

AIR FORCE
20.1 Small Business Innovation Research (SBIR)
Phase I Proposal Submission Instructions

INTRODUCTION

The Air Force (AF) proposal submission instructions are intended to clarify the Department of Defense (DoD) instructions as they apply to AF requirements. **Firms must ensure their proposal meets all requirements of the Broad Agency Announcement currently posted on the DoD website at the time the announcement closes.**

1. The AF Program Manager is Mr. David Shahady. The AF SBIR/STTR Program Office can be contacted at afsbirsttr-info@us.af.mil. For general inquiries or problems with the electronic submission, contact the DoD SBIR/STTR Help Desk via email at dodsbirsupport@reisystems.com (9:00 a.m. to 5:00 p.m. ET, Monday through Friday). For technical questions about the topics during the pre-announcement period (10 December 2019 through 13 January 2020), contact the Topic Authors listed for each topic on the Web site. For information on obtaining answers to your technical questions during the formal announcement period (14 Jan 2020 through 12 February 2020), go to <https://sbir.defensebusiness.org>. Your complete proposal **must** be submitted via the submissions site at <https://www.dodsbirsttr.mil/submissions/> on or before the **8:00 pm ET, 12 February 2020 deadline.**

General information related to the AF Small Business Program can be found at the AF Small Business website, <http://www.airforcesmallbiz.af.mil/>. The site contains information related to contracting opportunities within the AF, as well as business information and upcoming outreach/conference events. Other informative sites include those for the Small Business Administration (SBA), www.sba.gov, and the Procurement Technical Assistance Centers, <http://www.aptacus.us.org>. These centers provide Government contracting assistance and guidance to small businesses, generally at no cost.

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CHART 1: Consolidated SBIR Topic Information

Applicable Topics	Phase I					Phase II			
	Technical Volume (Vol 2)	Additional Info (Vol 5)	Award Amount	*Technical Duration	*Final Reporting Period	Technical Volume (Vol 2)	Additional Info (Vol 5)	Technical & Reporting	Initial Award Amount
AF201-001	Not to exceed 5 pages	Attach a pitch deck not to exceed 15 slides	Not to exceed \$150,000	6 months	3 months	Not to exceed 15 pages	Attach a pitch deck not to exceed 15 slides	Typically 27 months	Not to exceed \$750,000

*The technical duration and final reporting duration must be added together for the total duration of the project.

PHASE I PROPOSAL SUBMISSION

Read the DoD program announcement at <https://sbir.defensebusiness.org> for program requirements.

When you prepare your proposal, keep in mind that Phase I should address the feasibility of a solution to the topic. For the AF, the contract period of performance for a Phase I shall be nine (9) months, and the award shall not exceed \$150,000. We will accept only one Cost Volume per Topic Proposal and it must address the entire nine-month contract period of performance.

The Phase I topic awardees must accomplish the majority of their primary research during the first six months of the contract with the additional three months of effort to be used for generating final reports. Each AF organization may request Phase II proposals prior to the completion of the first six months of the contract based upon an evaluation of the contractor’s technical progress and review by the AF technical point of contact utilizing the criteria in section 8.0 of the DoD announcement. The last three months of the nine-month Phase I contract will provide project continuity for all Phase II awardees so no modification to the Phase I contract should be necessary.

Limitations on Length of Proposal

The Phase I Technical Volume has a 5-page-limit (excluding the Cover Sheet, Cost Volume, Cost Volume Itemized Listing (a-j). The Technical Volume must be in no type smaller than 10-point on standard 8-1/2" x 11" paper with one (1) inch margins. Only the Technical Volume and any enclosures or attachments count toward the 5-page limit. In the interest of equity, pages in excess of the 5-page limitation will not be considered for review or award. The documents required for upload into Volume 5 "Other" category do not count towards the 5-page limit.

NOTE: The Fraud, Waste and Abuse Certificate of Training Completion (Volume 6) is required to be completed prior to proposal submission. More information concerning this requirement is provided below under "**PHASE I PROPOSAL SUBMISSION CHECKLIST**".

Phase I Proposal Format

Proposal Cover Sheet: If your proposal is selected for award, the technical abstract and discussion of anticipated benefits will be publicly released on the Internet; therefore, do not include proprietary information in these sections.

