

National Aeronautics and Space Administration (NASA)

Small Business Innovation Research (SBIR)

SBIR Ignite Solicitation

Fiscal Year 2022

Complete Proposal Package Due Date and Time:
Thursday, September 1, 2022 by 5:00 p.m. ET

Congressional authorization of the SBIR and STTR programs is set to expire on September 30, 2022. NASA intends to continue evaluating proposals and making selections for negotiation after September 30, 2022.

NASA anticipates sending notifications for projects selected for negotiation of a Phase I contract and making contract awards from this solicitation when the SBIR and STTR program authority is reauthorized or extended.

Contents

Welcome to the SBIR Ignite Solicitation	6
1. Program Description.....	7
1.1 Executive Summary	7
1.2 Legislative Authority and Background.....	7
1.3 Program Management & Administration.....	7
1.4 Availability of Funds	7
1.5 Three-Phase Program.....	8
1.6 Eligibility Requirements.....	8
1.6.1 Small Business Concern (SBC) Certification	9
1.6.2 Performance of Work Requirements.....	9
1.6.3 Employment of the Principal Investigator	9
1.6.4 Location of Work and American-made Products and Equipment	9
1.6.5 Novated/Successor in Interested/Revised Funding Agreements	9
1.6.6 Majority-Owned by Multiple VCOs, Hedge Funds or Private Equity Firms.....	10
1.6.7 Required Benchmark Transition Rate	10
1.7 NASA Technology Available (TAV) for SBIR Use	10
1.7.1 Use of NASA Software.....	10
1.7.2 Use of NASA Patent.....	10
1.8 I-Corps™	11
1.9 Technical and Business Assistance (TABAs)	11
1.10 Small Business Administration (SBA) Applicant Resources	12
1.11 NASA Mentor-Protégé Program (MPP)	12
1.12 Fraud, Waste and Abuse and False Statements.....	12
1.13 NASA Procurement Ombudsman Program	13
1.14 Questions About This Solicitation and Means of Contacting NASA SBIR Program	13
1.15 Definitions	14
2. Certifications and Other Proposal Requirements	15
2.1 Small Business Administration (SBA) Firm Registry.....	15
2.2 System for Award Management (SAM) Registration	15
2.3 Certifications	15
2.4 Federal Acquisition Regulation (FAR) and NASA Certifications and Clauses.....	16
2.5 Software Development Standards	16
2.6 Human and/or Animal Subject.....	16

2.7 HSPD-12.....16

3. Proposal Preparation Instructions and Requirements 18

3.1 Multiple Proposal Submissions18

3.2 Understanding the Patent Landscape18

3.3 Proprietary Information in the Proposal Submission18

3.4 Release of Certain Proposal Information18

3.5 Requirements to Submit a Complete Phase I Proposal Package.....19

 3.5.1 General Requirements19

 3.5.2 Format Requirements19

 3.5.3 Complete Proposal Package.....19

3.6 Requirements to Submit a Complete Phase II Proposal Package.....26

 3.6.1 General Requirements26

 3.6.2 Format Requirements27

 3.6.3 Complete Phase II Proposal Package27

4. Method of Selection and Evaluation Criteria..... 35

4.1 Phase I Evaluation Process and Evaluation Criteria NASA will conduct a multi-stage review process of all complete Phase I proposal packages:35

 4.1.1 Administrative Review35

 4.1.2 Proposal Responsiveness35

 4.1.3 Evaluation Criteria.....35

 4.1.4 Scoring of Factors and Weighting to Determine the Most Highly Rated Proposals36

 4.1.5 Price Evaluation37

 4.1.6 Panel Review37

 4.1.7 Selection.....37

4.2 Phase II Evaluation Process and Evaluation Criteria Only Offerors selected for Phase I awards will be eligible to submit Phase II proposals. Phase II proposals will be evaluated and selected in accordance with the evaluation and selection criteria identified in this Section 4.2.37

 4.2.1 Administrative Review38

 4.2.2 Evaluation Criteria.....38

 4.2.3 Scoring of Factors and Weighting to Determine the Most Highly Rated Proposals39

 4.2.4 Price Evaluation39

 4.2.5 Panel Review39

 4.2.6 Selection.....39

4.3 Technical and Business Assistance (TABAs)40

4.4. Access to Proprietary Data by Non-NASA Personnel40

 4.4.1 Non-NASA Reviewers40

4.4.2 Non-NASA Access to Confidential Business Information	40
4.5 Notification and Feedback to Offerors	41
4.5.1 Providing Feedback	41
5. Considerations	42
5.1 Requirement for Contracting	42
5.2 Awards	43
5.2.1 Anticipated number of Awards	43
5.2.2 Award Conditions	43
5.2.3 Type of Contract	43
5.2.4 Model Contracts	43
5.3 Reporting and Required Deliverables	44
5.4 Payment Schedule	44
5.5 Profit or Fee	45
5.6 Cost Sharing	45
5.7 Rights in Data Developed Under SBIR Funding Agreements	45
5.8 Copyrights	45
5.9 Invention Reporting, Election of Title, Patent Application Filing, and Patents	45
5.10 Government-Furnished and Contractor-Acquired Property	45
5.11 Essentially Equivalent Awards and Prior Work	45
5.12 Additional Information	46
5.12.1 Precedence of Contract Over this Solicitation	46
5.12.2 Evidence of Contractor Responsibility	46
5.13 Use of Government Resources	46
6. Submission of Proposals	48
6.1 How to Submit Your Proposal Package	48
6.1.1 Electronic Submission Requirements	48
6.1.2 Deadlines for Submitting a Complete Proposal Package	48
6.1.3 Complete Proposal Package Submission	49
6.1.4 Acknowledgment of Receipt of a Complete Proposal Package	50
6.1.5 Withdrawal of Complete Proposal Packages	50
6.1.6 Service of Protests	50
7. Scientific and Technical Information Sources	51
7.1 NASA Organizational and Programmatic Information	51
7.2 United States Small Business Administration (SBA)	51
7.3 National Technical Information Service	52

8. Submission Forms	53
8.1 SBIR Phase I Checklist.....	53
8.2 SBIR Phase II Checklist.....	54
9. Research Topics for the SBIR Ignite Solicitation	55
Appendices	59
Appendix A: Technology Readiness Level (TRL) Descriptions	59
Appendix B: SBIR and the Technology Taxonomy.....	62
Appendix C: List of NASA SBIR Phase I Clauses, Regulations and Certifications	63

Welcome to the SBIR Ignite Solicitation

The SBIR Ignite solicitation is a limited pilot program focused on technologies with a strong commercial pull. There are several differences from the traditional NASA annual SBIR and STTR solicitations.

The limited number of topic areas of interest for this solicitation have been specifically selected for their commercial relevance. Offerors must demonstrate their understanding of the market and provide a strong commercialization plan to be considered responsive.

Offerors familiar with the traditional NASA annual SBIR and STTR solicitations will notice significant differences in Section 3: Proposal Preparation Instructions and Requirements; Section 4: Method of Selection and Evaluation Criteria; Section 6: Submission of Proposals; and Section 8: Submission Forms. Be sure to read each of these sections carefully to ensure your proposal makes it through administrative screening to be considered.

Proposal submission will occur through Box rather than the standard Electronic Handbook (EHB) platform used for the traditional NASA SBIR Phase I or II solicitation.

The technical proposal will be separated into 2 distinct parts:

- A white paper
- A slide deck

Firms may be invited to present to a panel made up of NASA subject matter experts and/or 3rd party reviewers.

Phase II proposals will be due 120 days from the start of the Phase I period of performance. Firms will be notified of the exact date when they receive their Phase I award. The goal is to reduce the time between the end of the Phase I and the beginning of the Phase II periods of performance.

The SBIR Ignite program aims to accelerate the advancement of technology to market. Firms are encouraged to propose the shortest Phase II period of performance that is required to reach their proposed milestones and not to default to the maximum 24-month period of performance. *Note: The Phase I period of performance is expected to be the standard 6 months.*

1. Program Description

1.1 Executive Summary

The Small Business Innovation Research (SBIR) Ignite Solicitation is a limited pilot program focused on technologies with a strong commercial pull. The topic areas of interest for this solicitation have been specifically selected for their commercial relevance. Offerors must demonstrate their understanding of the market and provide a strong plan for commercialization of the technology to be competitive for award.

NASA requests Small Business Concerns (SBCs) to submit proposals for the SBIR Ignite solicitation during fiscal year (FY) 2022. This solicitation includes instructions for SBCs to submit complete proposal packages as well as background information, eligibility and certification requirements, evaluation criteria, and contracting considerations. Details on the research topic areas appear in section 9. Communication between NASA and the firm is through email during the solicitation period. The SBIR Ignite proposal submission period begins on Tuesday, July 12, 2022 and ends at 5 p.m. Eastern Time on Thursday, September 1, 2022.

The NASA SBIR program focuses on transforming scientific discovery into products and services through innovations that have potential for infusion into NASA programs and missions, potential for commercialization into commercial markets, and societal benefit. Unlike fundamental research, the NASA SBIR program supports small businesses in the creation of innovative, disruptive technologies and enables the application of research advancements from concept to market. Unlike most investors, the NASA SBIR program provides non-dilutive funding at the earliest stages of company and technology development.

1.2 Legislative Authority and Background

The SBIR program was established under the Small Business Innovation Development Act of 1982 (P.L. 97-219) with the purpose of strengthening the role of innovative small business concerns in federally funded research and development (R&D). The SBIR program has been reauthorized and extended multiple times since its creation, the most recent being the [National Defense Authorization Act for Fiscal Year 2017 \(Pub. L. 114-328, §1834\(a\)\)](#) which extended it through September 30, 2022. This authorization is codified in the Small Business Act ([15 U.S.C. 638](#)) and policy is provided by the Small Business Administration (SBA) through the [SBIR/STTR Policy Directive](#).

The SBIR program is intended to support scientific excellence and technological innovation through the investment of federal research funds to build a strong national economy by stimulating technological innovation in the private sector; strengthening the role of small business in meeting federal research and development needs; increasing the commercial application of federally supported research results; and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

1.3 Program Management & Administration

NASA's Space Technology Mission Directorate (STMD) provides overall policy direction for implementation of the NASA SBIR program. The NASA SBIR/STTR Program Management Office (PMO), hosted at the NASA Ames Research Center (ARC), operates the program in conjunction with NASA mission directorates and field centers. For additional information on the mission directorates, see section 7.1. Additionally, the NASA Shared Services Center (NSSC) provides the overall procurement management for the programs.

1.4 Availability of Funds

There is no commitment by NASA to fund any proposal or to make a specific number of awards and NASA may elect to make several or no awards in any specific research topic. Number of awards will be based on the level of

appropriated funding provided to the program. Currently, it is anticipated that the SBIR Ignite Phase I proposals will be selected in November 2022 for negotiation of firm-fixed-price contracts. Awarded contracts will have a period of performance not to exceed six (6) months.

Due to the limited pilot nature of this solicitation, NASA will not accept more than two (2) complete proposal packages from any one firm to ensure the broadest participation of the small business community. NASA does not plan to award more than one (1) SBIR contract to any offeror.

This solicitation will be released prior to the passage of an appropriations act for FY 2023. Enactment of continuing resolutions or an appropriations act may affect the availability or level of funding for this program and may delay the award and start dates of Phase I contracts or impact the number of awards or maximum contract value levels.

1.5 Three-Phase Program

The standard three phases of the NASA SBIR/STTR program are described in detail on the NASA SBIR/STTR website: <https://sbir.nasa.gov/content/nasa-sbirsttr-basics>.

Phase I

Phase I projects should demonstrate technical feasibility of the proposed innovation and the potential for infusion within a NASA program or mission and/or use in the commercial market. The maximum value of a Phase I award is \$150,000 and the period of performance is 6 months.

Phase II

Phase II proposals continue the R&D developed under Phase I to bring the innovation closer to infusion into a NASA program or mission and/or commercialization of the innovation. Only Phase I awardees are eligible to submit a Phase II proposal at the conclusion of the Phase I contract. The maximum value of a Phase II award is \$850,000 and the maximum period of performance is 24 months.

Phase III

Phase III is the commercialization of innovative technologies, products, and services resulting from either a Phase I or Phase II contract. This includes further development of technologies for transition into NASA programs, other Government agencies, or the private sector. Phase III contracts are funded from sources other than the SBIR and STTR programs and may be awarded without further competition. Please refer to <https://sbir.nasa.gov/content/post-phase-ii-initiatives#Phase-III> for Phase III information.

Post-Phase II Opportunities for Continued Technology Development and Transition

NASA recognizes that Phase I and II awards may not be sufficient in either dollars or time for the firm to complete the total R/R&D and commercialization activities required to make the project ready for infusion or commercialization. Therefore, NASA has several initiatives for supporting its SBCs beyond their Phase I and Phase II awards. Firms are encouraged to line up funding commitments from investors early in the process to position themselves for NASA SBIR's Phase II-E and CCRPP matched funding opportunities. Please refer to <https://sbir.nasa.gov/content/post-phase-ii-initiatives> for the most up-to-date information on eligibility, application deadlines, and matching requirements.

1.6 Eligibility Requirements

For additional information on eligibility requirements, please visit: <https://www.sbir.gov/about>.

1.6.1 Small Business Concern (SBC) Certification

Each Phase I and Phase II awardee must submit a certification stating that it meets the size, ownership and other requirements of the SBIR program at the time of award, and at any other time set forth in the regulations at [13 CFR §§ 121.701-121.705](#). Socially and economically disadvantaged, and women-owned SBCs are particularly encouraged to propose.

1.6.2 Performance of Work Requirements

For SBIR Phase I, a minimum of two-thirds of the research or analytical effort must be performed by the awardee. For SBIR Phase II, a minimum of one-half of the research or analytical effort must be performed by the awardee. *Occasionally, deviations from these SBIR requirements may occur. Any deviations must be approved in writing by the Contracting Officer after consultation with the agency SBIR Program Manager.*

1.6.3 Employment of the Principal Investigator

For both Phase I and Phase II, the primary employment of the Principal Investigator (PI) must be with the SBC at the time of award and during the conduct of the proposed project. Primary employment means that more than one-half of the PI's employment time is spent in the employ of the SBC and precludes full-time employment with another organization. An SBC may replace the PI on an SBIR/STTR Phase I or Phase II award, subject to approval in writing by the Contracting Officer. *Occasionally, deviations from these SBIR requirements may occur. Any deviations must be approved in writing by the Contracting Officer after consultation with the agency SBIR Program Manager.*

1.6.4 Location of Work and American-made Products and Equipment

For both Phase I and Phase II, the R/R&D work must be performed in the United States. In addition, when purchasing equipment or products under the SBIR funding agreement, purchase only American-made items whenever possible. *However, based on a rare and unique circumstance, agencies may approve a particular portion of the R/R&D work to be performed or obtained in a country outside of the United States, for example, if a supply or material or other item or project requirement is not available in the United States. The Contracting Officer must approve each such specific condition in writing.*

Proposal packages must clearly indicate if any work will be performed outside the United States, including subcontractor performance, and justification must be provided by completing the "Request to Use a Foreign Vendor/Purchase of Items from a Foreign Vendor" form found in Chapter 8 at <https://sbir.nasa.gov/solicit/80089/detail?data=ch8> and uploaded in the budget form. *Note: NASA will not approve purchases from or work with countries that appear on the list of Designated Countries. For reference, please see <https://www.nasa.gov/oiir/export-control>.*

1.6.5 Novated/Successor in Interested/Revised Funding Agreements

An SBIR awardee may include, and SBIR work may be performed by, those identified via a "novated" or "successor in interest" or similarly revised funding agreement. In addition, an SBIR awardee may include those that have merely reorganized with the same key staff, regardless of whether they have been assigned a different tax identification number. In cases where there is a novation or similarly revised funding agreement, agencies may require the original awardee to relinquish its rights and interests in an SBIR project in favor of another applicant as a condition for that applicant's eligibility to participate in the programs for that project.

1.6.6 Majority-Owned by Multiple VCOCs, Hedge Funds or Private Equity Firms

While agencies may choose to make a small percentage of its awards to small businesses owned in majority part by multiple venture capital operating companies, hedge funds, or private equity firms, NASA chooses not to utilize this funding option. Thus, these types of firms are not eligible to submit a proposal under this NASA SBIR Ignite solicitation. In addition, a firm owned in majority part by a single venture capital operating company, hedge fund, or private equity firm does not qualify as a small business.

1.6.7 Required Benchmark Transition Rate

The Phase I to Phase II transition rate requirement applies to SBIR Phase I offerors that have received more than 20 (21 or more) Phase I awards over the past 5 fiscal years, excluding the most recent year. These companies must meet the required benchmark rate of transition from Phase I to Phase II. The current transition rate requirement, agreed upon and established by all 11 agencies that have SBIR/STTR programs and published for public comment at [77 FR 63410](#) in October 2012 and amended at [78 FR 30951](#) in May 2013, is that an awardee must have received an average of one Phase II for every four Phase I awards received during the most recent 5-year time period (which excludes the most recently completed fiscal year) to be eligible to submit a proposal for a new Phase I (or Direct-to-Phase II) award. That is, the ratio of Phase II to Phase I awards must be at least 0.25.

On June 1 of each year, the SBA assesses SBIR awardees using SBIR award information across all Federal agencies reported on <https://www.sbir.gov/> to determine if they meet the benchmark requirements. Companies that failed to meet the transition rate benchmark on June 1, 2022, are not eligible to submit a Phase I proposal during the period June 1, 2022, through May 31, 2023. Companies were notified by the SBA if they failed to meet the benchmark and can find their status at any time on <https://www.sbir.gov/>. More information on the transition rate requirements is available at <https://www.sbir.gov/faqs/performance-benchmarks>.

1.7 NASA Technology Available (TAV) for SBIR Use

Offerors have the option of using technology developed by NASA (Technology Available (TAV)) in their proposal. *Whether or not a firm proposes the use of a NASA patent or computer software within its proposed effort will not in any way be a factor in the selection for award.*

While NASA scientists and engineers conduct breakthrough research that leads to innovations, the range of NASA's effort does not extend to commercial product development. Additional work is often necessary to exploit these NASA technologies for either infusion or commercial viability and likely requires innovation on behalf of the private sector. NASA provides these technologies "as is" and makes no representation or guarantee that additional effort will result in infusion or commercial viability.

