document should estimate the initiation and completion of tasks should appear clearly in the 24-month timeline and in relation to other tasks.

This schedule should also provide projected levels of effort for each key person during each reporting period of the project. Key personnel to be listed generally include any senior personnel listed on line A of the main project budget, any persons listed on line A of any subaward budgets, or any budgeted consultants. The schedule should also include estimates of total level of effort (for all project personnel) and total expenditures for each six-month project period.

Payment Schedule: NSF generally makes the Phase II SBIR/STTR award funds available for draw-down in tranches, with the first tranche upon award and subsequent tranches at six-month intervals thereafter. The standard schedule is as follows:

- an initial payment of 25% of the total budget with award
- a 2nd payment of 25% of the total at the six-month mark and based on approval of the first interim report
- a 3rd payment of 25% of the total at the twelve-month mark and based on approval of the second interim report
- a 4th payment of 25% of the total (less $25,000) at the eighteen-month mark and based on approval of the third interim report
- a final payment of $25,000 based on approval of the final report and submission of the Project Outcomes Report

A deviation from the standard payment schedule can be requested if the standard schedule would pose significant difficulties for the awardee or would negatively affect the execution of the project. If the standard payment schedule as described above is not appropriate, please request alternative amounts for each payment, and provide a brief justification for the departure from the standard schedule.

B. Commercialization Plan (required)

The Commercialization Plan cannot exceed 15 pages, EXCLUDING letters of support.

The Commercialization Plan is a critical section of the proposal. It is the primary opportunity to describe the strategy that the proposing small business will employ to generate revenue from the proposed innovation research. The Commercialization Plan is the company's roadmap and should convey how the company will generate profits from its innovation. It should represent a compelling vision of a unique business opportunity that could be addressed with continued support from Phase II funding. The depth and quality of the analysis within the Commercialization Plan is a critical element of the NSF SBIR proposal review. Assumptions within the plan should be clearly stated, and evidence of validation should be provided.

The plan must concisely convey:

- The business opportunity enabled by the innovation
- The compelling value proposition(s) for the intended customer(s)
- The key points of a plan appropriate for the company's stage of development
- The status of the effort to date and map out a strategy for the enterprise moving forward
- The current as well as the anticipated commercial landscape and the resources required to address the opportunity enabled by the innovation
- The company's vision for the enterprise and how the proposed innovation fits into the future market.

The outline **below** describes the points that should be covered in a well-developed Commercialization Plan. There are four sections required for an NSF Commercialization Plan: Market Opportunity; Company/Team; Product/Technology and Competition; and Finance and Revenue Model. Each section should be developed with careful analysis of the company's position within the industry and the market opportunity that is enabled by the proposed innovation. The key points required for each section are also shown below.

This outline represents a standard NSF Commercialization Plan. The company's particular strategy may include additional components that are not represented below; please include other elements as appropriate.

The National Science Foundation recognizes that each innovation requires a specific strategy to generate strong outcomes and that no two businesses are exactly alike. Therefore, NSF supports a broad array of commercialization strategies. Each strategy requires a different emphasis on the plan's elements, depending on the specifics of the innovation and the market landscape. For instance, the strategy and mechanisms for leveraging and protecting intellectual property (IP) vary according to industry and innovation.

i. Market Opportunity

- Describe the target customer, with generally-known examples if possible.
- Describe which customer needs will be addressed with the product or service.
- How does the target customer currently meet the need; or does a significant unaddressed problem exist?
- Describe succinctly the product or service to be delivered based on the innovation.
- What is the business model the company envisions to generate revenue from the innovation?
- Is the target market domestic, international or both?
- Describe the communications and distribution channels the company will employ to reach the targeted customer.
- What is the current size of the broad market the company plans to enter and the "niche" market opportunity it is addressing in the short term?
- What are the growth trends for both the market and the industry that the company is targeting?
- What are the barriers to enter this market?
- Describe the technology/development objectives and critical milestones that must be met to address the market opportunity.