Technical Volume: The Technical Volume should include all graphics and attachments but should not include the Cover Sheet it is completed separately. The Phase I proposals shall include a technical volume (uploaded in Volume 2) that shall not exceed 5 pages and a pitch/slide deck not to exceed 15 slides (uploaded in Volume 5). The technical volume and slide deck will be reviewed holistically. It is recommended (but not required) that more detailed information is included in the technical volume and higher level information is included in the pitch deck. Most proposals will be printed out on black and white printers so make sure all graphics are distinguishable in black and white. To verify that your proposal has been received, click on the "Check Upload" icon to view your proposal. Typically, your uploaded file will be virus checked and converted to a .pdf document within the hour. If your proposal does not appear after an hour, please contact the DoD SBIR/STTR Help Desk via email at dodsbirsupport@reisystems.com (9:00 am to 6:00 pm ET Monday through Friday).

Key Personnel: Identify in the Technical Volume all key personnel who will be involved in this project; include information on directly related education, experience, and citizenship. A technical resume of the principal investigator, including a list of publications, if any, must be part of that information. Concise technical resumes for subcontractors and consultants, if any, are also useful. You must identify all U.S. permanent residents to be involved in the project as direct employees, subcontractors, or consultants. You must also identify all non-U.S. citizens expected to be involved in the project as direct employees, subcontractors, or consultants. For all non-U.S. citizens, in addition to technical resumes, please provide countries of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project, as appropriate. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a contract issued as a result of this announcement.

Phase I Work Plan Outline

<p><u>NOTE: THE AF USES THE WORK PLAN OUTLINE AS THE INITIAL DRAFT OF THE PHASE I STATEMENT OF WORK (SOW). THEREFORE, DO NOT INCLUDE PROPRIETARY INFORMATION IN THE WORK PLAN OUTLINE. TO DO SO WILL NECESSITATE A REQUEST FOR REVISION AND MAY DELAY CONTRACT AWARD.</u></p>
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At the beginning of your proposal work plan section, include an outline of the work plan in the following format:

Scope: List the major requirements and specifications of the effort.

Task Outline: Provide a brief outline of the work to be accomplished over the span of the Phase I effort.

Milestone Schedule

Deliverables

Kickoff meeting within 30 days of contract start

Progress reports

Technical review within 6 months

Final report with SF 298

Cost Volume

Cost Volume information should be provided by completing the on-line Cost Volume and including the Cost Volume Itemized Listing specified below. The Cost Volume detail must be adequate to enable Air Force personnel to determine the purpose, necessity and reasonability of each cost element. Provide sufficient information (a-j below) on how funds will be used if the contract is awarded. The on-line Cost Volume and Itemized Cost Volume Information will not count against the 5-page limit. The itemized listing may be placed in the “Explanatory Material” section of the on-line Cost Volume (if enough room), or may be submitted in Volume 5 under the “Other” dropdown option. (Note: Only one file can be uploaded to the DoD Submission Site). Ensure that this file includes your complete Technical Volume and the information below.

- a. Special Tooling and Test Equipment and Material: The inclusion of equipment and materials will be carefully reviewed relative to need and appropriateness of the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and relate directly to the specific effort. They may include such items as innovative instrumentation and/or automatic test equipment.
- b. Direct Cost Materials: Justify costs for materials, parts, and supplies with an itemized list containing types, quantities, and price and where appropriate, purposes.
- c. Other Direct Costs: This category of costs includes specialized services such as machining or milling, special testing or analysis, costs incurred in obtaining temporary use of specialized equipment. Proposals, which include leased hardware, must provide an adequate lease vs. purchase justification or rationale.
- d. Direct Labor: Identify key personnel by name if possible or by labor category if specific names are not available. The number of hours, labor overhead and/or fringe benefits and actual hourly rates for each individual are also necessary.
- e. Travel: Travel costs must relate to the needs of the project. Break out travel cost by trip, with the number of travelers, airfare, per diem, lodging, etc. The number of trips required, as well as the destination and purpose of each trip should be reflected. Recommend budgeting at least one (1) trip to the Air Force location managing the contract.
- f. Cost Sharing: If proposing cost share arrangements, please note each Phase I contract total value may not exceed \$75,000 total, while Phase II contracts shall have an initial Not to Exceed value of \$750,000. Please note that cost share contracts do not allow fees. NOTE: Subcontract arrangements involving provision of Independent Research and Development (IR&D) support are prohibited in accordance with