1.7.1 Use of NASA Software

NASA has over 1,000 available software applications/tools listed in its Software Catalog (<https://software.nasa.gov>). If an offeror intends to use NASA software, a Software Usage Agreement (SUA), on a nonexclusive, royalty-free basis, is necessary, and the clause at 48 C.F.R. 1852.227-88, Government-Furnished Computer Software and Related Technical Data, will apply to the contract. The SUA shall be requested from the appropriate NASA Center Software Release Authority (SRA), after contract award. The SUA must be provided with the proposal package

1.7.2 Use of NASA Patent

NASA has over 1,400 patents available for licensing in its portfolio (<https://technology.nasa.gov/>). Offerors submitting a proposal that includes the use of a NASA patent must apply for a nonexclusive, royalty-free evaluation license through the link "Apply Now to License this Technology" on the technology portfolio page. The Automated

Licensing System (ATLAS) will direct them to finalize their license with the appropriate field center technology transfer office. The completed evaluation license application must be provided with the proposal package.

The grant of a nonexclusive evaluation license will be set forth in the successful offeror's SBIR contract and will automatically terminate at the end of the SBIR contract. License applications will be treated in accordance with Federal patent licensing regulations as provided in 37 CFR Part 404. In addition to an evaluation license, if the proposed work includes the making, using, or selling of products or services incorporating a NASA patent, successful awardees will be given the opportunity to negotiate a nonexclusive commercialization license or, if available, an exclusive commercialization license to the NASA patent. Commercialization licenses are also provided in accordance with 37 CFR Part 404.

An SBIR awardee that has been granted a nonexclusive, royalty-free evaluation license to use a NASA patent may, if available and on a noninterference basis, also have access to NASA personnel knowledgeable about the NASA patent. Licensing Executives at the appropriate NASA center can assist awardees requesting information about a patent and, if available and on a noninterference basis, provide access to the inventor or surrogate for the purpose of knowledge transfer. *Note: Access to the inventor for the purpose of knowledge transfer will require the requestor to enter an agreement and the awardee may be required to reimburse NASA. For Phase I proposals, this can be a time-consuming process and is not recommended.*

1.8 I-Corps™

NASA has partnered with the National Science Foundation (NSF) to allow Phase I awardees the opportunity to participate in the NSF Innovation Corps (I-Corps™) program. Phase I awardees are encouraged to participate in this training which is designed to lower the market risk inherent in bringing a product or innovation to market, thereby improving the chances for a viable business. The NASA I-Corps program enables small businesses, including startup firms, to increase the odds of accelerating the process of developing their SBIR technologies into a repeatable and scalable business model. The program accomplishes this by putting the firms through a version of the Lean Launchpad/I-Corps process, which includes:

- Developing their business model hypotheses using the Business Model Canvas.
- Testing those hypotheses through the Customer Development Interview process.

The intended results of I-Corps are to enable firms to conduct customer discovery to learn their customers' needs, to obtain a better understanding of their company's value proposition as it relates to those customer needs, and to develop an outline of a business plan for moving forward. For more information on the NASA I-Corps program, see <https://sbir.nasa.gov/content/I-Corps>.

Offerors who are selected for Phase I contract negotiations will be provided the opportunity to participate in the NASA SBIR/STTR I-Corps program as indicated in Section 3.5.3.10. I-Corps awards will be made separately from the Phase I contract as a training grant. NASA will conduct an abbreviated competition for I-Corps after Phase I Offerors are selected for Phase I SBIR contracts. The amount of funding is up to \$10,000 for the shortened I-Corps version for SBIR firms.

1.9 Technical and Business Assistance (TABAs)

The [Small Business Act 15 U.S.C. 631, Section 9 \(q\) Discretionary Technical and Business Assistance](#) permits SBIR Phase I and II awardees to enter into agreements with one or more vendors to provide Technical and Business Assistance (TABAs). TABAs allow an additional supplement to the award (\$6,500 for Phase I and \$50,000 for Phase II) and is aimed at improving the commercialization success of SBIR awardees. TABAs may be obtained from entities such as public or private organizations, including an entity established or funded by a U.S. state that facilitates or

accelerates the commercialization of technologies or assists in the creation and growth of private enterprises that are commercializing technology.

In accordance with the Small Business Act, NASA may authorize the recipient of an SBIR award to purchase technical and business assistance services through one or more outside vendors. These services may, as determined appropriate, include access to a network of non-NASA scientists and engineers engaged in a wide range of technologies, assistance with product sales, intellectual property protections, market research, market validation, and development of regulatory plans and manufacturing plans, or access to technical and business literature available through online databases, for the purpose of assisting such concerns in:

1. Making better technical decisions concerning such projects;
2. Solving technical problems that arise during the conduct of such projects;
3. Minimizing technical risks associated with such projects; or
4. Commercializing new commercial products and processes resulting from such projects, including intellectual property protections.

For information on how to request TABA, please see sections 3.5.3.8 or 3.6.3.7, Request for Use of Technical and Business Assistance Funds. Technical and business assistance does not count towards the maximum award amount of your contract. Approval of technical and business assistance is not guaranteed and is subject to review by the Contracting Officer and the SBIR/STTR Program Management Office. A description of any technical and business assistance obtained under this section and the benefits and results of the technical or business assistance provided will be a required deliverable of your contract.

1.10 Small Business Administration (SBA) Applicant Resources

The SBA oversees the Federal SBIR and STTR programs. The SBA has resources that small businesses can take advantage of in learning about each of the programs and obtaining help in developing a complete proposal package to submit to a Federal SBIR/STTR program. Offerors are encouraged to review the information that is provided at the following links: <https://www.sbir.gov/>, <https://www.sba.gov/local-assistance>, and at <https://www.sbir.gov/resources>.

1.11 NASA Mentor-Protégé Program (MPP)

The purpose of the NASA Mentor-Protégé Program (MPP) is to provide incentives to NASA contractors, performing under at least one active approved subcontracting plan negotiated with NASA, to assist protégés in enhancing their capabilities to satisfy NASA and other contract and subcontract requirements. The NASA MPP established under the authority of Title 42, United States Code (U.S.C.) 2473(c)(1) and managed by the Office of Small Business Programs (OSBP), includes an Award Fee Pilot Program. Under the Award Fee Pilot Program, a mentor is eligible to receive an award fee at the end of the agreement period based upon the mentor's performance of providing developmental assistance to an active SBIR/STTR Phase II contractor in a NASA Mentor-Protégé agreement (MPA). For more information on the Mentor-Protégé Program, please visit <https://www.osbp.nasa.gov/mpp/index.html>.

1.12 Fraud, Waste and Abuse and False Statements

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

Knowingly and willfully making any false, fictitious, or fraudulent statements or representations may be a felony under the Federal Criminal False Statement Act (18 U.S.C., section 1001), punishable by a fine and imprisonment

of up to 5 years in prison. The Office of the Inspector General (OIG) has full access to all proposal packages submitted to NASA.

The Federal Government reserves the right to decline any proposal packages that include plagiarism and false claims.

Pursuant to NASA policy, any company representative who observes crime, fraud, waste, abuse, or mismanagement or receives an allegation of crime, fraud, waste, abuse, or mismanagement from a Federal employee, contractor, grantee, grantee employee, or any other source will report such observation or allegation to the OIG. NASA contractor employees and other individuals are also encouraged to report crime, fraud, waste, and mismanagement in NASA's programs to the OIG. The OIG offers several ways to report a complaint:

NASA OIG Hotline: 1-800-424-9183 (TDD: 1-800-535-8134)

NASA OIG Cyber Hotline: <https://oig.nasa.gov/cyberhotline.html>

Or by mail:

NASA Office of Inspector General
P.O. Box 23089
L'Enfant Plaza Station
Washington, DC 20026

1.13 NASA Procurement Ombudsman Program

The NASA Procurement Ombudsman Program is available under this solicitation as a procedure for addressing concerns and disagreements concerning the terms of the solicitation, the processes used for evaluation of complete proposal packages, or any other aspect of the SBIR procurement. The clause at NASA Federal Acquisition Regulation (FAR) Supplement (NFS) 1852.215-84 ("Ombudsman") is incorporated into this solicitation.

The cognizant ombudsman is:

Jason Detko, Deputy Assistant Administrator for Procurement
Office of Procurement
NASA Headquarters
Washington, DC 20546-0001
Telephone: 202-358-4483, Fax: 202-358-3082
Email: agency-procurementombudsman@nasa.gov

Offerors are advised that, in accordance with NFS 1852.215-84, the ombudsman does not participate in any way with the evaluation of complete proposal packages, the source selection process, or the adjudication of formal contract disputes. Therefore, before consulting with the ombudsman, Offerors must first address their concerns, issues, disagreements, and/or recommendations to the Contracting Officer for resolution. Offerors are further advised that the process set forth in this solicitation provision (and described at NFS 1852.215-84) does not augment their right to file a bid protest or otherwise toll or elongate the period in which to timely file such a protest.

1.14 Questions About This Solicitation and Means of Contacting NASA SBIR Program

To ensure fairness, questions relating to the intent and/or content of research topics in this solicitation cannot be addressed during the open solicitation period. Only questions requesting clarification of proposal package

instructions and administrative matters will be addressed. **The cutoff date and time for receipt of procurement-related questions for this SBIR Ignite solicitation is Thursday, August 25, 2022, at 5:00 p.m. ET.**

Offerors that have questions requesting clarification of proposal package instructions and administrative matters should refer to the NASA SBIR/STTR website or contact the NASA SBIR/STTR helpdesk.

1. NASA SBIR/STTR website: <https://sbir.nasa.gov/>
2. Help Desk: The NASA SBIR/STTR Help Desk can answer any questions regarding clarification of proposal package instructions and any administrative matters. The Help Desk may be contacted by:
 - a. Email: sbir@reisystems.com
 - b. The requestor must provide the name and telephone number of the person to contact, the organization name and address, and the specific questions or requests.

1.15 Definitions

A comprehensive list of definitions related to the programs is available at <https://sbir.nasa.gov/content/nasa-sbirsttr-program-definitions>. These definitions include those from the combined SBIR/STTR policy directives as well as terms specific to NASA. Offerors are strongly encouraged to review these prior to submitting a complete proposal package.

2. Certifications and Other Proposal Requirements

2.1 Small Business Administration (SBA) Firm Registry

All SBCs that are applying to any SBIR solicitation are required to register with the SBIR Firm Registry that is managed by the SBA. In addition, all SBCs must update their commercialization status at least annually through the SBIR Firm Registry. Information related to the steps necessary to register with the SBIR Firm Registry can be found at <https://www.sbir.gov/registration>.

After an SBC registers with SBA and/or updates their commercialization information, the offeror needs to obtain a PDF copy of the registration. The SBC must provide their unique SBC Control ID (assigned by SBA upon completion of the Company Registry registration) and must upload the PDF copy of the SBC registration with the Firms Certification Form. Additional information in section 2.3 below.

2.2 System for Award Management (SAM) Registration

Offerors are encouraged to register with SAM prior to submitting a proposal. To be eligible for SBIR awards, firms must be registered under the applicable North American Industry Classification System (NAICS) codes. For SBIR Phase I and II awards these codes are 541713 or 541715. Offerors without an active SAM registration by the proposal due date will be ineligible for award. Offerors who started the registration process but did not complete the registration by the proposal due date will be ineligible for award.

Offerors who are not registered should consider applying for registration immediately upon receipt of this solicitation. Typically, SAM registration and updates to SAM registration have required a processing period of several weeks. Offerors and contractors may obtain information on SAM registration and annual confirmation requirements at <https://www.sam.gov/SAM/pages/public/index.jsf> or by calling 866-606-8220.

SAM, maintained by the Department of Defense, is the primary repository for contractor information required to conduct business with NASA. To be registered in SAM, all mandatory information, including the Unique Entity Identifier (UEI) and a Commercial and Government Entity (CAGE) code, must be validated in SAM. *Note: It is recommended to list Purpose of Registration as "All Awards" on your SAM Registration.*

2.3 Certifications

Offerors must complete the Firm and Proposal Certifications by answering "Yes" or "No" to certifications as applicable. Firms should carefully read each of the certification statements. The Federal Government relies on the information to determine whether the business is eligible for an award.

A similar certification will be used to ensure continued compliance with specific program requirements at time of award and during the life of the Funding Agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, SBA regulations (13 CFR Part 121), the SBIR/STTR Policy Directives, and any statutory and regulatory provisions referenced in those authorities.

For Phase I awards, in addition to the final invoice certification and as a condition for payment of the final invoice, a life cycle certification shall be completed in the Contracts Electronic Handbook (EHB). The life cycle certification is preset in the EHB, and it shall be completed along with the final invoice certification before uploading the final invoice in the Department of Treasury's Invoice Processing Platform (IPP).

For Phase II awards, two life cycle certifications shall be completed in the EHB. A life cycle certification shall be completed along with the second invoice certification as a condition of payment of the second invoice.

Another life cycle certification shall be completed along with the final invoice certification as a condition of payment of the final invoice. The life cycle certifications are preset in the EHB.

If the Contracting Officer believes that the business may not meet certain eligibility requirements at the time of award, the business is required to file a size protest with the SBA, who will determine eligibility. At that time, SBA will request further clarification and supporting documentation to assist in the eligibility determination. Additionally, the Contracting Officer may request further clarification and supporting documentation regarding eligibility to determine whether a referral to SBA is required.

2.4 Federal Acquisition Regulation (FAR) and NASA Certifications and Clauses

SAM contains required certifications offerors may access at <https://www.acquisition.gov/browsefar> as part of the required registration (see FAR 4.1102). Offerors must complete these certifications to be eligible for award.

Offerors should be aware that SAM requires all offerors to provide representations and certifications electronically via the website and to update the representations and certifications as necessary, but at least annually, to keep them current, accurate, and complete. NASA will not enter into any contract wherein the contractor is not compliant with the requirements stipulated herein.

In addition, there are clauses that offerors will need to be aware of if selected for a contract. For a complete list of FAR and NASA clauses see Appendix C.

2.5 Software Development Standards

Offerors proposing projects involving the development of software may be required to comply with the requirements of NASA Procedural Requirements (NPR) 7150.2A, NASA Software Engineering Requirements, available online at <https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=7150&s=2>.

2.6 Human and/or Animal Subject

Offerors should be aware of the requirement that an approved protocol by a NASA review board is required if the proposed work includes human or animal subject. An approved protocol shall be provided to the Contracting Officer prior to the initiation of any human and/or animal subject research. Offerors shall identify the use of human or animal subject in the Proposal Certifications form. For additional information, contact the NASA SBIR/STTR Program Support Office at sbir@reisystems.com. Reference 14 CFR 1230 and 1232.

Due to the complexity of the approval process, use of human and/or animal subjects is not allowed for Phase I contracts.

2.7 HSPD-12

Firms that require access to Federally controlled facilities or access to a Federal information system (Federally controlled facilities and Federal information system are defined in FAR 2.101(b)(2)) for 6 consecutive months or more must adhere to Homeland Security Presidential Directive 12 (HSPD-12), Policy for a Common Identification Standard for Federal Employees and Contractors, and Federal Information Processing Standards Publication (FIPS PUB) Number 201, Personal Identity Verification (PIV) of Federal Employees and Contractors, which require agencies to establish and implement procedures to create and use a Government-wide secure and reliable form of identification no later than October 27, 2005. See <https://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.201-2.pdf>.

This is in accordance with FAR clause 52.204-9, Personal Identity Verification of Contractor Personnel, which states in part that the contractor shall comply with the requirements of this clause and shall ensure that individuals needing such access shall provide the personal background and biographical information requested by NASA. *Note: Additional information regarding PIV credentials can be found at <https://csrc.nist.gov/Projects/PIV>.*

3. Proposal Preparation Instructions and Requirements

3.1 Multiple Proposal Submissions

Each proposal submitted must be based on a unique innovation, must be limited in scope to just one topic, and shall be submitted only under that one topic. An offeror shall not submit more than two (2) proposals to this solicitation. An offeror may submit more than one unique proposal to the same topic; however, an offeror shall not submit the same (or substantially equivalent) proposal to more than one topic. Submitting substantially equivalent proposals to several topics may result in the rejection of all such proposals. To enhance SBC participation, NASA does not plan to select more than one (1) proposal from any one offeror under this solicitation.

Note: Offerors are advised to be thoughtful in selecting a topic to ensure the proposal is responsive to the NASA need as defined by the topic. The NASA SBIR/STTR program will NOT move a proposal between topics.

3.2 Understanding the Patent Landscape

Offerors should indicate in the proposal that a comprehensive patent review has been completed to ensure that there is no existing patent or perceived patent infringement based on the innovation proposed. The U.S. Patent and Trade Office (USPTO) has an online patent search tool that can be found at <https://www.uspto.gov/patents-application-process/search-patents>.

3.3 Proprietary Information in the Proposal Submission

Information contained in unsuccessful proposals will remain the property of the applicant. The Federal Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements. If proprietary information is provided by an applicant in a proposal, which constitutes a trade secret, commercial or financial information, it will be treated in confidence, to the extent permitted by law, provided that the proposal is clearly marked by the applicant as follows:

(A) The following “italicized” legend must appear on the title page of the proposal:

This proposal contains information that shall not be disclosed outside the Federal Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than evaluation of this proposal, unless authorized by law. The Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract if award is made as a result of the submission of this proposal. The information subject to these restrictions is contained on all pages of the proposal except for pages [insert page numbers or other identification of pages that contain no restricted information]. (End of Legend); and

(B) The following legend must appear on each page of the proposal that contains information the applicant wishes to protect:

Use or disclosure of information contained on this sheet is subject to the restriction on the title page of this proposal.

Information contained in unsuccessful proposals will remain the property of the applicant. However, the Government will retain copies of all proposals in accordance with its records retention schedule.

