**UNITED STATES SPECIAL OPERATIONS COMMAND  
19.3 Small Business Innovation Research (SBIR)  
Phase I Proposal Submission Instructions**

**Introduction:**

The United States Special Operations Command (USSOCOM) seeks small businesses with strong research and development capabilities to pursue and commercialize technologies needed by Special Operations Forces through the Department of Defense (DoD) SBIR 19.3 Program Broad Agency Announcement (BAA). A thorough reading of the “Department of Defense Small Business Innovation Research (SBIR) Program, SBIR 19.3 Program Broad Agency Announcement (BAA)” prior to reading these USSOCOM instructions is highly recommended.

These USSOCOM instructions explain USSOCOM specific aspects that differ from the DoD Announcement and its instructions.

**Table 1: Consolidated SBIR Topic Information**

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| --- | --- | --- | --- | --- |
| **Topic** | **Technical Volume (Vol 1)** | **Additional Info. (Vol 5)** | **Period of Performance** | **Award Amount** |
| *Phase I*  SOCOM193-001 | Not to exceed 5 pages | 15 page PowerPoint | Not to exceed 6 months | Typically $150,000 |
| *Phase I*  SOCOM193-002 | Not to exceed 5 pages | 15 page PowerPoint | Not to exceed 6 months | Typically $150,000 |

**Technical Inquiries:**

During the Pre-release Period of the DoD SBIR 19.3 Program BAA, all questions must be submitted in writing either by e-mail to [sbir@socom.mil](mailto:sbir@socom.mil) or to the online SBIR/STTR Interactive Topic Information System (SITIS). All questions and answers submitted to SITIS will be released to the general public. USSOCOM does not allow inquirers to talk directly or communicate in any other manner to the topic authors (differs from Section 4.15.c. of the DoD SBIR 19.3 Program BAA instructions). **All inquiries must include the topic number in the subject line of the e-mail.**

During the Open Period, follow the instructions in section 4.15.d of the DoD SBIR 19.3 Program BAA Instructions.

***Site visits will not be permitted during the Pre-release and Open Periods of the DoD SBIR 19.3 Program BAA.***

**Phase I Topics SOCOM193-001 and SOCOM193-002 Proposal Submission:**

**Topics SOCOM193-001 and SOCOM193-D003 are both titled “Novel ISR Payloads Hosting on Nanosatellite Bus.”** SOCOM193-001 is a Phase I topic allowing firms to submit Phase I proposals for new ideas that require a feasibility study. Otherwise submit to the Direct to Phase II topic SOCOM193-D003 per direct to Phase II instructions.

**Proposal Volumes:**

**Volume 1: Cover page required per DoD instructions.**

**Volume 2: Technical Volume**

The Technical Volume page count will include all the required items under section 5.4.c of the DoD SBIR 19.3 instructions and shall not exceed 5 pages. Offerors shall also submit a slide deck not to exceed 15 PowerPoint slides in Volume 5 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 slide deck. The Cost Volume (Volume 3) for the Special Topics will cover the total effort.

The identification of foreign national involvement in a USSOCOM SBIR topic is needed to determine if a firm is ineligible for award on a USSOCOM topic that falls within the parameters of the United States Munitions List, Part 121 of the International Traffic in Arms Regulation (ITAR). A firm employing a foreign national(s) (as defined in paragraph 3.5 entitled “Foreign Nationals” of the DoD SBIR 19.3 Announcement) to work on a USSOCOM ITAR topic must possess an export license to receive a SBIR Phase I contract.

**Volume 3: Cost Volume**

Companies submitting a Phase I proposal under this BAA must complete the DoD Phase I simplified Cost Volume using the DOD on-line form, with a base cost typically $150,000 plus Technical and Business Assistance (TABA) cost (if applicable) not to exceed $6,500 over a period of up to six months.

USSOCOM may provide TABA funds in Phase I awards to firms that require third-party vendor assistance setting up their accounting system to meet the audit needs for a cost plus fixed fee contract type. These funds can only be used to pay for third-party assistance. The small business that wishes to obtain TABA funds shall provide a cost proposal and work description from the selected third-party vendor. The TABA funds will be a separate contract line item and they shall be proposed separately and in addition to the research and development proposal. USSOCOM only considers TABA funding for firms that have never had a Defense Contract Audit Agency (DCAA) audit of their accounting system and never used external vendor assistance establishing a Federal Acquisition Regulations (FAR) compliant accounting system ready for audit. Information about DCAA and the audit process can be found at: <https://www.dcaa.mil/Home/AuditProcessOverview?title=Introductory%20information%20on%20the%20government%20auditing%20process%20and%20specific%20information%20for%20Small%20Business%20Contractors>.