Under Secretary of Defense (USD) memorandum "Contractor Cost Share", dated 16 May 2001, as implemented by SAF/AQ memorandum, same title, dated 11 July 2001.

g. Subcontracts: Involvement of university or other consultants in the planning and/or research stages of the project may be appropriate. If the offeror intends such involvement, describe in detail and include information in the Cost Volume. The proposed total of all consultant fees, facility leases or usage fees, and other subcontract or purchase agreements may not exceed one-third of the total contract price or cost, unless otherwise approved in writing by the Contracting Officer. Support subcontract costs with copies of the subcontract agreements. The supporting agreement documents must adequately describe the work to be performed. At a minimum, an offeror must include a Statement of Work (SOW) with a corresponding detailed Cost Volume for each planned subcontract.

h. Consultants: Provide a separate agreement letter for each consultant. The letter should briefly state what service or assistance will be provided, the number of hours required and hourly rate.

i. Any exceptions to the model Phase I purchase order (P.O.) found at <http://www.afsbirsttr.af.mil/Program/Overview/> should be included in your cost proposal. Full text for the clauses included in the P.O. may be found at <http://farsite.hill.af.mil>.

NOTE: If no exceptions are taken to an offeror's proposal, the Government may award a contract without discussions (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. If selected for award, the award contract or P.O. document received by your firm may vary in format/content from the model P.O. reviewed. If there are questions regarding the award document, contact the Phase I Contracting Officer listed on the selection notification. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary.

j. DD Form 2345: For proposals submitted under export-controlled topics (either International Traffic in Arms (ITAR) or Export Administration Regulations (EAR)), a copy of the certified DD Form 2345, Militarily Critical Technical Data Agreement, or evidence of application submission must be included. The form, instructions, and FAQs may be found at the United States/Canada Joint Certification Program website, <http://www.dla.mil/HQ/InformationOperations/Offers/Products/LogisticsApplications/JCP/DD2345Instructions.aspx>. Approval of the DD Form 2345 will be verified if proposal is chosen for award.

NOTE: Restrictive notices notwithstanding, proposals may be handled for administrative purposes only, by support contractors; U.Group, Peerless Technologies, Engineering Services Network, HPC-COM, Mile Two, REI Systems, MacB (an Alion company), Infinite Management Solutions, LLC, Mile Two. In addition, only Government employees and technical personnel from Federally Funded Research and Development Centers (FFRDCs) MITRE and Aerospace Corporations working under contract to provide technical support to AF Life Cycle Management Center and Space and Missiles Centers may evaluate proposals. All support contractors are bound by appropriate non-disclosure agreements. If you have concerns about any of these contractors, you should contact the AF SBIR/STTR Contracting Officer, Kris Croake, kristina.croake@us.af.mil.

k. The Air Force does not participate in the Discretionary Technical and Business Assistance (TABAs) program. Contractors should not submit proposals that include Discretionary Technical and Business Assistance.

PHASE I PROPOSAL SUBMISSION CHECKLIST

NOTE: If you are not registered in the System for Award Management, <https://www.sam.gov/>, you will not be eligible for an award. Additionally, verify that you are registered to receive contracts (not just grants) and that your address matches between your proposal and SAM.

- 1) The Air Force Phase I proposal shall be a nine-month effort, and the cost shall not exceed \$150,000.
- 2) The Air Force will accept only those proposals submitted electronically via the DoD SBIR Web site (<https://www.dodsbirsttr.mil/submissions/>).

It is mandatory that the complete proposal submission -- DoD Proposal Cover Sheet, Technical Volume with any appendices, Cost Volume, Itemized Cost Volume Information, and Fraud, Waste and Abuse Certificate of Training Completion -- be submitted electronically through the DoD SBIR Web site at <https://www.dodsbirsttr.mil/submissions/>) Each of these documents is to be submitted through the Website.

Please note that the Fraud, Waste and Abuse Training must be completed prior to submission of your proposal. This is accomplished under Volume 6 of the DoD SBIR Web site (<https://www.dodsbirsttr.mil/submissions/>)). When the training has been completed and certified, the DoD Submission Website will indicate this in the proposal which will complete the Volume 6 requirement. If the training has not been completed, you will receive an error message. Your proposal cannot be submitted until this training has been completed. The Fraud, Waste and Abuse Certificate of Training website can be found under Section 3.6 of the DoD 20.1 SBIR BAA Instructions. Your complete proposal **must** be submitted via the submissions site on or before the **8:00 pm ET, 12 February 2020 deadline**. A hardcopy **will not** be accepted.