3.4 Release of Certain Proposal Information

In submitting a proposal, the offeror agrees to permit the Government to disclose publicly the information contained in the Contact Information form, Proposal Abstract form which includes the Technical Abstract, and the

Briefing Chart. Other proposal data is considered the property of the offeror, and NASA will protect it from public disclosure to the extent permitted by law.

3.5 Requirements to Submit a Complete Phase I Proposal Package

3.5.1 General Requirements

NASA will be using Box for submission of these proposal packages. This solicitation guides firms through the steps for submitting a complete proposal package. All submissions are through a secure connection and most communication between NASA and the firm is through email. To access Box, go to <https://nasagov.app.box.com/f/32ef3edd858549c08756e3640c3f1fc2>. Additional details are available in section 6. The Complete Phase I proposal package contains a slide deck, white paper, and all required forms as described in section 3.5.3 below.

3.5.2 Format Requirements

Note: The Government administratively screens all elements of a proposal package and will reject any proposal that does not conform to the following formatting requirements:

Page Limitations and Margins

A Phase I technical proposal shall contain 2 elements:

- The Slide Deck:
 - Shall not exceed 15 slides.
- The White Paper:
 - Shall not exceed 7 standard 8.5- by 11-inch (21.6- by 27.9-cm) pages.
 - Margins must be 1.0 inch (2.5 cm). Offerors must ensure that the margins comply before uploading.

Technical proposal uploads with any page(s) going over the required page limits will not be accepted. The additional forms required in section 3.5.3 for a complete proposal package do not count against the page limits.

Type Size

No type size smaller than 10 point shall be used for text or tables, except for legends on reduced drawings in either the slide deck or white paper. Proposal packages prepared with smaller font sizes will be rejected during the administrative review and will not be considered.

Header/Footer Requirements

Slide deck title bars and white paper headers must include firm name and project title. Footers must include the page number and proprietary markings if applicable. Margins can be used for header/footer information.

Classified Information

NASA will reject any proposal package that contains classified information.

Project Title

The proposal project title shall be concise and descriptive of the proposed effort. The title should not use acronyms or words like "development of" or "study of". The NASA research topic title must not be used as the proposal title.

3.5.3 Complete Proposal Package

To be considered complete, each proposal package submitted shall contain the following items:

1. Proposal Cover Page to include Contact Information

2. Proposal Certifications
3. Proposal Abstract (must not contain proprietary data)
4. Proposal Budget (including letters of commitment for government resources and subcontractors/consultants, other direct costs, and the foreign vendor form, if applicable)
5. Slide Deck
6. White Paper
7. NASA Evaluation License Application, only if TAV is being proposed
8. Technical and Business Assistance (TABA) request (optional)
9. Letters indicating financial support/funding commitments
10. I-Corps Interest Form
11. Firm-Level Forms (completed once for all proposals submitted by a firm to a single solicitation)
 - a. Firm Information
 - b. Firm Certifications
 - c. Audit Information
 - d. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

Note: The program will not consider additional items such as relevant technical papers, product samples, videotapes, slides, or other ancillary item during the review process.

3.5.3.1 Proposal Cover Page

The Offeror shall provide complete information for each contact person and submit the form as required. *Note: Contact Information is public information and may be disclosed.*

3.5.3.2 Proposal Certifications Form

The Offeror shall provide complete information for each question in the form and certify as to its accuracy as required.

3.5.3.3 Proposal Abstract

The Offeror shall provide complete information for each section of the form as required. *Note: The Proposal Abstract is public information and may be disclosed. Do not include proprietary information in this form.*

3.5.3.4 Proposal Budget Form

Note: The Government is not responsible for any monies expended by the firm before award of any contract.

The offeror must complete the Proposal Budget form following the instructions provided. The total requested funding for the Phase I effort shall not exceed \$150,000 or \$156,500 (if requesting \$6,500 for TABA, see section 1.9 and 3.5.3.8). In addition, the following information must be submitted in the Proposal Budget form, as applicable:

Proposal Budget Requirements for Use of Government Resources

In cases where an offeror seeks to use Government resources as described in Part 3 of section 3.5.3.5 Slide Deck instructions, the offeror shall provide the following:

1. Statement, signed by the appropriate Government official at the affected Federal department or agency, verifying that the resources should be available during proposed period of performance.
2. Signed letter on company letterhead from the SBC's designated small business representative explaining why the SBIR research project requires the use of Government resources (such as, but not limited to, Federal services, equipment, or facilities, etc.) including data that verifies the absence of non-Federal facilities or personnel capable of supporting the research effort, a statement confirming that the facility proposed is not a Federal laboratory, if applicable, and the associated cost estimate.

Note: Use of Federal laboratories/facilities for Phase I contracts is highly discouraged as these arrangements will in most cases cause significant delays in making the final award. Approval for use of Federal facilities and laboratories for a Phase I technical proposal requires a strong justification at time of submission and will require approval by the Contracting Officer during negotiations if selected for award.

Use of Subcontractors and Consultants

Subject to the restrictions set forth in section 1.6 and below, the SBC may establish business arrangements with other entities or individuals to participate in performance of the proposed R/R&D effort. Subcontractors' and consultants' work have the same place-of-performance restrictions as stated in section 1.6.4. See Part 6 of section 3.5.3.6 White Paper for additional information on the use of subcontractors and consultants.

Offerors that propose using subcontractors or consultants must submit the following:

1. List of consultants by name with the number of hours and hourly costs identified for each consultant.
2. Breakdown of subcontractor budget should mirror the SBC's own breakdown in the Proposal Budget form and include breakdowns of direct labor, other direct costs, and profit, as well as indirect rate agreements.
3. A signed letter of commitment is required for each subcontractor and/or consultant. For educational institutions, the letter must be from the institution's Office of Sponsored Programs.

For Phase I contracts, the proposed subcontracted business arrangements, including consultants, must not exceed 33 percent of the research and/or analytical work [as determined by the total cost of the proposed subcontracting effort (to include the appropriate overhead (OH) and general and administrative expenses (G&A) in comparison to the total effort funded by the government (total contract price including cost sharing or less profit, if any)].

Occasionally, deviations from this SBIR requirement may occur, and must be approved in writing by the Contracting Officer after consultation with the NASA SBIR PMO.

Travel in Phase I

Due to the intent and short period of performance of the Phase I contracts, along with their limited budget, travel during the Phase I contract is discouraged unless it is required to successfully complete the proposed effort. If the purpose of the meeting cannot be accomplished via videoconference or teleconference, the offeror must provide a rationale for the trip in the proposal budget form. All travel must be approved by the Contracting Officer and concurred by the Technical Monitor.

3.5.3.5 Slide Deck

The slide deck must address the three parts below:

Part 1: The Market Opportunity:

Description of the market opportunity should address the following key elements:

Commercial Potential—Quantitative Market Analysis

1. Describe the market segment and potential commercial total addressable market (TAM) that is appropriate to the proposed innovation.
2. Describe the proposed innovation in terms of target customers (e.g., NASA, other Federal agency, or commercial enterprise).
3. Describe the competitive landscape by identifying potential competitors.

Commercial Intent—Value Proposition

1. Describe the commercial development.

2. Describe the risks to the commercial development plan and what mitigations, if any, can be taken over a reasonable period to lessen the risks.

Commercial Capability—How Will the Innovation Enter into a Market?

1. Describe the current and future company capitalization efforts.
2. As applicable, describe the approach, path to market, and revenues. (Companies with no SBIR/STTR awards or only fairly recent SBIR/STTR awards will not be penalized under past performance for the lack of past SBIR/STTR commercialization.)

Intellectual Property (IP)

1. Describe how you will protect the IP that results from your innovation.

Assistance and Mentoring

1. Describe the existing and future business relationships in terms of any formal partnerships, joint ventures, or licensing agreements with other companies/organizations.
2. Describe the plans for securing needed technical or business assistance through mentoring, partnering, or through arrangements with state assistance programs, Small Business Development Centers (SBDCs), Federally funded research laboratories, Manufacturing Extension Partnership centers, Federal programs, or other assistance providers.

Evidence of follow-on funding commitments:

1. A letter of commitment* for follow-on funding and/or product sales.
2. A letter of commitment* for matching funding to be provided for a future Phase II-E application.
3. A letter of capital commitment, signed by the proper authority (CEO, CFO, etc.), that indicates a commitment to provide funding and/or product sales, should the Phase II project be successful, and the market need still exists.
4. Letter of intent to provide funding should the Phase II project be successful, and the market need still exists.
5. A specific plan to secure Phase III funding.

Note: The slide deck should only include a list of these letters/commitments. The actual letters should be uploaded separately.

Part 2: Key Personnel/Team

Identify key individuals involved and their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries should focus on the most relevant experience/publications to meet proposal size limitation. *Note: The PI is considered key to the success of the effort and must make a substantial commitment to the project.*

Part 3: Facilities and Equipment

Provide a detailed description, availability and location of instrumentation and physical facilities proposed. Items of equipment to be purchased must be fully justified under this section. **When purchasing equipment or a product under the SBIR funding agreement, the small business should purchase only American-made items whenever possible.**

Government-furnished laboratory equipment, facilities, or services (collectively, “Government resources”) the offeror shall describe in this part why the use of such Government resources is necessary and not reasonably available from the private sector. See sections 3.5.3.4 and 5.13 for additional requirements when proposing use of

such Government resources. The narrative description of resources should support the proposed approach and documentation in the Proposal Budget form. *Note: Use of Federal laboratories/facilities for Phase I contracts is highly discouraged. Approval for use of Federal facilities and laboratories for a Phase I completed proposal package requires the Contracting Officer approval during negotiations if selected for award.*

3.5.3.6 White Paper

This part of the submission should not contain any budget data and **must consist of all 7 parts listed below in the given order. All 7 parts of the white paper must be numbered and titled. A proposal package omitting any part will be considered non-responsive to this solicitation and rejected without further consideration. Parts that are not applicable must be included and marked “Not applicable.”**

The white paper shall provide all information described in the seven parts below. Evaluators will not seek additional information. Any pertinent references or publications should be noted in part 5 or 6 of the white paper.

Part 1: Table of Contents

The white paper must begin with a brief table of contents indicating the page numbers of each of the parts.

Part Title	Page #
Part 1: Table of Contents	
Part 2: Identification and Significance of the Opportunity	
Part 3: Technical Objectives	
Part 4: Work Plan	
Part 5: Related R/R&D	
Part 6: Subcontractors/Consultants	
Part 7: Related, Essentially Equivalent, and Duplicate Proposals and Awards	

Part 2: Identification and Significance of the Opportunity

Succinctly describe:

- The proposed innovation.
- The relevance and significance of the proposed innovation to an interest, need, or needs, within a topic described in section 9.
- The proposed innovation relative to the current state of the art.

Part 3: Technical Objectives

State the specific objectives of the Phase I R/R&D effort as it relates to the problem statement(s) posed in the topic description and the types of innovations being requested. Indicate the proposed deliverables at the end of the Phase I effort and how these align with the proposed topic deliverables described within a topic found in section 9. *Note: All offerors submitting proposals who are planning to use NASA TAV including Intellectual Property (IP) must describe their planned developments with the IP. The NASA Evaluation License Application should be added as an attachment in the Proposal Certifications form (see section 1.7).*

Part 4: Work Plan

Include a detailed description of the Phase I R/R&D plan to meet the technical objectives. The plan shall indicate what will be done, where it will be done, and how the R/R&D will be carried out. Discuss in detail the methods planned to achieve each task or objective. The plan shall also include task descriptions, schedules, resource allocations, estimated task hours for each key personnel, and planned accomplishments (including project milestones). Offerors shall ensure that the estimated task hours provided in the work plan for key personnel are

consistent with the hours reported in the Proposal Budget form. If the offeror is a joint venture or limited partnership, a statement of how the workload will be distributed, managed, and charged must be included here.

Part 5: Related R/R&D

Describe significant current and/or previous R/R&D that is directly related to the technical proposal including any conducted by the PI or by the offeror. Describe how it relates to the proposed effort and any planned coordination with outside sources. The offeror must persuade reviewers of his or her awareness of key recent R/R&D conducted by others in the specific subject area.

Part 6: Subcontractors/Consultants

Provide a detailed description, availability, and work to be done by subcontractors/consultants. The offeror must describe all subcontracting or other business arrangements and identify the relevant organizations and/or individuals with whom arrangements are planned. The expertise to be provided by the entities must be described in detail, as well as the functions, services, and number of hours. Offerors are responsible for ensuring that all organizations and individuals proposed to be utilized are available for the time periods proposed. Subcontract costs shall be documented in the Subcontractors/Consultants section of the Proposal Budget form and supporting documentation should be uploaded for each (appropriate documentation is specified in the form). The narrative description of subcontractors and consultants in the technical proposal should support the proposed approach and documentation in the Proposal Budget form.

Part 7: Related, Essentially Equivalent, and Duplicate Proposals and Awards

NOTE: While it is permissible with proper notification to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into funding agreements requiring essentially equivalent work.

If an offeror elects to submit identical proposals or proposals containing a significant amount of essentially equivalent work under other Federal program solicitations, a statement must be included in each proposal indicating the following:

1. The name and address of the agencies to which proposals were submitted or from which awards were received.
2. Date of proposal submission or date of award.
3. Title, number, and date of solicitations under which proposals were submitted or awards received.
4. The specific applicable research topics for each proposal submitted or award received.
5. Titles of research projects.
6. Name and title of principal investigator or project manager for each proposal submitted or award received.

Offerors are at risk for submitting essentially equivalent proposals and therefore are strongly encouraged to disclose these issues to the soliciting agency to resolve the matter prior to award.

A summary of essentially equivalent work information, as well as related research and development on proposals and awards, is also required on the Proposal Certifications form (if applicable).

3.5.3.7 NASA Evaluation License Application, only if TAV is being proposed

If you have applied for TAV by following the instructions found at <https://technology.nasa.gov/>, upload the application of the TAV request with your complete proposal package. See section 1.7 for additional details.

3.5.3.8 Request for Use of Technical and Business Assistance (TABA) Funds at Phase I

Offerors may request TABA and can choose their own TABA vendor. NASA does not have a TABA preferred vendor. All requests for TABA must be submitted with the complete proposal package. However, offerors are not required to request TABA at Phase I, and there is no prerequisite that an offeror must use Phase I TABA funding to obtain a Phase II award or to request TABA funding at Phase II.

Requests for TABA funding are not reviewed during the commercial or technical evaluation of the proposal, and the request for TABA funds will not be part of the decision to make an award. All TABA requests will be reviewed after a proposal is selected for award and during the contract negotiation process. Offerors selected for Phase I contract negotiations can receive up to \$6,500 as a TABA supplement to the Phase I award.

If requesting Phase I TABA funding, offerors are required to provide the following TABA information by following the directions found in the Budget form. The following information must be provided for each TABA vendor:

- Name of vendor
- Contact information of the vendor
- Vendor DUNS number
- Vendor website address
- Description of vendor(s) expertise and knowledge of providing technical and business assistance services to develop and complete a TABA Needs Assessment for a future Phase II submission, to develop a commercialization plan for a future Phase II submission, or other TABA services. If requesting TABA for other services, the offeror must describe the vendor(s) expertise in providing the requested services
- Itemized list of services and costs the TABA vendor will provide. **This applies to all vendors.**
- Describe the deliverables the TABA vendor will provide and a plan to submit a deliverable summarizing the outcome of the TABA services with expected supporting information.
- TABA costs reflected in the budget forms.

Note: All TABA vendors must be a legal business in the United States and NASA will review the U.S. Government-wide System for Award Management (SAM) excluded parties list to ensure the proposed TABA vendor can receive Federal funds. NASA will consider TABA requests that are missing any requested TABA information (e.g., DUNS number, etc.) as incomplete and will not review the TABA request or provide TABA approval under the award.

NASA reserves the right to withhold funds requested for TABA until a formal review and approval of the requested vendor is completed. In addition, reviewing the TABA request in the proposal package, NASA may also consider additional information, such as a review of the vendor's website, Dun and Bradstreet reports, and SAM.gov, to verify the existence of the vendor(s) and to assess the capability of the vendor(s). NASA will only approve TABA funding if the proposal is selected for a Phase I award and the offeror adequately demonstrates the existence and capability of the selected vendor(s) as determined at the sole discretion of NASA. Notification of the approval or denial of TABA funding will be provided to the offeror prior to award.

Any TABA funding **will be in addition to the Phase I contract award value, is not subject to any profit or fee by the requesting firm and cannot be used in the calculation of indirect cost rates or general and administrative expenses (G&A).** The TABA cost(s) and service(s) to be provided by each vendor will be based on the original Phase I period of performance. Requests for TABA funding outside of the Phase I period of performance or after a complete proposal package has been submitted will not be considered.

Schedule of Deliverables and Payments for TABA—offerors that are approved to receive TABA under a Phase I award will be reimbursed for TABA expenses. Reimbursement for TABA will be based on the awardee providing a

TABA end-of-contract report at the end of the contract period of performance. Reimbursement will not be provided for any amounts incurred over the TABA funding amount approved by the Government prior to award.

3.5.3.9 Firm Level Forms

Form submissions shall be completed electronically and do not count toward the page limits for the slide deck or white paper. For many of these forms, offerors can view sample forms located in the NASA SBIR/STTR Resources section: https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html.

A. Firm Information

Firm information must be completed once for each firm and are applicable across all proposal package submissions by the firm to this solicitation. The offeror shall provide identifying information for the firm.

B. Firm Certifications

Firm certifications must be completed once for each firm and are applicable across all proposal package submissions by the firm to this solicitation. The offeror shall answer “Yes” or “No” as applicable. An example of the certifications can be found in the NASA SBIR/STTR Resources section: http://sbir.gsfc.nasa.gov/sbir/firm_library/index.html.

C. Audit Information

Although firms are not required to have an approved accounting system, knowledge that a firm has an approved accounting system facilitates NASA’s determination that rates are fair and reasonable. To assist NASA, the SBC shall complete the questions in the Audit Information form regarding the firm’s rates and upload the Federal agency audit report or related information that is available from the last audit, if applicable.

D. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

If the SBC has received more than 15 Phase II awards in the prior 5 fiscal years, submit the name of the awarding agency, solicitation year, phase, date of award, Funding Agreement/contract number, and subtopic title for each Phase II.

3.5.3.10 I-Corps Interest Form

A complete proposal package will require Offerors to complete a short I-Corps interest form (see section 1.8 for additional information on the I-Corps program) as part of their submission. NASA uses this form to determine the level of interest from Phase I Offerors to participate in the NASA I-Corps program.

Based on the initial level of interest in the I-Corps program, NASA plans to open the opportunity to all Phase I awardees to ensure a successful cohort of teams participate in the program. Phase I awardees will receive information from the SBIR/STTR PMO during contract negotiations describing the process to provide a 5-page proposal to participate in the I-Corps program. Directions for completing the proposal including due dates, training dates, and available grant funding will be provided via email.

Additional details on the program can be found at <https://sbir.nasa.gov/content/I-Corps>.

The Government reserves the right to limit the number of Offerors to participate in the I-Corps program based on the assessment of the I-Corps proposals and funding availability.

3.6 Requirements to Submit a Complete Phase II Proposal Package

3.6.1 General Requirements

NASA will be using Box for submission of these proposal packages. This solicitation guides firms through the steps for submitting a complete proposal package. All submissions are through a secure connection and most communication between NASA and the firm is through email. To access Box, go to <https://nasagov.app.box.com/f/32ef3edd858549c08756e3640c3f1fc2>. Additional details are available in section 6.

Complete Phase II proposal packages must contain all documents as described in sections 3.6.3 below.

3.6.2 Format Requirements

Note: The Government administratively screens all elements of a proposal package and will reject any proposal package that does not conform to the following formatting requirements.

Page Limitations and Margins

Technical Proposal:

- o Shall not exceed a total of 40 standard 8.5- by 11-inch (21.6- by 27.9-cm) pages.
- o Margins must be 1.0 inch (2.5 cm). Offerors must ensure that the margins comply before uploading.

Proposal uploads with any page(s) going over the required page limits will not be accepted. The additional forms required for a complete proposal package do not count against the page limits.

Type Size

In the proposal, no type size smaller than 10 point shall be used for text or tables, except for legends on reduced drawings. Proposal packages prepared with smaller font sizes will be rejected during the administrative review and will not be considered.

Header/Footer Requirements

Proposal headers must include firm name and project title. Footers must include the page number and proprietary markings if applicable. Margins can be used for header/footer information.

Classified Information

NASA will reject any Phase II proposal package that contains classified information.

Project Title

The proposal project title shall be concise and descriptive of the proposed effort. The title should not use acronyms or words like "development of" or "study of." The NASA research topic title must not be used as the proposal title.

3.6.3 Complete Phase II Proposal Package

To be considered complete, each Phase II proposal package submitted shall contain the following items:

1. Proposal Cover Page to include Contact Information
2. Proposal Certifications
3. Proposal Abstract (must not contain proprietary data)
4. Proposal Budget (including letters of commitment for government resources and subcontractors/consultants, other direct costs, and the foreign vendor form, if applicable)
5. Phase II Proposal Narrative
6. NASA Evaluation License Application, only if TAV is being proposed
7. Technical and Business Assistance (TABAs) request (optional)
8. Letters indicating financial support/funding commitments
9. Firm-Level Forms (completed once for all proposals submitted by a firm to a single solicitation)
 - a. Firm Information

- b. Firm Certifications
- c. Audit Information
- d. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

Note: The program will not consider additional items such as relevant technical papers, product samples, videotapes, slides, or other ancillary item during the review process.

3.6.3.1 Proposal Cover Page

The Offeror shall provide complete information for each contact person and submit the form as required. *Note: Contact Information is public information and may be disclosed.*

3.6.3.2 Proposal Certifications Form

The Offeror shall provide complete information for each item and certify as to its accuracy as required.

3.6.3.3 Proposal Abstract

The Offeror shall provide complete information for each item as required. *Note: The Proposal Abstract is public information and may be disclosed. Do not include proprietary information in this form.*

3.6.3.4 Proposal Budget Form

Note: The Government is not responsible for any monies expended by the firm before award of any contract.

The offeror must complete the Proposal Budget form following the instructions provided. The total requested funding for the Phase II effort shall not exceed \$850,000 or \$900,000 (if requesting up to \$50,000 for TABA, see section 1.9 and 3.6.3.7). In addition, the following information must be submitted in the Proposal Budget form, as applicable:

Proposal Budget Requirements for Use of Government Resources

In cases where an offeror seeks to use Government resources as described in Part 8 of section 3.6.3.5 Phase II proposal narrative instructions, the offeror shall provide the following:

1. Statement, signed by the appropriate Government official at the affected Federal department or agency, verifying that the resources should be available during proposed period of performance.
2. Signed letter on company letterhead from the SBC's designated small business representative explaining why the SBIR research project requires the use of Government resources (such as, but not limited to, Federal services, equipment, or facilities, etc.) including data that verifies the absence of non-Federal facilities or personnel capable of supporting the research effort, a statement confirming that the facility proposed is not a Federal laboratory, if applicable, and the associated cost estimate.

Use of Subcontractors and Consultants

Subject to the restrictions set forth in section 1.6 and below, the SBC may establish business arrangements with other entities or individuals to participate in performance of the proposed R/R&D effort. Subcontractors' and consultants' work have the same place-of-performance restrictions as stated in section 1.6.4. See Part 9 of section 3.6.3.5 Phase II proposal narrative instructions for additional information on the use of subcontractors and consultants.

Offerors that propose using subcontractors or consultants must submit the following:

1. List of consultants by name with the number of hours and hourly costs identified for each consultant.
2. Breakdown of subcontractor budget should mirror the SBC's own breakdown in the Proposal Budget form and include breakdowns of direct labor, other direct costs, and profit, as well as indirect rate agreements.

3. A signed letter of commitment is required for each subcontractor and/or consultant. For educational institutions, the letter must be from the institution’s Office of Sponsored Programs.

In Phase II, the proposed subcontracted business arrangements, including consultants, must not exceed 50 percent of the research and/or analytical work [as determined by the total cost of the proposed subcontracting effort (to include the appropriate overhead (OH) and general and administrative expenses (G&A) in comparison to the total effort funded by the government (total contract price including cost sharing or less profit, if any)]. Occasionally, deviations from this SBIR requirement may occur, and must be approved in writing by the Contracting Officer after consultation with the NASA SBIR PMO.

3.6.3.5 Phase II Proposal Narrative

The proposal **must consist of all 10 parts listed below in the given order. All 10 parts of the proposal document must be numbered and titled.** The proposal must not contain budget data. **A proposal which omits any part will be considered non-responsive to this solicitation and rejected without further consideration. Parts that are not applicable must be included and marked “Not applicable.”**

Part 1: Table of Contents

The proposal must begin with a brief table of contents indicating the page numbers of each of the parts.

Part Title	Page #
Part 1: Table of Contents	
Part 2: Identification and Significance of the Opportunity	
Part 3: Technical Objectives	
Part 4: Work Plan	
Part 5: Related R/R&D	
Part 6: Key Personnel	
Part 7: Commercialization and Business Plan	
Part 8: Facilities and Equipment	
Part 9: Subcontractors/Consultants	
Part 10: Related, Essentially Equivalent, and Duplicate Proposals and Awards	

Any pertinent references or publications should be noted in part 5 or 6 of the proposal.

Part 2: Identification and Significance of the Opportunity

Succinctly describe:

- The proposed innovation.
- The relevance and significance of the proposed innovation to an interest, need, or needs, within a topic described in section 9.
- The proposed innovation relative to the current state of the art.

Part 3: Technical Objectives

State the specific objectives of the Phase II R/R&D effort as it relates to the problem statement(s) posed in the topic description and the types of innovations being requested. Indicate the proposed deliverables at the end of the Phase II effort and how these align with the proposed topic deliverables described within a topic found in section 9.

Note: All offerors submitting proposals who are planning to use NASA TAV including Intellectual Property (IP) must describe their planned developments with the IP. The NASA Evaluation License Application should be added as an attachment in the Proposal Certifications form (see section 1.7).

Part 4: Work Plan

Include a detailed description of the Phase II R/R&D plan to meet the technical objectives. The plan shall indicate what will be done, where it will be done, and how the R/R&D will be carried out. Discuss in detail the methods planned to achieve each task or objective. The plan shall also include task descriptions, schedules, resource allocations, estimated task hours for each key personnel, and planned accomplishments (including project milestones). Offerors shall ensure that the estimated task hours provided in the work plan for key personnel are consistent with the hours reported in the Proposal Budget form. If the offeror is a joint venture or limited partnership, a statement of how the workload will be distributed, managed, and charged must be included here.

Note: The SBIR Ignite program aims to accelerate the advancement of technology to market. Because of this, the program encourages Phase II proposals with periods of performance less than the standard 24 months in a regular Phase II award.

Part 5: Related R/R&D

Describe significant current and/or previous R/R&D that is directly related to the technical proposal including any conducted by the PI or by the offeror. Describe how it relates to the proposed effort and any planned coordination with outside sources. The offeror must persuade reviewers of his or her awareness of key recent R/R&D conducted by others in the specific subject area.

Part 6: Key Personnel and Biographical Information of Directly Related Work

Identify all key personnel involved in Phase II activities whose expertise and functions are essential to the success of the project. Provide biographical information, including directly related education and experience. Where resume/vitae are extensive, summaries that focus on the most relevant experience or publications are desired and may be necessary to meet proposal size limitation. *Note: If the Phase II key personnel are different than the key personnel under Phase I, please provide rationale for the change.*

Part 7: Commercialization and Business Plan

This part should provide the following information to communicate and validate that the firm has the knowledge and ability to commercialize the innovation being proposed and to validate the company's future viability and financial viability.

Commercial Potential—Quantitative Market Analysis

1. Describe the market segment and potential commercial total addressable market (TAM) that is appropriate to the proposed innovation.
 - a. Indicate how the market was validated and what assumptions were used in the analysis.
 - b. Indicate the market size by providing the scope in dollars if possible.
 - c. Indicate market segmentation and/or TAM in dollars if possible.
 - d. Indicate the projected percentage of the offeror's market share in 2 to 3 years after entry into the identified market.
2. Describe the proposed innovation in terms of target customers (e.g., NASA, other Federal agency, or commercial enterprise).
3. Describe the competitive landscape by identifying potential competitors.
 - a. Indicate potential competitors by company name within the identified market.
 - b. Discuss the barriers to entry and how many years it would take a competitor to enter this segment in terms of capitalization, technology, and people.
 - c. Describe how the proposed innovation is different from current and future competitors.

Commercial Intent—Value Proposition

1. Describe the commercial development.
 - a. Include the development timeline to bring the innovation to market.
 - b. Describe the applicable business model (spin-out, license, original equipment manufacturer (OEM), etc.) the offeror would use to bring the innovation to market.
 - c. Indicate the channels of distribution (direct sales, distributors, etc.) that would be used in bringing the innovation into the identified market.
 - d. Indicate the pro forma 2- to 3-year revenue dollar projections based on the proposed innovation's penetration of the identified market.
 - e. Describe any follow-on development (long term > 5 years) plans to expand your proposed innovation's market presence.
2. Describe the risks to the commercial development plan and what mitigations, if any, can be taken over a reasonable period to lessen the risks.

Commercial Capability—How Will the Innovation Enter into a Market?

1. Describe the current and future company capitalization efforts.
 - a. Provide a pro forma forecast based on income statements, balance sheet(s), and statement of cash flows. These forecasts should indicate current and projected revenues, expenses, and other items that are calculated as a percentage of future sales.
 - b. Discuss the operations/manufacturing and business staff conducting the project and how they will be utilized to achieve commercialization.
 - c. Describe the physical plant, including facilities and the capital equipment, tooling, and test equipment used to conduct the investigation and how they will be utilized to achieve commercialization.
 - d. Discuss consultants, incubators, and research institutions that will be utilized to achieve commercialization.
 - e. Indicate how the innovation will enter production (i.e., in house or through a licensee or other means) and what changes (if any) will be made to company capitalization for commercialization.
2. As applicable, describe the approach, path to market, and revenues from past commercialization(s) resulting from SBIR/STTR awards disclosed in the Commercial Metrics Survey (CMS). (Companies with no SBIR/STTR awards or only recent SBIR/STTR awards will not be penalized under past performance for the lack of past SBIR/STTR commercialization.)

Intellectual Property (IP)

1. Describe how you will protect the IP that results from your innovation.
 - a. Note any actions you may consider for at least a temporary competitive advantage.
 - b. Describe your company's prior IP record.
 - c. Comment on the company's strategy to build a sustainable business through protection of IP.

Assistance and Mentoring

1. Describe the existing and future business relationships in terms of any formal partnerships, joint ventures, or licensing agreements with other companies/organizations.
2. Describe the plans for securing needed technical or business assistance through mentoring, partnering, or through arrangements with state assistance programs, Small Business Development Centers (SBDCs), Federally funded research laboratories, Manufacturing Extension Partnership centers, Federal programs, or other assistance providers.
 - a. Identify if any assistance and mentoring is being requested under your TABA needs assessment and provide details in this section. The TABA needs assessment is reviewed separately from the proposal.

Evidence of follow-on funding commitments:

1. A letter of commitment for follow-on funding and/or product sales.
2. A letter of commitment for matching funding to be provided for a future Phase II-E application.
3. A letter of capital commitment, signed by the proper authority (CEO, CFO, etc.), that indicates a commitment to provide funding and/or product sales, should the Phase II project be successful, and the market need still exists.
4. A specific plan to secure Phase III funding.

Note: The proposal should only include a list of these letters/commitments. The actual letters should be uploaded separately.

Part 8: Facilities and Equipment

If an offeror requests to use Government-furnished laboratory equipment, facilities, or services (collectively, "Government resources") the offeror shall describe in this part why the use of such Government resources is necessary and not reasonably available from the private sector. See sections 3.6.3.4 and 5.13 for additional requirements when proposing use of such Government resources. The narrative description of resources should support the proposed approach and documentation in the Proposal Budget form.

Part 9: Subcontractors/Consultants

The offeror must describe all subcontracting or other business arrangements and identify the relevant organizations and/or individuals with whom arrangements are planned. The expertise to be provided by the entities must be described in detail, as well as the functions, services, number of hours, and labor rates. Offerors are responsible for ensuring that all organizations and individuals proposed to be utilized are actually available for the time periods proposed. Subcontract costs shall be documented in the Subcontractors/Consultants section of the Proposal Budget form and supporting documentation should be uploaded for each (appropriate documentation is specified in the form). The narrative description of subcontractors and consultants in the technical proposal should support the proposed approach and documentation in the Proposal Budget form.

Part 10: Related, Essentially Equivalent, and Duplicate Proposals and Awards

NOTE: While it is permissible with proper notification to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into funding agreements requiring essentially equivalent work.

If an applicant elects to submit identical proposals or proposals containing a significant amount of essentially equivalent work under other Federal program solicitations, a statement must be included in each such proposal indicating the following:

1. The name and address of the agencies to which proposals were submitted or from which awards were received.
2. Date of proposal submission or date of award.
3. Title, number, and date of solicitations under which proposals were submitted or awards received.
4. The specific applicable research topics for each proposal submitted for award received.
5. Titles of research projects.
6. Name and title of principal investigator or project manager for each proposal submitted or award received.

Offerors are at risk for submitting essentially equivalent proposals and therefore are strongly encouraged to disclose these issues to the soliciting agency to resolve the matter prior to award. A summary of essentially

equivalent work information, as well as related research and development on proposals and awards, is also required on the Proposal Certifications form (if applicable).

3.6.3.6 NASA Evaluation License Application, only if TAV is being proposed

If you have applied for TAV by following the instructions found at <https://technology.nasa.gov/>, upload the application of the TAV request with your complete proposal package. See section 1.6 for additional details.

3.6.3.7 Request for Use of Technical and Business Assistance (TABA) Funds at Phase II

Offerors may request TABA and can choose their own TABA vendor. NASA does not have a TABA preferred vendor. All requests for TABA must be submitted with the complete proposal package.

Requests for TABA funding are not reviewed during the evaluation of the proposal, and the request for TABA funds will not be part of the decision to make an award. All TABA requests will be reviewed after a proposal is selected for award and during the contract negotiation process. Offerors selected for Phase II contract negotiations can receive up to \$50,000 as a TABA supplement to the Phase II award.

If requesting Phase II TABA funding, offerors are required to provide the following TABA information by following the directions found in the Budget form. The following information must be provided for each TABA vendor:

- Name of vendor
- Contact information of the vendor
- Vendor DUNS number
- Vendor website address
- Description of vendor(s) expertise and knowledge of providing technical and business assistance services.
- Itemized list of services and costs the TABA vendor will provide. **This applies to all vendors.**
- Describe the deliverables the TABA vendor will provide and a plan to submit a deliverable summarizing the outcome of the TABA services with expected supporting information.
- TABA costs reflected in the budget forms.

Note: All TABA vendors must be a legal business in the United States and NASA will review the U.S. Government-wide System for Award Management (SAM) excluded parties list to ensure the proposed TABA vendor can receive Federal funds. NASA will consider TABA requests that are missing any requested TABA information (e.g., DUNS number, etc.) as incomplete and will not review the TABA request or provide TABA approval under the award.

NASA reserves the right to withhold funds requested for TABA until a formal review and approval of the requested vendor is completed. In addition, reviewing the TABA request in the proposal package, NASA may also consider additional information, such as a review of the vendor's website, Dun and Bradstreet reports, and SAM.gov, to verify the existence of the vendor(s) and to assess the capability of the vendor(s). NASA will only approve TABA funding if the proposal is selected for a Phase II award and the offeror adequately demonstrates the existence and capability of the selected vendor(s) as determined at the sole discretion of NASA. Notification of the approval or denial of TABA funding will be provided to the offeror prior to award.