The TABA information must be included in the firm’s cost proposal specifically identified as “Discretionary Technical and Business Assistance” and cannot be subject to any profit or fee by the requesting SBIR firm. In addition, the provider of the TABA may not be the requesting firm, an affiliate of the requesting firm, an investor of the requesting firm, or a subcontractor or consultant of the requesting firm otherwise required as part of the paid portion of the research effort (e.g., research partner, consultant, tester, or administrative service provider). Proposed TABA will be evaluated by the USSOCOM SBIR Program office. The proposed amount is in addition to the award amount for Phase I and cannot exceed $6,500 per year. The firm’s proposal must (1) clearly identify the need for assistance (purpose and objective of required assistance); (2) provide details on the provider of the assistance (name and point of contact for performer and unique skills/specific experience to carry out the assistance proposed); and (3) the cost of the required assistance (costs and hours proposed or other details on arrangement that would justify the proposed expense).

A minimum of two-thirds of the research and/or analytical work in Phase I must be conducted by the proposing firm. The percentage of work is measured by both direct and indirect costs as a percentage of the total contract cost. The Cost Volume may include travel to Tampa during the third or fourth month of the contract for a progress review and Phase II proposal overview meeting. This travel is not mandatory and the Offeror may propose a telephone conference. If you choose to have a meeting in person, the meeting will be held at the SOFWERX facility:

1925 E 2nd Avenue, Suite 102

Tampa, FL 33605

**Volume 4: Company Commercialization Report**

Required by DoD but not evaluated by USSOCOM.

**Volume 5: Supporting Documents**

Potential Offerors shall submit a slide deck not to exceed 15 PowerPoint slides.

**Volume 6: Fraud, Waste and Abuse Training**

Required by DoD but not evaluated by USSOCOM

**Phase I proposals shall NOT include:**

1. Any other travel for Government meetings. All other meetings with the Government will be conducted via electronic media.
2. Government furnished property or equipment.
3. Priced or Unpriced Options.
4. A Technical Volume exceeding five pages. USSOCOM will only evaluate the first five pages of the Technical Volume. Additional pages will not be considered or evaluated.
5. “Basic Research” (or “Fundamental Research”) defined as a “Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and/or observable facts without specific applications toward processes or products in mind.”
6. Human or animal studies.

**Phase I Evaluations:**

USSOCOM evaluates Phase I proposals using the evaluation criteria specified in section 6.0 of the DoD 19.3 SBIR Announcement except for:

The Technical Volume and slide deck will be reviewed holistically. The two-part evaluation process is explained below:

Part I: The evaluation of the Technical Volume will utilize the Evaluation Criteria provided in Section 6.0 of the DoD SBIR 19.3 BAA. Once the evaluations are complete, all Offerors will be notified as to whether they were selected to present the slide deck portion of their proposal.

Part II: Selected Offerors will receive an invitation to present their slide deck (30 minute presentation time / 30 minute question and answer), in a technical question and answer forum, to the USSOCOM evaluation team, on 19-20 November 2019 at the SOFWERX facility. All selected firms will be reimbursed $2,000 to offset presentation costs. This presentation will be evaluated by a panel against the criteria listed under Section 6.0 of the DoD SBIR 19.3 BAA. Notifications of selection/non-selection will be completed within the following five business days.

Additionally, input on technical aspects of the proposals may be solicited by USSOCOM from non-Government consultants and advisors who are bound by appropriate non-disclosure requirements.  Non-Government personnel will not establish final assessments of risk, rate, or rank Offeror’s proposals.

These advisors are expressly prohibited from competing for USSOCOM SBIR awards.  All administrative support contractors, consultants, and advisors having access to any proprietary data will certify that they will not disclose any information pertaining to this announcement, including any submission, the identity of any submitters, or any other information relative to this announcement; and shall certify that they have no financial interest in any submission. Submissions and information received in response to this announcement constitutes the Offeror’s permission to disclose that information to administrative support contractors and non-Government consultants and advisors.

**Selection Notifications**:

The Government Contracting Officer will notify each Offeror by e-mail whether they have been selected for award. The e-mail notification will be sent to the Corporate Official (Business) identified by the Offeror.

**Informal Feedback:**

A non-selected Offeror can make a written request, within 30 calendar days of receipt of notification of non-selection, for informal feedback. USSOCOM will provide informal feedback within 30 calendar days of an Offeror’s written request rather than a debriefing as specified in paragraph 4.10, entitled "Debriefing," of the DoD SBIR 19.3 Announcement.