ii. Company/Team

- Provide a short description of the origins of the company.
- What type of corporate structure is in place?
- What is the current capitalization?
- What is the current employee count?
- What is the company's financing and revenue history for the past three years?
- What are the sources of operating capital or revenue: product sales, consulting/services, license revenues, R&D grants/contracts and others?
- Give a brief description of the experience and credentials of the personnel responsible for taking the innovation to market.
- What specific experience does the team lack and how will this be addressed during the Phase II effort and beyond?
- How does the background and experience of the team enhance the credibility of the Commercialization Plan; have they previously taken similar products/services to market?
- From which additional resources will the company draw support or guidance (e.g., Board of Directors, Board of Advisors, technical advisors, legal counsel)? Provide details on the names, affiliations and expertise of these resources.

iii. Product/Technology and Competition

- Which features of the technology enable a compelling value proposition? How has the company validated the significance of these features?
- What is the customer willing to pay for the product or service? How has the company validated this assumption?
- What are the costs to produce the product or service? What are the assumptions that underlie the cost model(s)?
- How does the technology/innovation allow the team to compete and win in the marketplace?
- How does the product or service compare to that of the competition?
- Describe the anticipated competitive landscape when the company reaches product launch.
- Describe the intellectual property landscape.
- Do you have "freedom to operate?"
- How does the company plan to protect the intellectual property associated with the technology and/or company?
- Which other sources of intellectual property does the company need to address the market opportunity?

iv. Finance and Revenue Model

- Describe an appropriate staged finance plan given the market opportunity; enumerate the level of funding required for each stage along the path to commercialization.
- How will the company access the appropriate funds? Provide specific contacts, leads, previous relationships and agreements already in place.

Which commitments does the company have for follow-on funding?

- Describe the projected revenue streams (licensing, product sales or other) associated with the company's commercialization plan. What is the expected timeline for first revenues and revenue ramp?
- When does the company anticipate initial revenues from each projected stream?
- When does the company expect to reach break-even operations?
- Provide annual pro formas for the next five years (2 years of the Phase II effort + 3 years post Phase II). Income Statements are *required*. Cash Flow and Balance Sheets *may* be included if they are considered critical for your strategy. If not included, Cash Flow and Balance Sheets should be available upon request from NSF.
- What are the assumptions in the company's models? How has it validated these assumptions?

Phase II Supplemental Opportunities: Small businesses with NSF SBIR/STTR Phase II awards should actively pursue supplemental opportunities to support and enhance their Phase II activities. Please review the NSF SBIR/STTR website for more details.

C. Company Commercialization History (required if the proposer has received any prior Phase II awards)

This section is a requirement for any proposer who has ever received a Phase II SBIR or STTR award (from any Federal agency). Please follow the format of the NSF-specific Commercialization History form, linked below.

A commercialization history is required for all proposers certifying receipt of Phase II awards on the proposal Cover Sheet. All items must be addressed in the format outlined below. 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:

- Firm Name.
- Identify any name change the firm has executed within the past five years.
- List the parent company if the proposing small business a subsidiary or a spin-off. List subsidiaries and spin-offs if the proposing small business is a parent company.
- Amount of financing and associated % of total company financing for each of the past three (3) fiscal years from federal SBIR/STTR funding (includes Phase I and Phase II awards).

List each Phase II SBIR/STTR award and fill out the requested information on the NSF-specific Commercialization Form.

D. Phase I Technical Narrative (required)

Upload a complete copy of the most recent Phase I technical narrative. This is either the Final Report submitted to NSF via Research.gov at the conclusion of the Phase I effort, OR a technical narrative that covers all Phase I results and progress to date, in specific:

- A summary description of the research carried out, the results thus far and the activities to be carried out for the remainder of the Phase I project (if applicable).
- Problems encountered and methods of resolution used.
- Problems remaining or unfilled research objectives.
- Conclusion of the Phase I findings and how these conclusions support a Phase II proposal.