Any TABA funding **will be in addition to the Phase II contract award value, is not subject to any profit or fee by the requesting firm and cannot be used in the calculation of indirect cost rates or general and administrative expenses (G&A).** The TABA cost(s) and service(s) to be provided by each vendor will be based on the original Phase I period of performance. Requests for TABA funding outside of the Phase II period of performance or after a complete proposal package has been submitted will not be considered.

Schedule of Deliverables and Payments for TABA—offerors that are approved to receive TABA under a Phase II award will be reimbursed for TABA expenses. Reimbursement for TABA will be based on the awardee providing a TABA end-of-contract report at the end of the contract period of performance. Reimbursement will not be provided for any amounts incurred over the TABA funding amount approved by the Government prior to award.

3.6.3.8 Firm Level Forms

Form submissions shall be completed electronically and do not count toward the page limits for the proposal. For many of these forms, offerors can view sample forms located in the NASA SBIR/STTR Resources section: https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html.

A. Firm Certifications

Firm certifications must be completed once for each firm and are applicable across all proposal package submissions by the firm to this solicitation. The offeror shall answer “Yes” or “No” as applicable. An example of the certifications can be found in the NASA SBIR/STTR Resources section: https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html.

B. Audit Information

Although firms are not required to have an approved accounting system, knowledge that a firm has an approved accounting system facilitates NASA’s determination that rates are fair and reasonable. To assist NASA, the SBC shall complete the questions in the Audit Information form regarding the firm’s rates and upload the Federal agency audit report or related information that is available from the last audit, if applicable.

C. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

If the SBC has received more than 15 Phase II awards in the prior 5 fiscal years, submit the name of the awarding agency, solicitation year, phase, date of award, Funding Agreement/contract number, and topic/subtopic title for each Phase II.

4. Method of Selection and Evaluation Criteria

The NASA SBIR Program does not make awards solely directed toward system studies, market research, routine engineering, development of existing product(s), proven concepts, or modifications of existing products without substantive innovation.

All Phase I and II proposals will be evaluated and judged on a competitive basis (as an “other competitive procedure” in accordance with FAR 6.102(d)(2) and FAR 35.016 (and the criteria and procedures set forth within this solicitation). Proposals will be initially screened to determine responsiveness. Proposals passing this initial screening will be evaluated by commercialization experts, engineers, or scientists to determine the most promising technologies. Offerors should not assume that evaluators are acquainted with the offeror, key individuals, or with any experiments or other information. Each proposal will be judged on its own merit in accordance with the criteria and procedures set forth within this solicitation and NASA will not conduct any tradeoff analyses between or among competed proposals. NASA is under no obligation to fund any proposal or any specific number of proposals in each topic. It also may elect to fund several or none of the proposed approaches to the same topic.

4.1 Phase I Evaluation Process and Evaluation Criteria

NASA will conduct a multi-stage review process of all complete Phase I proposal packages:

4.1.1 Administrative Review

All proposal packages received by the published deadline will undergo an administrative review to determine if the proposal package meets the requirements found in Section 3 (Proposal Preparation Instructions and Requirements), and Section 6 (Submission of Proposals). A proposal package that is found to be noncompliant with any requirements in Sections 3 and 6 may be rejected and no further evaluations will occur. The offeror will be notified of NASA’s decision to eliminate the proposal package from consideration and the reason(s) for the decision. Incomplete proposal packages will be automatically rejected, and no further evaluations will occur.

4.1.2 Proposal Responsiveness

Offerors are advised that this is a commercialization-focused solicitation. Offerors are also advised to be thoughtful in selecting a topic area to ensure the proposal is responsive to the need as defined by the topic. The NASA SBIR program will NOT evaluate a proposal under a topic that was not selected by the firm and will not switch a proposal package from one topic to another.

4.1.3 Evaluation Criteria

The following four evaluation factors will be used in the review of the proposal documents that have met the administrative and responsiveness requirements of this solicitation.

Factor 1: Commercial Potential

The assessment of the commercial potential of the Phase I proposal (as described in the slide deck and white paper) will be evaluated to determine its effectiveness in achieving the following:

- Description of the commercial potential through a quantitative market analysis to include the market segmentation and the commercial Total Addressable Market (TAM), the proposed innovation in terms of target customers, and the competitive landscape, by identifying potential competitors.
- Description of commercial intent to include the development timeline required to bring the innovation to market, the applicable business model (spin-out, license, OEM, etc.) the offeror would use, and the risks

to the commercial development plan and what mitigations, if any, can be taken over a reasonable period of time to lessen the risks.

- Description of commercial capability to include the current and future company capitalization efforts
- Description of the Offerors approach to protecting any Intellectual Property that results from the innovation.
- Description of any assistance or mentoring the company intends to pursue.
- Evidence of follow-on funding support.

Factor 2: Scientific/Technical Merit and Feasibility

The Phase I proposal (as described in the slide deck and white paper) will be evaluated to determine its effectiveness in achieving the following criteria:

- The technical approach and the anticipated agency and commercial benefits that may be derived from the research.
- The adequacy of the proposed effort, and its relationship to the fulfillment of requirements of the research topic.
- The soundness and technical merit of the proposed approach and its incremental progress toward topic solution.
- The proposal should describe an innovative and feasible technical approach to the identified NASA problem area/topic. Specific objectives, approaches, and plans for developing and verifying the innovation must demonstrate a clear understanding of the problem and the current state of the art. The degree of understanding and significance of the risks involved in the proposed innovation must be presented.

Factor 3: Experience, Qualifications, and Facilities

The qualifications of the proposed Principal Investigators/Project Managers, supporting staff and consultants and subcontractors, if any, will be evaluated for consistency with the research effort and their degree of commitment and availability. The proposed necessary instrumentation or facilities required to accomplish the proposed technical approach will be evaluated to determine if they are adequate. In addition, any proposed reliance on external sources, such as Government-furnished equipment or facilities (part 8 of section 3.5.3.5 Slide Deck), will be evaluated for reasonableness of the need.

Factor 4: Effectiveness of the Proposed Work Plan

The proposed work plan should describe the methods planned to achieve each objective or task in detail. The work plan will be evaluated for comprehensiveness, including its proposed effective use of available resources and approach to labor distribution. In addition, the work plan’s proposed schedule for meeting the Phase I objectives will be evaluated to make sure they are reasonable and consistent with the proposed technical approach.

4.1.4 Scoring of Factors and Weighting to Determine the Most Highly Rated Proposals

- Factor 1: Commercialization Potential is worth a potential 30 points.
- Factor 2: Scientific/Technical Merit and Feasibility is worth a potential 30 points.
- Factor 3: Experience, Qualifications, and Facilities is worth a potential 20 points.
- Factor 4: Effectiveness of the Proposed Work Plan is worth a potential 20 points.

The sum of the scores for Factors 1, 2, 3, and 4 will constitute the proposal’s total score. The most highly rated proposals will be presented to the Panel (4.1.6) for additional review and consideration.

4.1.5 Price Evaluation

Utilizing the procedures set forth in FAR 15.404-1, the offeror's budget proposal form will be evaluated to determine whether the offeror's proposed pricing is fair and reasonable. NASA will only make an award when the price is fair and reasonable and approved by the NASA Contracting Officer. If a proposal is selected for award, the Contracting Officer will review all the evaluations for the proposal and will address any pricing issues identified during negotiation of the final award.

4.1.6 Panel Review

A panel made up of NASA subject matter experts and/or 3rd party reviewers will review the most highly rated proposals. The panel will assign adjectival ratings and rank the proposals considering the results of 4.1.4 and programmatic investment considerations (e.g., first-time awardee, portfolio balance across technologies, other strategic considerations, etc.). The most highly ranked proposals will be invited to present a slide deck and participate in a Question & Answer session. Specific details regarding the Question & Answer session will be provided with the invitation. The questions will be tailored to the specifics of each Offeror's proposal. Following the completion of the Question & Answer sessions, the panel will assign a final adjectival rating considering the proposal, the Offeror's slide deck presentation, and responses during the Question & Answer session and establish final rankings of the proposals in each topic area.

The possible adjectival ratings for the Panel Review are:

- Excellent: A thorough and compelling proposal of exceptional merit that fully responds to the objectives of the solicitation.
- Good: A competent proposal of high merit that fully responds to the objectives of the solicitation.
- Fair: A competent proposal of moderate merit that represents a credible response to the solicitation.
- Poor: A proposal of low merit that does not represent a credible response to the solicitation.

The panel's final rankings and rationale for the rankings will be presented to the SSO.

4.1.7 Selection

The SSO has the final authority for choosing the specific proposals for contract negotiation. In making such a determination, the SSO, in their discretion, may consider additional programmatic balance factors such as portfolio balance across NASA Programs, Centers and Mission Directorates, available funding, first-time awardees/participants, historically underrepresented communities, and geographic distribution. Under this solicitation, NASA will not accept more than 2 complete proposal packages from any one firm to ensure the broadest participation of the small business community. NASA does not plan to make more than one Phase I award to any offeror. The list of proposals selected for negotiation will be posted on the NASA SBIR/STTR website (<https://sbir.nasa.gov/>). All firms will receive a formal notification letter.

Each proposal package selected for negotiation by the SSO will be evaluated by the Contracting Officer to determine eligibility for an award. The terms and conditions of the contract will be negotiated based on the SBIR Small Business Act (15 U.S.C. 638), FAR and NASA FAR requirements, and a responsibility determination will be made. The Contracting Officer will advise the SSO on matters pertaining to price analysis and responsibility determinations. A Contracting Officer will negotiate an appropriate contract to be signed by both parties before work begins.

4.2 Phase II Evaluation Process and Evaluation Criteria

Only Offerors selected for Phase I awards will be eligible to submit Phase II proposals. Phase II

proposals will be evaluated and selected in accordance with the evaluation and selection criteria identified in this Section 4.2.

NASA will conduct a multi-stage review process of all complete Phase II proposal packages.

4.2.1 Administrative Review

All proposal packages received by the published deadline will undergo an administrative review to determine if the proposal package meets the requirements found in Section 3 (Proposal Preparation Instructions and Requirements), and Section 6 (Submission of Proposals). A proposal package that is found to be noncompliant with any requirements in Sections 3 and 6 may be rejected and no further evaluations will occur. The offeror will be notified of NASA's decision to eliminate the proposal package from consideration and the reason(s) for the decision. Incomplete proposal packages will be automatically rejected, and no further evaluations will occur.

4.2.2 Evaluation Criteria

The following four evaluation factors will be used in the review of the proposals that have met the administrative and responsiveness requirements of this solicitation.

Factor 1: Commercial Potential

The assessment of the commercial potential of the Phase II proposal will be evaluated to determine its effectiveness in achieving the following:

- Description of the commercial potential through a quantitative market analysis to include the market segmentation and the commercial Total Addressable Market (TAM), the proposed innovation in terms of target customers, and the competitive landscape, by identifying potential competitors.
- Description of commercial intent to include the development timeline required to bring the innovation to market, the applicable business model (spin-out, license, OEM, etc.) the offeror would use, and the risks to the commercial development plan and what mitigations, if any, can be taken over a reasonable period of time to lessen the risks.
- Description of commercial capability to include the current and future company capitalization efforts
- Description of the Offerors approach to protecting any Intellectual Property that results from the innovation.
- Description of any assistance or mentoring the company intends to pursue.
- Evidence of follow-on funding support.

Factor 2: Scientific/Technical Merit and Feasibility

The Phase II proposal will be evaluated to determine its effectiveness in achieving the following criteria:

- The technical approach and the anticipated agency and commercial benefits that may be derived from the research.
- The adequacy of the proposed effort, and its relationship to the fulfillment of requirements of the research topic.
- The soundness and technical merit of the proposed approach and its incremental progress toward topic solution.
- The proposal should describe an innovative and feasible technical approach to the identified NASA problem area/topic. Specific objectives, approaches, and plans for developing and verifying the innovation must demonstrate a clear understanding of the problem and the current state of the art. The degree of understanding and significance of the risks involved in the proposed innovation must be presented.

Factor 3: Experience, Qualifications, and Facilities

The qualifications of the proposed Principal Investigators/Project Managers, supporting staff and consultants and subcontractors, if any, will be evaluated for consistency with the research effort and their degree of commitment and availability. The proposed necessary instrumentation or facilities required to accomplish the proposed technical approach will be evaluated to determine if they are adequate. In addition, any proposed reliance on external sources, such as Government-furnished equipment or facilities (section 3.6.3.4 and part 8 of the technical proposal), will be evaluated for reasonableness.

Factor 4: Effectiveness of the Proposed Work Plan

The proposed work plan should describe the methods planned to achieve each objective or task in detail. The work plan will be evaluated for comprehensiveness, including its proposed effective use of available resources and approach to labor distribution. In addition, the work plan's proposed schedule for meeting the Phase I objectives will be evaluated to make sure they are reasonable and consistent with the proposed technical approach.

4.2.3 Scoring of Factors and Weighting to Determine the Most Highly Rated Proposals

- Factor 1: Commercialization Potential is worth a potential 30 points.
- Factor 2: Scientific/Technical Merit and Feasibility is worth a potential 30 points.
- Factor 3: Experience, Qualifications, and Facilities is worth a potential 20 points.
- Factor 4: Effectiveness of the Proposed Work Plan is worth a potential 20 points.

The sum of the scores for Factors 1, 2, 3, and 4 will constitute the proposal's total score.

4.2.4 Price Evaluation

Utilizing the procedures set forth in FAR 15.404-1, the offeror's budget proposal form will be evaluated to determine whether the offeror's proposed pricing is fair and reasonable. NASA will only make an award when the price is fair and reasonable and approved by the NASA Contracting Officer. If a proposal is selected for award, the Contracting Officer will review all the evaluations for the proposal and will address any pricing issues identified during negotiation of the final award.

4.2.5 Panel Review

A panel made up of NASA subject matter experts and 3rd party reviewers will review the proposals in each topic area and assign adjectival ratings using the evaluation criteria outlined in 4.2.2 and programmatic investment considerations (e.g., first-time awardee, portfolio balance across technologies, other strategic considerations, etc.).

The possible adjectival ratings for the Panel Review are:

- Excellent: A thorough and compelling proposal of exceptional merit that fully responds to the objectives of the solicitation.
- Good: A competent proposal of high merit that fully responds to the objectives of the solicitation.
- Fair: A competent proposal of moderate merit that represents a credible response to the solicitation.
- Poor: A proposal of low merit that does not represent a credible response to the solicitation.

The panel's final rankings and rationale for the rankings will be presented to the SSO.

4.2.6 Selection

The SSO has the final authority for choosing the specific proposals for contract negotiation. In making such a determination, the SSO, in their discretion, may consider additional programmatic balance factors such as portfolio balance across NASA Programs, Centers and Mission Directorates, available funding, first-time

awardees/participants, historically underrepresented communities, and geographic distribution. The list of proposals selected for negotiation will be posted on the NASA SBIR/STTR website (<https://sbir.nasa.gov/>). All firms will receive a formal notification letter.

Each proposal package selected for negotiation by the SSO will be evaluated by the Contracting Officer to determine eligibility for an award. The terms and conditions of the contract will be negotiated based on the SBIR Small Business Act (15 U.S.C. 638), FAR and NASA FAR requirements, and a responsibility determination will be made. The Contracting Officer will advise the SSO on matters pertaining to price analysis and responsibility determinations. A Contracting Officer will negotiate an appropriate contract to be signed by both parties before work begins.

Note: Sections 4.3, 4.4 and 4.5 below apply to both the Phase I and Phase II evaluation process.

4.3 Technical and Business Assistance (TABA)

NASA conducts a separate review of all offeror requests for TABA after the SSO makes the final selection of projects to enter negotiation for a contract. The SBIR/STTR PMO conducts the initial evaluation of the TABA request to determine if the request meets the requirements found in sections 1.9, 3.5.3.8, and 3.6.3.7. The Contracting Officer makes the final determination to allow TABA funding under the contract.

The review of TABA requests will include the following:

- A review to determine if the awardee will use the funding for approved services;
- Verification of TABA vendors by reviewing the vendor information and websites;
- A review of the vendor(s) expertise and knowledge in providing technical and business assistance services;
- A review of the costs to be provided to the TABA vendor(s);
- Proposed plans to submit a deliverable summarizing the outcome of the TABA services with expected supporting information;
- Verification that TABA costs are reflected in the budget forms; and
- Verification that there is no evidence of Fraud, Waste and Abuse for these funds.

4.4. Access to Proprietary Data by Non-NASA Personnel

4.4.1 Non-NASA Reviewers

In addition to utilizing Government personnel in the review process, NASA, at its discretion and in accordance with NASA FAR Supplement (NFS) section 1815.207-71, may utilize individuals from outside the Government with highly specialized expertise not found in the Government. Qualified experts outside of NASA (including industry, academia, and other Government agencies) may assist in performing evaluations as required to determine or verify the merit of a complete proposal package. Any decision to obtain an outside evaluation shall take into consideration requirements for the avoidance of organizational or personal conflicts of interest and any competitive relationship between the prospective contractor or subcontractor(s) and the prospective outside evaluator. Any such evaluation will be under agreement with the evaluator that the information (data) contained in the complete proposal package will be used only for evaluation purposes and will not be further disclosed.

4.4.2 Non-NASA Access to Confidential Business Information

In the conduct of processing proposal packages and potential contract administration, the Agency may find it necessary to provide access to the complete proposal package to other NASA contractor and subcontractor personnel. NASA will provide access to such data only under contracts that contain an appropriate NFS 1852.237-72 Access to Sensitive Information clause that requires the contractors to fully protect the information from

unauthorized use or disclosure and where the contractor has implemented the appropriate processes and procedures to protect the information.

4.5 Notification and Feedback to Offerors

After selection for negotiation have been made, a notification will be sent to the designated small business representative identified in the complete proposal package according to the processes described below.

Note: Due to the competitive nature of the program and limited funding, recommendations to fund or not fund a proposal will be final. Any notification or feedback provided to the offeror is not an opportunity to reopen selection decisions or obtain additional information regarding the final decision. Offerors are encouraged to use the written feedback to understand the outcome and review of their proposal package and to develop plans to strengthen future proposals.