The AF recommends that you complete your submission early, as computer traffic gets heavy near the announcement closing and could slow down the system. **Do not wait until the last minute.** The AF will not be responsible for proposals being denied due to servers being “down” or inaccessible. **Please assure that your e-mail address listed in your proposal is current and accurate. The AF is not responsible for ensuring notifications are received by firms changing mailing address/e-mail address/company points of contact after proposal submission without proper notification to the AF. Changes of this nature that occur after proposal submission or award (if selected) for Phase I and II shall be sent to the Air Force SBIR/STTR site address, afsbirsttr-info@us.af.mil.**

AIR FORCE PROPOSAL EVALUATIONS

The AF will utilize the Phase I proposal evaluation criteria in section 6.0 of the DoD announcement in descending order of importance with technical merit being most important, followed by the qualifications of the principal investigator (and team), followed by the potential for commercialization as detailed in the Commercialization Plan.

The AF will utilize the Phase II proposal evaluation criteria in section 8.0 of the DoD announcement in descending order of importance with technical merit being most important, followed by the potential for commercialization as detailed in the Commercialization Plan, followed by the qualifications of the principal investigator (and team).

Proposal Status and Feedback

The Principal Investigator (PI) and Corporate Official (CO) indicated on the Proposal Cover Sheet will be notified by e-mail regarding proposal selection or non-selection. Small Businesses will receive a notification for each proposal submitted. Please read each notification carefully and note the Proposal

Number and Topic Number referenced. **If changes occur to the company mail or email address(es) or company points of contact after proposal submission, the information should be provided to the AF at afsbirsttr-info@us.af.mil.**

Feedback requests must be submitted in writing within 30 days after receipt of notification of non-selection. Written requests for feedback must be submitted via www.afsbirsttr.af.mil through the SBIR system. Requests for feedback should include the company name and telephone number/email address for a company point of contact and alternate. Also include the topic number under which the proposal(s) was submitted, and the proposal number(s). Feedback requests received more than 30 days after receipt of notification of non-selection will be fulfilled at the Contracting Officers' discretion. Unsuccessful offerors are entitled to no more than one feedback session for each proposal.

IMPORTANT: Proposals submitted to the AF are received and evaluated by different offices within the Air Force and handled on a Topic-by-Topic basis. Each office operates within their own schedule for proposal evaluation and selection. Updates and notification timeframes will vary by office and Topic. If your company is contacted regarding a proposal submission, it is not necessary to contact the AF to inquire about additional submissions. Additional notifications regarding your other submissions will be forthcoming.

We anticipate having all the proposals evaluated and our Phase I contract decisions within approximately three months of proposal receipt. All questions concerning the status of a proposal, or feedback, should be directed to the local awarding organization's SBIR Program Manager.

PHASE II PROPOSAL SUBMISSIONS

Phase II is the demonstration of the technology that was found feasible in Phase I. Only Phase I awardees are eligible to submit a Phase II proposal. All Phase I awardees will be sent a notification with the Phase II proposal submittal date and a link to detailed Phase II proposal preparation instructions, located here: <http://www.afsbirsttr.af.mil/Program/Phase-I-and-II/>. Phase II efforts are typically 27 months in duration (24 months technical performance, with 3 additional months for final reporting), and an initial value not to exceed \$750,000.

NOTE: Phase II awardees should either have or start working towards having a Defense Contract Audit Agency (DCAA) approved accounting system. It is strongly urged that an approved accounting system be in place prior to the AF Phase II award timeframe. If you have questions regarding this matter, please discuss with your Phase I Contracting Officer.