This report should not exceed 15 pages. It must be self-contained (i.e., not refer to other documents submitted to NSF in the original Phase I proposal nor to reports) because the Phase II reviewers do not have access to any documents submitted via Research.gov as part of the Phase I effort.

E. Postdoctoral Mentoring Plan (required if support for postdoctoral researchers is requested as part of a subaward)

If the proposal contains a subaward to an IHE or another institution requesting funding for postdoctoral researchers, a postdoctoral mentoring plan must be included as a supplementary document. *Note that employees of the small business or other for-profit companies DO NOT count as postdoctoral researchers for this requirement*. More information on this requirement can be found in the PAPPG Chapter II.C.2.j.

F. Data Management Plan (required)

Proposals must contain a supplementary document labeled "Data Management Plan" which should simply include the statement, "All data generated in this SBIR Phase II project is considered proprietary." FastLane will not permit submission of a proposal that is missing the Data Management Plan.

G. Letters of Commitment from Subawardees and Consultants. Please refer to Section V.A.5 "Budget and Budget Justification" for details.

H. Letter(s) of Support (strongly recommended; no more than 5 letters)

Letters of support indicate market validation for the proposed innovation, market opportunity, or small business/team, and add significant credibility to the proposed effort. Letters of support should ideally demonstrate that the company has developed partnerships and/or a meaningful dialog with relevant stakeholders (potential customers, strategic partners or investors) for the proposed innovation and that a real business opportunity may exist. The letter(s) must contain affiliation and contact information for the signatory stakeholder. Letters and supporting documents from consultants and subcontractors (or subawardees) are NOT considered letters of support.

I. Human Subjects Protection Documentation (required if the proposed R&D involves human subjects)

Projects involving research with human subjects must ensure that subjects are protected from research risks in conformance with the relevant Federal policy known as the Common Rule *(Federal Policy for the Protection of Human Subjects,*45 CFR 690). All projects involving human subjects must either (1) have approval from an Institutional Review Board (IRB) before issuance of an NSF award; or, (2) must obtain a statement from the IRB indicating research exemption from IRB review. This documentation must be completed before issuance of an NSF award, in accordance with the applicable subsection, as established in section 101(b) of the Common Rule. If certification of exemption is provided after submission of the proposal and before the award is issued, the exemption number corresponding to one or more of the exemption categories also must be included in the documentation provided to NSF. 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 the Department of Health and Human Services (HHS): http://www.hhs.gov/ohrp/assurances/index.html#registernew).
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;

3. Use a commercial provider.

For projects lacking definite plans for the use of human subjects, their data or their specimens, pursuant to 45 CFR § 690.118, NSF can accept a determination notice that establishes a limited time period under which the PI may conduct preliminary or conceptual work that does not involve human subjects. See more information and instructions regarding this documentation in the PAPPG here.

J. Vertebrate Animals Documentation (required if the proposed R&D involves vertebrate animals)

Any project proposing use of vertebrate animals for research or education shall comply with the Animal Welfare Act (7 USC 2131, et seq.) and the regulations promulgated thereunder by the Secretary of Agriculture (9 CFR 1 .1 -4.11) pertaining to the humane care, handling, and treatment of vertebrate animals held or used for research, teaching or other activities supported by Federal awards. In accordance with these requirements, proposed projects involving use of any vertebrate animal for research or education must be approved by the submitting organization's Institutional Animal Care and Use Committee (IACUC) before an award can be made. For this approval to be accepted by NSF, the organization must have a current Public Health Service (PHS) Approved Assurance. See also PAPPG Chapter XI.B.3 for additional information on the administration of awards that utilize vertebrate animals. This documentation must be completed before issuance of an NSF award.

K. Cooperative Research Agreement (required for STTR proposals)

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 prior to award. For proposal submission, place a draft of the CRA or a letter that includes the STTR partner stating that a CRA will be provided upon notification of award recommendation.