4.5.1 Providing Feedback

NASA uses a two-stage process to notify offerors of the outcome of their proposal package.

1. At the time of the public selection announcement, the designated small business representative will receive an email indicating the outcome of the proposal package.
2. NASA will automatically email proposal feedback to the designated small business representative within 60 days of the announcement of selection for negotiation. If you have not received your feedback within 60 days after the announcement, contact the NASA SBIR/STTR Program Support Office at sbir@reisystems.com. **Due to the sensitivity of this feedback, NASA will only provide feedback to the designated small business representative and will not provide this to any other parties.**

5. Considerations

5.1 Requirement for Contracting

Upon award of a Funding Agreement, the awardee will be required to make certain legal commitments through acceptance of numerous clauses in Funding Agreements. The outline that follows is illustrative of the types of clauses to which the contractor would be committed. This list is not a complete list of clauses to be included in Funding Agreements and is not the specific wording of such clauses. Copies of complete terms and conditions are available by following the links in Appendix C.

1. Standards of Work. Work performed under the Funding Agreement must conform to high professional standards.
2. Inspection. Work performed under the Funding Agreement is subject to Government inspection and evaluation at all times.
3. Examination of Records. The Comptroller General (or a duly authorized representative) must have the right to examine any pertinent records of the awardee involving transactions related to this Funding Agreement.
4. Default. The Federal Government may terminate the Funding Agreement if the contractor fails to perform the work contracted.
5. Termination for Convenience. The Funding Agreement may be terminated at any time by the Federal Government if it deems termination to be in its best interest, in which case the awardee will be compensated for work performed and for reasonable termination costs.
6. Disputes. Any dispute concerning the Funding Agreement that cannot be resolved by agreement must be decided by the contracting officer with right of appeal.
7. Contract Work Hours. The awardee may not require an employee to work more than 8 hours a day or 40 hours a week unless the employee is compensated accordingly (for example, overtime pay).
8. Equal Opportunity. The awardee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
9. Equal Opportunity for Veterans. The awardee will not discriminate against any employee or application for employment because he or she is a disabled veteran or veteran of the Vietnam era.
10. Equal Opportunity for People with Disabilities. The awardee will not discriminate against any employee or applicant for employment because he or she is physically or intellectually disabled.
11. Officials Not to Benefit. No Federal Government official may benefit personally from the SBIR Funding Agreement.
12. Covenant Against Contingent Fees. No person or agency has been employed to solicit or secure the Funding Agreement upon an understanding for compensation except bona fide employees or commercial agencies maintained by the awardee for the purpose of securing business.
13. Gratuities. The Funding Agreement may be terminated by the Federal Government if any gratuities have been offered to any representative of the Government to secure the award.
14. Patent Infringement. The awardee must report each notice or claim of patent infringement based on the performance of the Funding Agreement.
15. American Made Equipment and Products. When purchasing equipment or a product under the SBIR Funding Agreement, purchase only American-made items whenever possible.

To simplify making contract awards and to reduce processing time, all contractors selected for contracts will ensure that:

1. All information in your complete proposal package is current (e.g., your address has not changed, the proposed PI is the same, etc.). If changes have occurred since submittal of your proposal, notify the Contracting Officer immediately.
2. Your firm is registered with System for Award Management (SAM) (section 2.2).
3. Your firm complies with the FAR 52.222-37 Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (VETS-4212) requirement (See Appendix D). Confirmation that a

VETS-4212 report has been submitted to the Department of Labor, and is current, shall be provided to the Contracting Officer within 10 business days of the notification of selection for negotiation.

4. Your firm HAS NOT proposed a Co-Principal Investigator.
5. Your firm will provide timely responses to all communications from the NSSC Contracting Officer.
6. Budget form items:
 - All proposed cost is supported with documentation, such as a quote, previous purchase order, published price lists, etc.
 - All letters of commitment are dated and signed by the appropriate person with contact information.
 - If a university is proposed as a subcontractor, the signed letter shall be on the university letterhead from the Office of Sponsored Programs.
 - If an independent consultant is proposed, the signed letter should not be on a university letterhead.
 - If the use of Government facilities or equipment is proposed, your firm shall submit a signed letter from the Government facility authorizing the use of the facility and stating the availability and the cost, if any, together with a signed letter from your firm justifying the need to use the facility.

From the time of notification of selection for contract negotiation until the award of a contract, all communications shall be submitted electronically to NSSC-SBIR-STTR@nasa.gov.

Note: Costs incurred prior to and in anticipation of award of a contract are entirely the risk of the contractor if a contract is not subsequently awarded. A notification of selection for negotiation is not to be misconstrued as an award notification to commence work.

5.2 Awards

5.2.1 Anticipated number of Awards

For this pilot effort, it is anticipated that a limited number of proposals will be selected for negotiation. The program is anticipating selecting 12 Phase I proposals for contract negotiation with successful Phase I awards being selected for Phase II contract negotiation.

5.2.2 Award Conditions

NASA awards are electronically signed by a NASA Contracting Officer and transmitted electronically to the organization via email. NNSC will distribute the NASA SBIR award with the following items.

- SF26—Contract Cover Sheet
- Contract Terms and Conditions—to include reference to the complete proposal package
- Attachment 1: Contract Distribution List
- Attachment 2: Template of the Final Summary Chart
- Attachment 3: IT Security Management Plan Template
- Attachment 4: Applicable Documents List
- Negotiation Confirmation
- Frequently Asked Questions (FAQs)

5.2.3 Type of Contract

NASA SBIR Phase I and Phase II awards are made as firm fixed price contracts.

5.2.4 Model Contracts

Examples of the NASA SBIR contracts can be found in the NASA SBIR/STTR Resources section:

https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html. **Note: Model contracts are subject to change.**

5.3 Reporting and Required Deliverables

An IT Security Management Plan is required at the beginning of the contract. Contractors interested in doing business with NASA and/or providing IT services or solutions to NASA should use the list found at the website of the Office of the Chief Information Officer (OCIO) as a reference for information security requirements: <https://www.nasa.gov/content/security-requirements-policies>. An example of an IT Security Management Plan can be found in the NASA SBIR/STTR Resources section: https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html. For more information, see NASA FAR Supplement clause 1852.204-76.

All contracts shall require the delivery of technical reports that present (1) the work and results accomplished; (2) the scientific, technical, and commercial merit and feasibility of the proposed innovation and project results; (3) the proposed innovation's relevance and significance to one or more NASA interests (section 9); and (4) the strategy for development and transition of the proposed innovation and project results into products and services for NASA mission programs and other potential customers. Deliverables may also include the demonstration of the proposed innovation and/or the delivery of a prototype or test unit, product, or service for NASA testing and utilization if requested.

The technical reports and other deliverables are required as described in the contract and are to be provided to NASA. These reports shall document progress made on the project and activities required for completion. Periodic certification for payment will be required as stated in the contract. A final report must be submitted to NASA upon completion of the Phase I R/R&D effort in accordance with applicable contract provisions. **Note: because the Phase II proposal is due 120 days from the start of the Phase I period of performance, firms are advised that the milestones reported in the interim/mid-term report should demonstrate sufficient progress to warrant selection for a Phase II award.**

A final New Technology Summary Report (NTSR) is due at the end of the contract, and New Technology Report(s) (NTR) are required if technology(ies) is/are developed under the award prior to submission of the final invoice. For additional information on NTSR and NTR requirements and definitions, see section 5.9.

If TABA is requested, contracts will require TABA deliverables that summarize the outcome of the TABA services with expected supporting information.

Report deliverables shall be submitted electronically via the EHB. For any reports that require an upload, NASA requests the submission in PDF or Microsoft Word format.

Note: To access contract management in the EHB, you will be required to have an identity in the NASA Access Management System (NAMS). This is the Agency's centralized system for requesting and maintaining accounts for NASA IT systems and applications. The system contains user account information, access requests, and account maintenance processes for NASA employees, contractors, and remote users such as educators and foreign users. A basic background check and completion of NASA IT Security Training is required for this account. Instructions to create an identity in NAMS will be provided during contract negotiations. It is recommended that you begin this process immediately upon notification, as this access will be required to submit deliverables and invoices.

5.4 Payment Schedule

All NASA SBIR contracts are firm-fixed-price contracts. The exact payment terms will be included in the contract.

Although invoices are submitted electronically through the Department of Treasury's Invoice Processing Platform (IPP), as a condition for payment, invoice certifications shall be completed in the EHB for each individual invoice. The certification is preset in the EHB, and it shall be completed before uploading each invoice in IPP. Upon completion of the certification, a link to IPP is automatically provided in the EHB.

If TABA is requested, awardees will be required to submit TABA vendor invoices for reimbursement per the payment schedule in section 3.5.3.8 or 3.6.3.7.

5.5 Profit or Fee

Contracts may include a reasonable profit. The reasonableness of proposed profit is determined by the Contracting Officer during contract negotiations. Reference [FAR 15.404-4](#).

5.6 Cost Sharing

Cost sharing is permitted for proposal packages under this program solicitation; however, cost sharing is not required. Cost sharing will not be an evaluation factor in consideration of your proposal package nor will it be used in the determination of the percentage of Phase I work to be performed on the contract.

5.7 Rights in Data Developed Under SBIR Funding Agreements

The SBIR program provides specific rights for data developed under SBIR awards. Please review the full text at the following [FAR 52.227-20 Rights in Data-SBIR Program](#) and [PCD 21-02 FEDERAL ACQUISITION REGULATION \(FAR\) CLASS DEVIATION – PROTECTION OF DATA UNDER THE SMALL BUSINESS INNOVATIVE RESEARCH/SMALL TECHNOLOGY TRANSFER RESEARCH \(SBIR/STTR\) PROGRAM](#).

5.8 Copyrights

The contractor may copyright and publish (consistent with appropriate national security considerations, if any) material developed with NASA support. NASA receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgment and disclaimer statement.

5.9 Invention Reporting, Election of Title, Patent Application Filing, and Patents

Awardees under the SBIR program are required to provide New Technology Reports (NTR) for any new subject inventions, and the New Technology Summary Reports (NTSR) for the interim and final contract periods. Please review full text at the following https://www.sbir.gov/sites/default/files/SBA_SBIR_STTR_POLICY_DIRECTIVE_OCT_2020_v2.pdf to understand these requirements.

5.10 Government-Furnished and Contractor-Acquired Property

In accordance with the SBIR/STTR Policy Directive, the Federal Government may transfer title to property provided by the SBIR Participating Agency to the awardee or acquired by the awardee for the purpose of fulfilling the contract, where such transfer would be more cost effective than recovery of the property.

5.11 Essentially Equivalent Awards and Prior Work

If an award is made pursuant to a complete proposal package submitted under a SBIR solicitation, the firm will be required to certify with every invoice that it has not previously been paid nor is currently being paid for essentially

equivalent work by any agency of the Federal Government. **Failure to report essentially equivalent or duplicate efforts can lead to the termination of contracts and/or civil or criminal penalties.**

5.12 Additional Information

5.12.1 Precedence of Contract Over this Solicitation

This program solicitation reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract take precedence over the solicitation.

5.12.2 Evidence of Contractor Responsibility

The Government may request the offeror to submit certain organizational, management, personnel, and financial information to establish responsibility of the offeror. Contractor responsibility includes all resources required for contractor performance (e.g., financial capability, workforce, and facilities).

5.13 Use of Government Resources

Federal Departments and Agencies

Use of SBIR funding for unique Federal/non-NASA resources from a Federal department or agency that does not meet the definition of a Federal laboratory as defined by U.S. law and in the SBA Policy Directive on the SBIR program requires a waiver from the SBA. Proposal packages requiring waivers must include an explanation of why the waiver is appropriate. NASA will provide the offeror's request, along with an explanation to SBA, during the negotiation process. NASA cannot guarantee that a waiver can be obtained from SBA. Specific instructions to request use of Government Resources are in sections 3.5 or 3.6 of the solicitation. *Note: NASA facilities qualify as Federal laboratories.*

Support Agreements for Use of Government Resources

Note: Use of Federal laboratories/facilities for Phase I contracts is highly discouraged as these arrangements will in most cases cause significant delays in making the final award. Approval for use of Federal facilities and laboratories for a Phase I technical proposal requires a strong justification at time of submission and will require approval by the Contracting Officer during negotiations if selected for award.

All offerors selected for award who require the use of any Federal facility shall, within 20 business days of notification of selection for negotiations, provide to the NSSC Contracting Officer an agreement by and between the Contractor and the appropriate Federal facility/laboratory, executed by the Government official authorized to approve such use. The agreement must delineate the terms of use, associated costs, and facility responsibilities and liabilities. Having a signed agreement for use of Government resources is a requirement for award.

For proposed use of NASA resources, a NASA SBIR/STTR Support Agreement template is available in the Resources section (https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html) and must be executed before a contractor can use NASA resources. Offerors shall only include a signed letter of commitment from an authorized NASA point of contact in the complete proposal packages. NASA expects selected offerors to finalize and execute their NASA SBIR Support Agreement during the negotiation period with the NSSC.

Contractor Responsibilities for Costs

In accordance with FAR Part 45, it is NASA's policy not to provide services, equipment, or facilities (resources) (capital equipment, tooling, test, and computer facilities, etc.) for the performance of work under SBIR contracts. Generally, any contractor will furnish its own resources to perform the proposed work on the contract.

In all cases, the contractor shall be responsible for any costs associated with services, equipment, or facilities provided by NASA or another Federal department or agency, and such costs shall result in no increase in the price of this contract.

6. Submission of Proposals

6.1 How to Submit Your Proposal Package

NASA uses electronically supported business processes for the SBIR program. An offeror must have internet access and an email address. Paper submissions are not accepted.

To apply for a NASA SBIR contract all SBCs are required to follow the steps found below.

6.1.1 Electronic Submission Requirements

NASA will be using Box for submission of these proposal packages. To access Box, go to <https://nasagov.app.box.com/f/32ef3edd858549c08756e3640c3f1fc2>. PDF forms are available for all firm-level and proposal-level forms required for a complete proposal package. To access the firm-level and proposal-level forms, go to Chapter 8 at <https://sbir.nasa.gov/solicit-detail/80089>. All submissions are through a secure connection and most communication between NASA and the firm is through email.

It is recommended that the designated small business representative, or an authorized representative designated by the designated small business representative, be the person to complete the required proposal package forms and upload the proposal package to Box for the SBC.

For successful submission of a complete proposal package, SBCs shall complete all required and applicable PDF forms, and upload their required documents as a ZIP folder to Box. Each complete proposal package should be one (1) ZIP folder and submitted separately to Box. The ZIP folder should follow the file naming convention: Firm Name_Proposal Title.

Due to the limited pilot nature of this solicitation, NASA will not accept more than two (2) complete proposal packages from any one firm to ensure the broadest participation of the small business community.

Firms cannot submit security/password-protected files, as reviewers may not be able to open and read these files. Proposal packages containing security/password-protected files will be declined and not considered.

6.1.2 Deadlines for Submitting a Complete Proposal Package

6.1.2.1 Phase I

A complete proposal package for Phase I shall be received no later than 5:00 p.m. ET on Thursday, September 1, 2022, via Box. See Section 3. Proposal Preparation Instructions and Requirements for additional details on proposal package requirements.

Offerors are responsible for ensuring that all files constituting the complete proposal package be uploaded prior to the deadline. **If a complete proposal package is not received by the 5:00 p.m. ET deadline, the proposal package will be determined to be incomplete and will not be evaluated.** Offerors are strongly encouraged to start the submission process early to allow sufficient time to upload their complete proposal package. An offeror that waits to submit a proposal package near the deadline is at risk of not completing the required uploads and endorsements of their completed proposal package by the required deadline, resulting in the rejection of the proposal package.

6.1.2.2 Phase II

A complete proposal package for Phase II shall be received no later than 5:00 p.m. ET on the 120th day after the start of the Phase I period of performance. See Section 3. Proposal Preparation Instructions and Requirements for additional details on proposal package requirements.

Offerors are responsible for ensuring that all files constituting the complete proposal package be uploaded prior to the deadline. **If a complete proposal package is not received by the 5:00 p.m. ET deadline, the proposal package will be determined to be incomplete and will not be evaluated.** Offerors are strongly encouraged to start the submission process early to allow sufficient time to upload their complete proposal package. An offeror that waits to submit a proposal package near the deadline is at risk of not completing the required uploads and endorsements of their completed proposal package by the required deadline, resulting in the rejection of the proposal package.

6.1.3 Complete Proposal Package Submission

Firms will upload all components of a complete proposal package via Box as described in section 6.1.1. All transactions are encrypted for security purposes.

A complete Phase I proposal package consists of online forms and associated documentation that must be submitted in PDF format via Box. Below is what a complete proposal package includes. See section 3 for additional information on how to complete each of these sections.

1. Proposal Cover Page to include Contact Information
2. Proposal Certifications
3. Proposal Abstract
4. Proposal Budget and associated forms
5. Slide Deck (15 slide maximum)
6. White Paper (7 page maximum)
7. NASA Evaluation License Application (only if TAV is being proposed)
8. Technical and Business Assistance (TABAs) Request, if applicable
9. I-Corps Interest Form
10. Firm-Level Forms (if information has changed since the Phase I proposal submission)
 - a. Firm Information
 - b. Firm Certifications
 - c. Audit Information
 - d. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

A complete Phase II proposal package consists of online forms and associated documentation that must be submitted in PDF format via Box. Below is what a complete proposal package includes. See section 3 for additional information on how to complete each of these sections.

1. Proposal Cover Page to Include Contact Information
2. Proposal Certifications
3. Proposal Abstract
4. Proposal Budget and associated forms
5. Phase II Proposal
6. NASA Evaluation License Application (only if TAV is being proposed)
7. Technical and Business Assistance (TABAs) Request, if applicable
8. Firm-Level Forms (completed once for all complete proposal packages submitted by a firm to a single solicitation)
 - a. Firm Certifications

- b. Audit Information
- c. Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)

Firms cannot submit security/password-protected PDF files, as reviewers may not be able to open and read these files. Proposal packages containing security/password-protected PDF files will be declined and not considered.