All proposals must be submitted electronically at <https://www.dodsbirsttr.mil/submissions/> by the date indicated in the notification. The Technical Volume is **limited to 15 pages** (unless a different number is specified in the notification; any advocacy letters, SBIR Environment Safety and Occupational Health (ESOH) Questionnaire, and Cost Volume Itemized Listing (a-j) will not count against the 15-page limitation and should be placed as the last pages of the Technical Volume file that is uploaded. The Phase II proposals shall also include a pitch/slide deck not to exceed 15 slides (uploaded in Volume 5). The technical volume and slide deck will be reviewed holistically and there is no set format requirements for the two documents. It is recommended (but not required) that more detailed information is included in the technical volume and higher level information is included in the pitch deck. (Note: For Phase II applications only one file can be uploaded to the DoD Submission Site. Ensure that this single file includes your complete Technical Volume and the additional Cost Volume information.) The preferred format for submission of proposals is Portable Document Format (.pdf). Graphics must be distinguishable in black and white. Please virus-check your submissions.

AIR FORCE SBIR PROGRAM MANAGEMENT IMPROVEMENTS

The AF reserves the right to modify the Phase II submission requirements. Should the requirements change, all Phase I awardees will be notified. The AF also reserves the right to change any administrative procedures at any time that will improve management of the AF SBIR Program.

AIR FORCE SUBMISSION OF FINAL REPORTS

All Final Reports will be submitted to the awarding AF organization in accordance with the Contract. Companies will not submit Final Reports directly to the Defense Technical Information Center (DTIC).

AIR FORCE SBIR 20.1 Topic Index

AF201-001 Flight Test Playback Tool

AIR FORCE SBIR 20.1 Topic Descriptions

AF201-001 TITLE: Flight Test Playback Tool

TECHNOLOGY AREA(S): Information Systems

ACQUISITION PROGRAM: N/A

OBJECTIVE: Develop, test, and implement a Flight Test playback and review tool that incorporates terrain data.

DESCRIPTION: The Air Force's Special Operations Forces/ Combat Search and Rescue team perform constant aircraft avionics system software and hardware revision cycles to meet new or improved Air Force mission capabilities. With each revision cycle (Block Upgrade), the 402nd Software Engineering Group (402 SWEG) performs extensive Independent Verification and Validation (IV&V) of the avionics suite.

Currently, the process of performing analysis on test-flight data is manpower and time intensive. Performing manual review has several limitations. For example, analysts cannot correlate terrain data with Unit Under Test (UUT). Radar terrain data accuracy cannot be evaluated. If topology can be incorporated with UUT sensor data, Software/Hardware performance accuracy can be confirmed and, the analysts will finally have a method to accurately evaluate radar returns. Being able to incorporate terrain data into flight test reviews will provide for more detailed analysis of aircraft dynamics as they relate to the environment allowing for analysis of the airframe as it moves through the test envelope.

This research topic is seeking innovative advancements and automation of the current technology available to the US Air Force to support UUT flight-test and radar data analysis. There are many limiting factors involving manual analysis of flight-test data. Currently, the ability to accurately compare radar return data with topology is non-existent. The research will bring about the process required for maximizing the effectiveness of all flight tests by the incorporation of specific terrain features providing a complete analysis of the complete test environment. The US Air Force will see process improvement, elimination of safety risk, improved software sustainment, and benefits derived from the new process.

PHASE I: Develop a Flight Test playback and review tool that incorporates terrain data.

PHASE II: The Phase I technology will be tested, optimized and expanded to incorporate those characteristics that were not previously developed.

PHASE III DUAL USE APPLICATIONS: If Phase II is successful, the company will be expected to support the Air Force in transitioning the technology for use. Working with the Air Force, the company will integrate the technology for evaluation to determine its effectiveness in an operationally relevant environment.

REFERENCES:

1. "Terrain Synthesis from Digital Elevation Models." Howard Zhou, Jie Sun, Greg Turk, and Jim Rehg, IEEE Viz. 2007. <https://ieeexplore.ieee.org/document/4293025>.
2. "Real-Time Editing, Synthesis, and Rendering of Infinite Landscapes on GPUs." Jens Schneider, Tobias Boldte, Rüdiger Westermann, 2006. <https://pdfs.semanticscholar.org/2000/fd31703293aaa08fe622a3b032f21ba707e6.pdf>.
3. Digital Representations of the Real World: How to Capture, Model, and Render Visual Reality. A K Peters/CRC Press. May 7, 2015. Ps. 137 and 455.
4. Devouassoux, Y., 2001, Extended Kalman Filter For The Navigation System Of An Autonomous Helicopter, Special Problem Report, School of Aerospace Engineering, Georgia Institute of Technology, 2001.

KEYWORDS: automation, data analysis, topography, terrain