9. Single Copy Documents (including Collaborators and Other Affiliations)

At their option, proposers can include suggested reviewers for their proposal (or the identities of reviewers that they prefer NOT be used) in the "List of Suggested Reviewers" module.

Collaborators and Other Affiliations information must be separately provided for each individual identified as senior personnel on the project, as required in PAPPG Chapter II.C.1.e. Proposers may also include an optional list of collaborators or other affiliations of company owners and/or officers in the "Collaborators and Other Affiliations" module.

Proposers are reminded to identify the NSF publication number (located on the first page of this document) 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.

Proposers are reminded to identify the NSF publication number (located on the first page of this document) 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.

Other Budgetary Limitations:

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

Budget Preparation Instructions:

SBIR/STTR Phase II proposals may be submitted for funding up to $1,000,000. SBIR/STTR Phase II projects typically run for 24 months, though deviations are possible depending on the circumstances of the proposer and the research project (potential proposers are encouraged to contact their cognizant Phase I Program Officer to discuss).

C. Due Dates

- **Submission Window Date(s)** (due by 5 p.m. submitter's local time):

    January 11, 2022 - March 03, 2022

    March 04, 2022 - June 30, 2022

    July 01, 2022 - October 26, 2022

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: 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. 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 PAPPG Chapter II.C.1.d for a listing of the certifications). The AOR must provide the required electronic

certifications at the time of proposal submission. 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 PAPPG Exhibit III-1.

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. 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 strategic objectives 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 must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of 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. (PAPPG 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 PAPPG 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 other underrepresented groups 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

For all NSF SBIR/STTR Phase II proposals, the review process shall consider an additional criterion: commercial impact. The Commercial Impact criterion focuses on the potential of the activity to lead to significant outcomes in the commercial market.

The following criteria should be applied in the review of the Commercial Impact criterion:

1. Is there a significant market opportunity that could be addressed by the proposed product, process, or service?
2. Does the company possess a significant and durable competitive advantage, based on scientific or technical innovation, that would be difficult for competitors to neutralize or replicate?
3. Is there a compelling potential business model?
4. Does the proposing company/team have the essential elements, including expertise, structure, and experience, that would suggest the potential for strong commercial outcomes?
5. Will NSF support serve as a catalyst to improve substantially the technical and commercial impact of the underlying commercial endeavor?
6. As a result of Phase I effort, did the firm succeed in providing a solid foundation for the proposed Phase II activity?

Should the proposing small business's proposal be considered for funding after it is competitively reviewed, the NSF SBIR/STTR Program Officer will refer them to the Cost Analysis and Pre-Award Review (CAP) Web Site for Phase II Reviews. These reviews are conducted to evaluate a prospective awardee's ability to effectively and efficiently manage a Federal award.

B. Review and Selection Process

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

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

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 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 *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Award Conditions:

NSF SBIR/STTR Phase II awards are subject to availability of funds. NSF has no obligation to make any specific number of Phase II awards based on a solicitation and may elect to make several or no awards under any specific technical topic or subtopic. The NSF SBIR/STTR Phase II fixed-priced cooperative agreements will not exceed $1,000,000 per award and normally will be made for a 24-month period of performance. New terms and conditions for awards made under this solicitation were posted in Summer 2020 and are available on the Award Conditions page, under SBIR/STTR Terms and Conditions.

The award notice specifies a pre-determined fixed amount of NSF support for the project described in the referenced proposal. This amount is based upon the budget approved by NSF for the referenced proposal, as amended.

Payment of the award amount is subject to compliance with the award terms and conditions and NSF's acceptance of the reports submitted by the awardee. On the basis of its review of these reports and/or other pertinent information, NSF reserves the right to modify the payment schedule or suspend or terminate the award, if NSF determines that such actions are appropriate. If estimated total expenditures are significantly less than the award amount, the awardee shall contact NSF to renegotiate the scope of this award. Similarly, if the awardee expects that the full scope of work will be completed at a total cost significantly lower than the award amount, it is the obligation of the awardee to promptly notify NSF.