Offerors are responsible for virus checking all files prior to submission. NASA may reject any complete proposal package that contains a file with a detected virus.

You may revise a slide deck, white paper, or proposal multiple times during the open solicitation period. The final uploaded version at the time the solicitation period closes will be considered for review. *Note: Embedded animation or video, as well as reference technical papers for “further reading,” will not be considered for evaluation.*

6.1.4 Acknowledgment of Receipt of a Complete Proposal Package

NASA will acknowledge receipt of an electronically submitted complete proposal package by sending an email to the designated small business representative’s email address as provided on the complete proposal package cover sheet. ***If acknowledgment is not received within 24 hours (Monday – Friday) after submission of a complete proposal package, the offeror should immediately contact the NASA SBIR/STTR Program Support Office at sbir@reisystems.com.***

6.1.5 Withdrawal of Complete Proposal Packages

Prior to the close of submissions, complete proposal packages may be withdrawn. In order to withdraw a complete proposal package after the deadline, the designated small business representative must send written notification via email to sbir@reisystems.com.

6.1.6 Service of Protests

Protests, as defined in section [FAR 33.101](#) of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from:

Theresa Stanley
NASA Shared Services Center
Building 1111, Jerry Hlass Road
Stennis Space Center, MS 39529
Agency-SBIR-STTRsolicitation@mail.nasa.gov

The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

7. Scientific and Technical Information Sources

7.1 NASA Organizational and Programmatic Information

General sources relating to organizational and programmatic information at NASA is available via the following websites:

NASA Budget Documents, Strategic Plans, and Performance Reports:

<https://www.nasa.gov/about/budget/index.html>

NASA Organizational Structure: <https://www.nasa.gov/centers/hq/organization/index.html>

NASA SBIR/STTR Programs: <https://sbir.nasa.gov/>

Information regarding 2020 NASA Technology Taxonomy and the NASA Strategic Integration Framework can be obtained at the following websites:

Office of the Chief Technologist	
2020 NASA Technology Taxonomy	https://www.nasa.gov/offices/oct/taxonomy/index.html

NASA Mission Directorates	
Aeronautics Research	https://www.aeronautics.nasa.gov/
Human Exploration and Operations	https://www.nasa.gov/directorates/heo/home/
Science	https://nasascience.nasa.gov/
Space Technology	https://www.nasa.gov/directorates/spacetech/home/index.html

NASA Centers	
Ames Research Center (ARC)	https://www.nasa.gov/centers/ames/home/index.html
Armstrong Flight Research Center (AFRC)	https://www.nasa.gov/centers/armstrong/home/index.html
Glenn Research Center (GRC)	https://www.nasa.gov/centers/glenn/home/index.html
Goddard Space Flight Center (GSFC)	https://www.nasa.gov/centers/goddard/home/index.html
Jet Propulsion Laboratory (JPL)	https://www.nasa.gov/centers/jpl/home/index.html
Johnson Space Center (JSC)	https://www.nasa.gov/centers/johnson/home/index.html
Kennedy Space Center (KSC)	https://www.nasa.gov/centers/kennedy/home/index.html
Langley Research Center (LaRC)	https://www.nasa.gov/centers/langley/home/index.html
Marshall Space Flight Center (MSFC)	https://www.nasa.gov/centers/marshall/home/index.html
Stennis Space Center (SSC)	https://www.nasa.gov/centers/stennis/home/index.html
NASA Shared Services Center (NSSC)	https://www.nssc.nasa.gov/

7.2 United States Small Business Administration (SBA)

The SBA oversees the Federal SBIR and STTR programs. The SBA has resources that small businesses can take advantage of in learning about the program and obtaining help in developing a proposal package to a Federal SBIR/STTR program. Offerors are encouraged to review the information that is provided at the following links: <https://www.sbir.gov/>, <https://www.sba.gov/local-assistance>, and at <https://www.sbir.gov/resources>.

The SBA issues a SBIR/STTR Policy Directive which provides guidance to all Federal Agencies that have a SBIR/STTR program. The Policy Directives for the SBIR/STTR programs may be obtained from the SBA at <https://www.sbir.gov/> or at the following address:

U.S. Small Business Administration
Office of Technology – Mail Code 6470
409 Third Street, S.W.
Washington, DC 20416
Phone: 202-205-6450

7.3 National Technical Information Service

The National Technical Information Service (NTIS) is an agency of the Department of Commerce and is the Federal Government's largest central resource for Government-funded scientific, technical, engineering, and business-related information. For information regarding various NTIS services and fees, call or write:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 703-605-6000
URL: <https://www.ntis.gov/>

8. Submission Forms

Note: Previews of all forms and certifications are available via the NASA SBIR/STTR Resources section, located at https://sbir.gsfc.nasa.gov/sbir/firm_library/index.html.

8.1 SBIR Phase I Checklist

For assistance in completing your Phase I proposal package, use the following checklist to ensure your submission is complete.

1. The slide deck and white paper for any innovation are submitted for one topic only.
2. The complete proposal package is submitted consistently with the requirements outlined in section 3.
 - a. Proposal Cover Page to include Contact Information
 - b. Proposal Certifications
 - c. Proposal Abstract
 - d. Proposal Budget
 - Subcontractors/Consultants form (if applicable)
 - Other Direct Costs form (if applicable)
 - Foreign Vendor form (if applicable)
 - e. Slide Deck (15 slide maximum)
 - f. White Paper (7 page maximum)
 - g. NASA Evaluation License Application (only if TAV is being proposed)
 - h. Technical and Business Assistance (TABAs) Request, if applicable
 - i. I-Corps Interest Form
 - j. Firm-Level Forms (completed once for all complete proposal packages submitted by a firm to a single solicitation)
 - Firm Information
 - Firm Certifications
 - Audit Information
 - Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)
3. **The slide deck shall not exceed 15 slides and the white paper shall not exceed a total of 7 standard 8.5- by 11-inch pages with one-inch margins and shall follow the format requirements found in section 3.5.2.**
4. The slide deck and white paper contain all required parts in order (section 3.5.3).
5. Any additional required letters/documentation.
 - a. A letter of commitment from the appropriate Government official if the research or R&D effort requires use of Government resources (sections 3.5 and 5.13).
 - b. Letters of commitment from subcontractors/consultants.
 - c. If the firm is an eligible joint venture or a limited partnership, a copy or comprehensive summary of the joint venture agreement or partnership agreement is included.
 - d. NASA Evaluation License Application if proposing the use of NASA technology (TAV).
 - e. Supporting documentation of budgeted costs.
6. Proposed funding does not exceed \$150,000 (section 1.5), and if requesting TABAs, the cost for TABAs does not exceed \$6,500 (sections 1.9 and 3.5.3.8).
7. Proposed project duration does not exceed six (6) months (section 1.5).
8. **Complete proposal packages shall be received no later than 5:00 p.m. ET on Thursday, September 1, 2022 (section 6.1.2).**

8.2 SBIR Phase II Checklist

For assistance in completing your Phase II proposal package, use the following checklist to ensure your submission is complete.

1. The proposal and innovation are submitted for one topic only.
2. The complete proposal package is submitted consistently with the requirements outlined in section 3.
 - a. Proposal Cover Page to include Contact Information
 - b. Proposal Certifications
 - c. Proposal Abstract
 - d. Proposal Budget
 - Subcontractors/Consultants form (if applicable)
 - Other Direct Costs form (if applicable)
 - Foreign Vendor form (if applicable)
 - e. Phase II Proposal
 - f. NASA Evaluation License Application (only if TAV is being proposed)
 - g. Technical and Business Assistance (TABAs) Request, if applicable
 - h. Firm-Level Forms (completed once for all complete proposal packages submitted by a firm to a single solicitation)
 - Firm Certifications
 - Audit Information
 - Prior Awards Addendum (for firms with more than 15 Phase II awards in the past 5 years)
3. **The proposal shall not exceed a total of 40 standard 8.5- by 11-inch pages with one-inch margins and shall follow the format requirements found in section 3.6.2).**
4. The proposal plan contains all required parts in order (section 3.6.3).
5. Any additional required letters/documentation.
 - a. A letter of commitment from the appropriate Government official if the research or R&D effort requires use of Government resources (sections 3.6 and 5.13).
 - b. Letters of commitment from subcontractors/consultants.
 - c. If the firm is an eligible joint venture or a limited partnership, a copy or comprehensive summary of the joint venture agreement or partnership agreement is included.
 - d. NASA Evaluation License Application if proposing the use of NASA technology (TAV).
 - e. Supporting documentation of budgeted costs.
6. Proposed funding does not exceed \$850,000 (section 1.5), and if requesting TABAs, the cost for TABAs does not exceed \$50,000 (sections 1.9 and 3.6.3.7).
7. Proposed project duration does not exceed 24 months (section 1.5).
8. **Complete proposal packages shall be received no later than 5:00 p.m. ET on the 120th day after the start of the Phase I period of performance (section 6.1.2).**

9. Research Topics for the SBIR Ignite Solicitation

Introduction

Offerors are advised to be thoughtful in selecting a topic to ensure the proposal is responsive to the NASA need as defined by the topic. The NASA SBIR program will NOT move a completed proposal package between SBIR topics.

As stated in section 2.2, an Offeror shall not submit the same (or substantially equivalent) completed proposal packages to more than one topic. It is the Offeror's responsibility to select which topic to propose to.

Topic Title: Technologies Using NASA Data to Foster Climate Resilience

Problem Statement:

This focus area seeks technologies that enable people worldwide to use NASA's vast and diverse Earth science data sets to peer into different futures. Solutions should demonstrate how they leverage the diverse suite of available Earth science data and models to provide decision-makers with actionable information – helping leaders understand the potential outcomes and impacts of various climate-related risks, and of planning and land-use decisions to address these risks. Of particular interest are:

- Advanced visualization and modeling tools that help users explore and analyze the physical risk of sea level rise and compounding hazards due to our changing climate; and
- Solutions that apply Earth science data and models to support pre- and post-wildfire planning and strategic resource allocation related decisions; and
- Solutions that are co-produced with and can address the concerns of underserved populations.

Proposers are encouraged to highlight novel and state-of-the-art features of their solutions, including advancements that differentiate them from their competition. In addition to solution benefits, proposers should describe analyses and results of data quality assessments and data product validations, including uncertainty quantifications.

Topic Title: Enabling technologies for the development of a robust Low-Earth Orbit Economy.

Problem Statement:

One of [NASA's strategic goals](#) is to "Lay the foundation for America to maintain a constant human presence in low-Earth orbit (LEO) enabled by a commercial market." To achieve that goal, NASA is committed to developing a robust LEO economy and enabling both the supply side (i.e., future LEO destinations providing services for a fee) and the demand side (i.e., need for on-orbit services for Government requirements or to produce products of commercial value).

The [Commercial LEO Destinations](#) (CLDs) project will enable the development of commercially owned and operated LEO destinations that are safe, reliable, and cost-effective, and allows NASA to be one of many customers. In December 2021, NASA signed three [funded Space Act Agreements](#) with U.S. companies worth \$415.6 million to develop designs of commercial destinations in LEO. The International Space Station (ISS) is also enabling the development of commercially owned and operated LEO destinations by hosting a new [commercial segment by Axiom Space](#) that will attach to the ISS Node 2 forward port and expand the habitable volume for commercial research and other activities. All of these agreements are part of the agency's efforts to enable a robust, American-led commercial economy in low-Earth orbit. Building on the success of the Commercial Orbital Transportation System, Commercial Cargo, and Commercial Crew programs, these agreements will catalyze additional commercial activity in space to expand opportunities in LEO for both established players and small businesses. The CLD project is enabling opportunities and partnerships to be created with universities, small businesses, industry, emerging commercial entities, individual innovators, and other Government agencies to meet NASA mission needs and support commercial expansion in space.

[Doing business in space](#) has become one of the fastest growing businesses on earth. The space economy has expanded by over 60% in the last decade and is now valued at roughly \$400 billion. A robust LEO economy ensures national interests for research and development in space are fulfilled while allowing NASA to focus government resources on deep space exploration through the Artemis program and land the first woman and next man on the surface of the Moon in 2024. Creating a robust LEO economy will be dependent on bringing many new businesses and people into space and will require the development of enabling technologies for this emerging LEO economy. Three areas of interest are:

1. Technologies that reduce the cost of transportation of humans and non-human cargo to/from the ISS, LEO, and/or future CLDs, and crewed habitation and use of CLDs for extended periods. [Market studies](#) have shown that current transportation costs and crew systems (such as life support and hygiene) represent a high barrier to entry into the LEO economy. Driving down costs for transportation and crew systems could help enable increase demand in LEO for various activities such as tourism, outreach, research, and commercial and marketing activities.
2. Rapid, reliable, and cost-effective launch and re-entry capabilities for scientific samples and small payloads to and from the ISS and/or future CLDs. [Market studies](#) have shown that current frequency of transportation represent a high barrier to entry into the LEO economy. Downmass from the ISS is especially a premium commodity, which limits the amount of science, and payloads that can be returned to Earth. Increasing the frequency by which payloads can launch and then return to Earth could help enable a more robust LEO economy.
3. Safe, reliable, and cost-effective extravehicular activities (EVA) suits for use in LEO (can be tethered or non-tethered). Right now, the only EVA suits available are NASA owned and operated. This is currently constraining a level of demand for private astronaut missions and other commercial LEO activities, including space tourism. A cost effect solution for EVA suits to enable space operations, that multiple companies could utilize, could help enable a robust LEO economy.

Topic Title: Electric and Hybrid Electric Systems for Unmanned Aerial Vehicle (UAV) and Aircraft in the 1500 to 5000 lbs. size class

Problem Statement:

The purpose of this topic is to stimulate U.S. entrepreneurship in the emerging markets of electric and hybrid electric aircraft. Components are sought for integration, ground, and potential flight testing for a 1500 lbs. class hybrid electric drone. Proposals should support market introduction to the existing large UAV or the emerging electric and hybrid electric aircraft markets. Components sought include, but are not limited to motors, converters, circuit interrupt devices, cables, turbo generators, batteries, bus capacitors, electrically actuated control surfaces, electrically actuated landing gear, components that integrate multiple functions (like a motor/converter combination). Evaluation will be based on economic, environmental, and technical criteria. We seek companies that will produce technology and the resultant product in the U.S., have understanding of how their product reduces lifecycle aviation emissions, and have a differentiating technology advantage which has been clearly shown though an evaluation of the power/weight and efficiency metrics.

NASA is currently designing an unpowered, 25% scale, version of the Subsonic Single Aft Engine (SUSAN) Transport Aircraft Concept described generally here: <https://www1.grc.nasa.gov/aeronautics/eap/airplane-concepts/susan/> and with more detail in the paper here: <https://arc.aiaa.org/doi/pdf/10.2514/6.2022-2179>. Reference information for the 25% SUSAN Flight Research Vehicle: Power: 150kW total, individual converters at 40Kw, and 10kW operating on 300V DC bus. Thermal management: Pumped liquid cooling loops with a worst-case hot temp of 60C. Max altitude: 15,000 ft. Max speed 150 mph.

Topic Title: Low-Cost Photovoltaic Arrays for Space

Problem Statement:

Space rated photovoltaic costs are orders of magnitude higher than terrestrial photovoltaics. The increased cost is seen at all levels from the material, manufacturing, test, and qualification which presents multiple opportunities to improve processes and develop new strategies to advance low-cost space rated solar arrays.

High durability, high efficiency multijunction photovoltaics have long been the choice for space missions which typically require the highest possible PV performance. Unfortunately, the production of these devices requires the use of high cost, high quality crystalline substrates, precision epitaxial deposition systems, and meticulous device and module fabrication processes which drive costs to more than 100 times that of terrestrial silicon photovoltaics. High beginning of life conversion efficiency (>30%, 1 sun air mass zero at 28C) and durability in the space environment (resistance to darkening to UV light, stability through thermal cycles, and high energy radiation resistance) are required for many space missions and cannot be achieved using terrestrial silicon solar cells. Additionally, high efficiency reduces the mass, deployed area, and stowed volume at the solar array level.

Both NASA and commercial satellite providers would greatly benefit from technology that enables manufacturing of low-cost, high-efficiency photovoltaics for space applications at high throughput scale for <\$25 per watt. Potential solutions include but are not limited to growth of substrates including reuse and alternative materials, low-cost deposition methods that maintain high efficiency performance, and cell processing (metallization, etching, packaging).

NREL techno-economic studies (<https://www.nrel.gov/docs/fy19osti/72103.pdf>) have indicated that these cost reductions for III-V photovoltaics are possible, especially at larger scale manufacturing.

Topic Title: Point-of-use Recycling for Optimized Space-Age Logistics

Problem Statement:

On Earth, logistics innovations have allowed industry to ship more and more, and waste less and less, but the packaging required for delivering a given product can still—sometimes—outweigh and outsize the product itself, leaving a large percentage of packaging waste at the delivery destination or point-of-use. The packaging problem is magnified when many small items need to be packaged and organized into larger packages, and when the deliveries must cover long distances under harsh environmental conditions. This is the challenge for logistics deliveries in space. A significant amount of packaging is required, but that leads to a significant amount of packaging waste. **NASA seeks point-of-use recycling solutions for common waste streams produced in space.** This includes the packaging waste stream, produced by logistics supply missions; but also, could include recycling of other common waste streams, such as food waste, human waste or paper, plastic, or cloth waste. The waste streams may be recycled individually, or they may be combined into mixed waste streams for more efficient recycling. In space, point-of-use recycling systems must be efficient and fit into a small footprint; and astronaut crews cannot spend valuable time separating or preparing the waste for recycling. Finally, the recycled products must be useful for the crew and reduce the need for delivering future supplies. Recycled materials may serve as feedstock for 3D printing or as resources for other manufacturing processes. Or recycled materials may be converted into end-use items for the crew. Examples of this might include Ziploc bags, plastic containers, paper towels, wipes, gloves, radiation shielding, tissue-paper or other paper or plastic products produced from recycled packing materials or other common waste streams. In this way, all the materials delivered, including the packaging, can be recycled and used, wasting nothing. Here on Earth, point-of-use recycling could also offer an efficient way for individuals and households to make direct use of all that unwanted packaging waste we produce at home. Instead of putting the waste in a recycling bin that may, or may not, eventually reach a recycling center, we could convert the material into useful household products, saving us both time and money.

Topic Title: Commercial Development of Active Debris Remediation (ADR) Services

Problem Statement:

The U.S. economy depends on space for critical infrastructure, from communications and financial exchanges to national security, transportation, and climate monitoring. Orbital debris created by objects such as abandoned vehicle stages, non-functional satellites, and fragments of launched materials impedes our ability to use space by increasing the cost of space operations (maneuvering around debris), threatening the safety of astronauts and satellites, limiting the ability to launch spacecraft, and potentially rendering entire orbits unusable for a generation or more. As described in the 2021 National Orbital Debris Research and Development Plan, there are three broad methods to reduce the risks associated with debris: 1) limit the generation of new debris; 2) better track and characterize debris; 3) and remediate debris that has already been created.

Debris remediation services are those that move, remove, or reuse extant debris to reduce the risks associated with it. The National Orbital Debris R&D Plan identifies the major challenges associated with debris remediation, including two major technological challenges. First, remediation technologies are often tailored to specific types of debris, making it difficult for a single technology to scale from remediating one piece to many pieces of debris. Second, some technologies have the potential to be counterproductive. For example, some methods may create more debris—either on accident or as part of nominal operations—or increase the remediated object's cumulative probability of collision with other objects.

NASA is soliciting proposals for innovative systems that can perform commercial ADR services. Preference will be given to proposals that: a) can scale to provide bulk remediation services, potentially by remediating risk from different types of debris and/or remediating multiple debris items per mission; b) qualitatively address potential concerns that the proposed systems may be counterproductive; c) roughly estimate the monetary costs and benefits associated with a demonstration mission and the operational capability; and d) include plans to work with potential customers to reveal their use cases and price points.

All forms of remediation are in-scope, not just the capture and de-orbiting of debris. Likewise, the scope of the solicitation includes all forms of debris, not just upper stages or defunct satellites.

Appendices

Appendix A: Technology Readiness Level (TRL) Descriptions

The Technology Readiness Level (TRL) describes the stage of maturity in the development process from observation of basic principles through final product operation. The exit criteria for each level document that principles, concepts, applications, or performance have been satisfactorily demonstrated in the appropriate environment required for that level. A relevant environment is a subset of the operational environment that is expected to have a dominant impact on operational performance. Thus, reduced gravity may be only one of the operational environments in which the technology must be demonstrated or validated to advance to the next TRL.

TRL	Definition	Hardware Description	Software Description	Exit Criteria
1	Basic principles observed and reported.	Scientific knowledge generated underpinning hardware technology concepts/applications.	Scientific knowledge generated underpinning basic properties of software architecture and mathematical formulation.	Peer reviewed publication of research underlying the proposed concept/application.
2	Technology concept and/or application formulated.	Invention begins, practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture.	Practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture. Basic properties of algorithms, representations and concepts defined. Basic principles coded. Experiments performed with synthetic data.	Documented description of the application/concept that addresses feasibility and benefit.
3	Analytical and experimental critical function and/or characteristic proof of concept.	Analytical studies place the technology in an appropriate context and laboratory demonstrations, modeling and simulation validate analytical prediction.	Development of limited functionality to validate critical properties and predictions using non-integrated software components.	Documented analytical/experimental results validating predictions of key parameters.
4	Component and/or breadboard validation in laboratory environment.	A low fidelity system/component breadboard is built and operated to demonstrate basic functionality and critical test environments, and associated performance predictions are defined relative to the final operating environment.	Key, functionally critical, software components are integrated, and functionally validated, to establish interoperability and begin architecture development. Relevant Environments defined and performance in this environment predicted.	Documented test performance demonstrating agreement with analytical predictions. Documented definition of relevant environment.
5	Component and/or breadboard validation in relevant environment.	A medium fidelity system/component brassboard is built and operated to demonstrate overall performance in a simulated operational environment with realistic support elements that	End-to-end software elements implemented and interfaced with existing systems/simulations conforming to target environment. End-to-end software system, tested in relevant environment, meeting predicted performance.	Documented test performance demonstrating agreement with analytical predictions. Documented definition of scaling requirements.

		demonstrates overall performance in critical areas. Performance predictions are made for subsequent development phases.	Operational environment performance predicted. Prototype implementations developed.	
6	System/sub-system model or prototype demonstration in a relevant environment.	A high-fidelity system/component prototype that adequately addresses all critical scaling issues is built and operated in a relevant environment to demonstrate operations under critical environmental conditions.	Prototype implementations of the software demonstrated on full-scale realistic problems. Partially integrate with existing hardware/software systems. Limited documentation available. Engineering feasibility fully demonstrated.	Documented test performance demonstrating agreement with analytical predictions.
7	System prototype demonstration in an operational environment.	A high-fidelity engineering unit that adequately addresses all critical scaling issues is built and operated in a relevant environment to demonstrate performance in the actual operational environment and platform (ground, airborne, or space).	Prototype software exists having all key functionality available for demonstration and test. Well integrated with operational hardware/software systems demonstrating operational feasibility. Most software bugs removed. Limited documentation available.	Documented test performance demonstrating agreement with analytical predictions.
8	Actual system completed and "flight qualified" through test and demonstration.	The final product in its final configuration is successfully demonstrated through test and analysis for its intended operational environment and platform (ground, airborne, or space).	All software has been thoroughly debugged and fully integrated with all operational hardware and software systems. All user documentation, training documentation, and maintenance documentation completed. All functionality successfully demonstrated in simulated operational scenarios. Verification and Validation (V&V) completed.	Documented test performance verifying analytical predictions.
9	Actual system flight proven through successful mission operations.	The final product is successfully operated in an actual mission.	All software has been thoroughly debugged and fully integrated with all operational hardware/software systems. All documentation has been completed. Sustaining software engineering support is in place. System has been successfully operated in the operational environment.	Documented mission operational results.

Definitions

Brassboard: A medium-fidelity functional unit that typically tries to make use of as much operational hardware/software as possible and begins to address scaling issues associated with the operational system. It does not have the engineering pedigree in all aspects but is structured to be able to operate in simulated operational environments in order to assess performance of critical functions.

Breadboard: A low-fidelity unit that demonstrates function only, without respect to form or fit in the case of hardware, or platform in the case of software. It often uses commercial and/or ad hoc components and is not intended to provide definitive information regarding operational performance.

Engineering Unit: A high-fidelity unit that demonstrates critical aspects of the engineering processes involved in the development of the operational unit. Engineering test units are intended to closely resemble the final product (hardware/software) to the maximum extent possible and are built and tested so as to establish confidence that the design will function in the expected environments. In some cases, the engineering unit will become the final product, assuming proper traceability has been exercised over the components and hardware handling.

Laboratory Environment: An environment that does not address in any manner the environment to be encountered by the system, subsystem, or component (hardware or software) during its intended operation. Tests in a laboratory environment are solely for the purpose of demonstrating the underlying principles of technical performance (functions), without respect to the impact of environment.

Mission Configuration: The final architecture/system design of the product that will be used in the operational environment. If the product is a subsystem/component, then it is embedded in the actual system in the actual configuration used in operation.

Operational Environment: The environment in which the final product will be operated. In the case of spaceflight hardware/software, it is space. In the case of ground-based or airborne systems that are not directed toward spaceflight, it will be the environments defined by the scope of operations. For software, the environment will be defined by the operational platform.

Proof of Concept: Analytical and experimental demonstration of hardware/software concepts that may or may not be incorporated into subsequent development and/or operational units.

Prototype Unit: The prototype unit demonstrates form, fit, and function at a scale deemed to be representative of the final product operating in its operational environment. A subscale test article provides fidelity sufficient to permit validation of analytical models capable of predicting the behavior of full-scale systems in an operational environment

Relevant Environment: Not all systems, subsystems, and/or components need to be operated in the operational environment in order to satisfactorily address performance margin requirements. Consequently, the relevant environment is the specific subset of the operational environment that is required to demonstrate critical "at risk" aspects of the final product performance in an operational environment. It is an environment that focuses specifically on "stressing" the technology advance in question.

Appendix B: SBIR and the Technology Taxonomy

NASA's technology development activities expand the frontiers of knowledge and capabilities in aeronautics, science, and space, creating opportunities, markets, and products for U.S. industry and academia. Technologies that support NASA's missions may also support science and exploration missions conducted by the commercial space industry and other Government agencies. In addition, NASA technology development results in applications for the general population, including devices that improve health, medicine, transportation, public safety, and consumer goods.

The 2020 NASA Technology Taxonomy is an evolution of the technology roadmaps developed in 2015. The 2020 NASA Technology Taxonomy provides a structure for articulating the technology development disciplines needed to enable future space missions and support commercial air travel. The 2020 revision is composed of 17 distinct technical-discipline-based taxonomies (TX) that provide a breakdown structure for each technology area. The taxonomy uses a three-level hierarchy for grouping and organizing technology types. Level 1 represents the technology area that is the title of that area. Level 2 is a list of the subareas the taxonomy is a foundational element of NASA's technology management process. NASA's mission directorates reference the taxonomy to solicit proposals and to inform decisions on NASA's technology policy, prioritization, and strategic investments.

Details on the 2015 NASA Technology Roadmaps remain accessible here:

(<https://www.nasa.gov/offices/oct/home/roadmaps/index.html>), and information on the new 2020 NASA Technology Taxonomy can be found at:

(https://www.nasa.gov/sites/default/files/atoms/files/2020_nasa_technology_taxonomy_lowres.pdf).

The research and technology topics for the SBIR program are identified annually by mission directorates and center programs. The directorates identify high-priority research and technology needs for respective programs and projects.

Appendix C: List of NASA SBIR Phase I Clauses, Regulations and Certifications

Introduction

Offerors who plan to submit a completed proposal package to this solicitation will be required to meet specific rules and regulations as part of the submission and if awarded a contract. Offerors should ensure that they understand these rules and requirements before submitting a completed proposal package to NASA.

Below are the all the clauses, regulations and certifications that apply to Phase I submissions and contracts. Each clause, regulation and certification contain a hyperlink to the webpages from the NASA FAR Supplement, SBIR/STTR Policy Directive, and www.acquisition.gov where you can read about the requirements.

Federal Acquisition Regulations (FAR) Clauses for Phase I

[52.203-19 PROHIBITION ON REQUIRING CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS OR STATEMENTS.](#)

[52.204-6 UNIQUE ENTITY IDENTIFIER.](#)

[52.204-7 SYSTEM FOR AWARD MANAGEMENT.](#)

[52.204-8 ANNUAL REPRESENTATIONS AND CERTIFICATIONS \(DEVIATION 20-02A\)](#)

[52.204-10 REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS.](#)

[52.204-13 SYSTEM FOR AWARD MANAGEMENT MAINTENANCE.](#)

[52.204-16 COMMERCIAL AND GOVERNMENT ENTITY CODE REPORTING.](#)

[52.204-18 COMMERCIAL AND GOVERNMENT ENTITY CODE MAINTENANCE.](#)

[52.204-19 INCORPORATION BY REFERENCE OF REPRESENTATIONS AND CERTIFICATIONS.](#)

[52.204-22 ALTERNATIVE LINE ITEM PROPOSAL.](#)

[52.204-23 PROHIBITION ON CONTRACTING FOR HARDWARE, SOFTWARE, AND SERVICES DEVELOPED OR PROVIDED BY KASPERSKY LAB AND OTHER COVERED ENTITIES.](#)

[52.204-24 REPRESENTATION REGARDING CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT](#)

[52.204-25 PROHIBITION ON CONTRACTING FOR CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT.](#)

[52.204-26 COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES - REPRESENTATION.](#)

[52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT.](#)

[52.215-1 INSTRUCTIONS TO OFFERORS—COMPETITIVE ACQUISITION.](#)

[52.215-8 ORDER OF PRECEDENCE—UNIFORM CONTRACT FORMAT.](#)

[52.216-1 TYPE OF CONTRACT.](#)

[52.219-6 NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE](#)

[52.219-28 POST-AWARD SMALL BUSINESS PROGRAM REREPRESENTATION.](#)

[52.222-3 CONVICT LABOR.](#)

[52.222-21 PROHIBITION OF SEGREGATED FACILITIES.](#)

[52.222-26 EQUAL OPPORTUNITY.](#)

[52.222-36 EQUAL OPPORTUNITY FOR WORKERS WITH DISABILITIES.](#)

[52.222-50 COMBATING TRAFFICKING IN PERSONS.](#)

[52.223-6 DRUG-FREE WORKPLACE.](#)

[52.223-18 ENCOURAGING CONTRACTOR POLICIES TO BAN TEXT MESSAGING WHILE DRIVING.](#)

[52.223-99 ENSURING ADEQUATE COVID-19 SAFETY PROTOCOLS FOR FEDERAL CONTRACTORS \(DEVIATION 21-03\)](#)

[52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES.](#)

[52.227-1 AUTHORIZATION AND CONSENT.](#)

[52.227-11 PATENT RIGHTS—OWNERSHIP BY THE CONTRACTOR.](#)

[52.227-20 RIGHTS IN DATA—SBIR PROGRAM.](#)

[52.232-2 PAYMENTS UNDER FIXED-PRICE RESEARCH AND DEVELOPMENT CONTRACTS.](#)

[52.232-9 LIMITATION ON WITHHOLDING OF PAYMENTS.](#)

[52.232-12 ADVANCE PAYMENTS.](#)

[52.232-23 ASSIGNMENT OF CLAIMS.](#)

[52.232-25 PROMPT PAYMENT.](#)

[52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—SYSTEM FOR AWARD MANAGEMENT.](#)

[52.232-39 UNENFORCEABILITY OF UNAUTHORIZED OBLIGATIONS.](#)

[52.232-40 PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS. \(DEVIATION 20-03A\)](#)

[52.233-1 DISPUTES.](#)

[52.233-3 PROTEST AFTER AWARD.](#)

[52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM.](#)

[52.242-15 STOP-WORK ORDER.](#)

[52.243-1 CHANGES—FIXED PRICE.](#)

[52.246-7 INSPECTION OF RESEARCH AND DEVELOPMENT—FIXED PRICE.](#)

[52.246-16 RESPONSIBILITY FOR SUPPLIES.](#)

[52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS. \(DEVIATION 20-03A\)](#)

[52.249-1 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT \(FIXED-PRICE\) \(SHORT FORM\).](#)

[52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE.](#)

[52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS.](#)

[52.253-1 COMPUTER GENERATED FORMS.](#)

[52.252-2 CLAUSES INCORPORATED BY REFERENCE.](#)

[52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES.](#)

NASA Clauses

Phase I

[1852.216-78 FIRM FIXED PRICE.](#)

[1852.203-71 REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS](#)

[1852.204-76 SECURITY REQUIREMENTS FOR UNCLASSIFIED INFORMATION TECHNOLOGY RESOURCES.
\(DEVIATION 21-01\)](#)

[1852.215-84 OMBUDSMAN.](#)

[1852.219-80 LIMITATION ON SUBCONTRACTING – SBIR PHASE I PROGRAMT. \(OCT 2006\)](#)

[1852.219-83 LIMITATION OF THE PRINCIPAL INVESTIGATOR – SBIR PROGRAM. \(OCT 2006\)](#)

[1852.225-70 EXPORT LICENSES](#)

[1852.225-71 RESTRICTION ON FUNDING ACTIVITY WITH CHINA](#)

[1852.225-72 RESTRICTION ON FUNDING ACTIVITY WITH CHINA – REPRESENTATION. \(DEVIATION 12-01A\)](#)

[1852.215-81 PROPOSAL PAGE LIMITATIONS.](#)

[1852.227-72 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE.](#)

[1852.232-80 SUBMISSION OF VOUCHERS FOR PAYMENT.](#)

[1852.233-70 PROTESTS TO NASA.](#)

[1852.235-70 CENTER FOR AEROSPACE INFORMATION.](#)

[1852.239-74 INFORMATION TECHNOLOGY SYSTEM SUPPLY CHAIN RISK ASSESSMENT. \(DEVIATION 15-03D\)](#)

[1852.235-73 FINAL SCIENTIFIC AND TECHNICAL REPORTS.](#)

[1852.235-74 ADDITIONAL REPORTS OF WORK - RESEARCH AND DEVELOPMENT.](#)

[1852.237-73 RELEASE OF SENSITIVE INFORMATION.](#)

[PCD 21-02 FEDERAL ACQUISITION REGULATION \(FAR\) CLASS DEVIATION – PROTECTION OF DATA UNDER THE
SMALL BUSINESS INNOVATIVE RESEARCH/SMALL TECHNOLOGY TRANSFER RESEARCH \(SBIR/STTR\) PROGRAM](#)

Additional Regulations

[SOFTWARE DEVELOPMENT STANDARDS](#)

[HUMAN AND/OR ANIMAL SUBJECT](#)

[HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 12 \(HSPD-12\)](#)

[RIGHTS IN DATA DEVELOPED UNDER SBIR FUNDING AGREEMENT](#)

[INVENTION REPORTING, ELECTION OF TITLE, PATENT APPLICATION FILING, AND PATENTS](#)

SBA Certifications required for Phase I

[\(1\) CERTIFICATIONS.](#)

[\(2\) PERFORMANCE OF WORK REQUIREMENTS.](#)

[\(3\) EMPLOYMENT OF THE PRINCIPAL INVESTIGATOR/PROJECT MANAGER.](#)

[\(4\) LOCATION OF THE WORK.](#)

[\(5\) NOVATED/SUCCESSOR IN INTERESTED/REVISED FUNDING AGREEMENTS.](#)

[\(6\) MAJORITY-OWNED BY MULTIPLE VCOCS, HEDGE FUNDS OR PRIVATE EQUITY FIRMS \[SBIR ONLY\].](#)

[\(7\) AGENCY BENCHMARKS FOR PROGRESS TOWARDS COMMERCIALIZATION.](#)

[\(8\) LIFE CYCLE CERTIFICATIONS.](#)