SBIR/STTR Funding Agreement Certification:

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

NSF SBIR/STTR Statement on Harassment:

The PI and any co-PI(s) identified on an NSF award are in a position of trust. These individuals must comport themselves in a responsible and accountable manner during the award period of performance, including but not limited to the following environments: the lab, online, or at locales such as field sites, facilities, customer discovery sites, or conferences/workshops. All personnel supported by an NSF award must remain in full compliance with grantee policies and/or codes of conduct, statutes, regulations, or executive orders relating to sexual harassment, other forms of harassment, or sexual assault.

Fraud, Waste, and Abuse (FWA) Notification:

The Office of Inspector General (OIG) maintains a Hotline to receive this information, which can be reached at https://oig.nsf.gov/contact/hotline. Disclosures can also be made via an anonymous phone line at (800) 428-2189. Upon request, OIG will take appropriate measures to protect the identity of any individual who reports misconduct, as authorized by the Inspector General Act of 1978, as amended. Reports to OIG may be made anonymously.

The mailing address of OIG is 2415 Eisenhower Ave, Alexandria, VA 22314 ATTN: OIG HOTLINE.

Ensuring Adequate COVID-19 Safety Protocols

a. This clause implements Section 3(b) of Executive Order 14042, Ensuring Adequate COVID Safety Protocols for Federal Contractors, dated September 9, 2021 (published in the Federal Register on September 14, 2021, 86 FR 50985). Note that the Department of Labor has included "cooperative agreements" within the definition of "contract-like instrument" in its rule referenced at Section 2(e) of this Executive Order, which provides:

   For purposes of this order, the term "contract or contract-like instrument" shall have the meaning set forth in the Department of Labor's proposed rule, "Increasing the Minimum Wage for Federal Contractors, " 86 Fed. Reg. 38816, 38887 (July 22, 2021). If the Department of Labor issues a final rule relating to that proposed rule, that term shall have the meaning set forth in that final rule.

b. The awardee must comply with all guidance, including guidance conveyed through Frequently Asked Questions, as amended during the performance of this award, for awardee workplace locations published by the Safer Federal Workforce Task Force (Task Force Guidance) at https://www.saferfederalworkforce.gov/contractors/

c. *Subawards*. The awardee must include the substance of this clause, including this paragraph (c), in subawards at any tier that exceed the simplified

acquisition threshold, as defined in Federal Acquisition Regulation 2.101 on the date of subaward, and are for services, including construction, performed in whole or in part within the United States or its outlying areas. That threshold is presently $250,000.

d. *Definition*. As used in this clause

United States or its outlying areas means—

1. The fifty States;
2. The District of Columbia;
3. The commonwealths of Puerto Rico and the Northern Mariana Islands;
4. The territories of American Samoa, Guam, and the United States Virgin Islands; and
5. The minor outlying islands of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Atoll.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

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

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

NSF SBIR/STTR Phase II awardees are required to complete an annual report found here.

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:

- Contact Your NSF Phase I Program Officer, telephone: (703) 292-8050, email: sbir@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188

- FastLane Help Desk e-mail: fastlane@nsf.gov.

- Research.gov Help Desk e-mail: rgov@nsf.gov

Since all NSF Phase II SBIR/STTR proposers are already associated with an NSF SBIR/STTR Phase I award, Phase II proposers are strongly encouraged to use their cognizant NSF SBIR/STTR Phase I Program Officer as the primary point of contact for any questions. *The contact above can be used for other inquiries, or when proposers are not sure who to contact. Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.*

IX. OTHER INFORMATION

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

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at https://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 (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 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 https://www.nsf.gov

- **Location:**   2415 Eisenhower Avenue, Alexandria, VA 22314

- **For General Information**   (703) 292-5111
  (NSF Information Center)**:**

- **TDD (for the hearing-impaired):**   (703) 292-5090

- **To Order Publications or Forms:**

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

    or telephone: (703) 292-8134

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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