**USSOCOM SBIR Program Point of Contact:**

Inquiries concerning the USSOCOM SBIR Program should be addressed to [sbir@socom.mil](mailto:sbir@socom.mil).

**USSOCOM SBIR 19.3 Topic Index**

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| SOCOM193-001 | Nanosatellite Payloads for Tactical Intelligence, Surveillance, and Reconnaissance |
| SOCOM193-002 | Small Arms Spotting Round |

**USSOCOM SBIR 19.3 Topic Descriptions**

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| SOCOM193-001 | TITLE: Nanosatellite Payloads for Tactical Intelligence, Surveillance, and Reconnaissance |

TECHNOLOGY AREA(S): Electronics, Sensors, Space Platforms

ACQUISITION PROGRAM: Technical Collection and Communications and Joint Threat Warning Systems

OBJECTIVE: The objective of this topic is the development of innovative payloads that can be hosted onboard a nanosatellite bus, for the advancement of USSOCOM capabilities in rapid intelligence collection, surveillance, and reconnaissance.

DESCRIPTION: USSOCOM is interested in improving its capabilities in intelligence collection, surveillance, and reconnaissance from spaceborne platforms. Although existing national assets and commercial services can provide ISR data to USSOCOM users, USSOCOM desires more abundant capabilities for rapid collection and dissemination of actionable data. A constellation of ISR satellites is envisioned. Since costs (developmental, procurement, and launch) are all generally correlated with spacecraft size, building such a constellation with traditional large spacecraft would be cost-prohibitive. Thus, it is advantageous to reduce the size of the spacecraft as much as possible.  
  
Nanosatellites, and particularly CubeSats, have become increasingly popular in the last decade. Although many of the first missions were academic or experimental in nature, more recent missions have demonstrated the feasibility of using these platforms for actual operational capabilities. Certain missions that would have traditionally been performed by larger spacecraft can be transitioned to these smaller platforms, resulting in numerous benefits.  
  
There are, however, also technical tradeoffs and challenges in hosting payloads on nanosatellites rather than larger platforms. The payload must have a smaller volume and be shaped appropriately. Available power is limited, both instantaneously and orbit-averaged. Thermal regulation, attitude control, onboard processing, and communication data-rates are all typically poorer on smaller spacecraft than their larger counterparts.  
  
The purpose of this SBIR topic is to advance the state-of-the-art of technologies for small satellite ISR data production and delivery, acknowledging both the mentioned challenges and the harsh space environment. The desired outcome is high TRL (technology readiness level) packaged ISR payloads for nanosatellites. Resulting payloads should demonstrate novel capabilities or significant advantages over spacecraft ISR payloads currently available on this size scale.  
  
In terms of the missions themselves, USSOCOM is interested in ISR data of various forms. Broadly, USSOCOM is interested in detecting, geolocating, identifying, and/or characterizing objects of interest. Objects of interest include adversaries, their weapons, their equipment, their vessels/vehicles, and the terrain/structures of the environment itself (note that both terrestrial and maritime environments are applicable). Collection methods could include, as one example, analyzing imagery in the visible band (this is already the most prolific and mature of nanosatellite missions). Additional utility might be achieved by expanding imagers into the infrared regime or improving spectral resolution. Other techniques might be able to derive actionable intelligence from RF signals, by either actively probing (e.g. synthetic aperture radar) or passively collecting, enabled by advancements in antennas and software-defined radios. Other methods of remote sensing, such as those used on scientific missions, might offer unexplored utility when applied to USSOCOM ISR applications. These descriptions are non-exhaustive, and suggestions for ISR methods not-listed might also be appealing.  
  
So long as the proposed effort is developmental in nature, there are multiple avenues that could be followed in achieving the desired outcome of producing packaged nanosatellite ISR payloads that advance the state-of-the-art. The following are all within scope of this topic:  
• Innovating with novel sensors or designs to produce nanosatellite ISR payloads for which fundamental merits have been demonstrated, but there are no operational heritages.  
• Miniaturization of larger ISR payloads to the nanosatellite form factor.  
• Repurposing of existing technologies or payloads to meet USSOCOM-specific ISR needs. This could include, for example, development of novel software processing techniques to derive new conclusions from common sensors, or hardware modifications to enhance collection capabilities on USSOCOM-peculiar targets.  
• Adaptation of payloads used on ground, sea, or airborne platforms to the nanosatellite platforms. Developments would need to account for the challenges unique to nanosatellite platforms, including reduced Size Weight and Power of the new platforms, the challenges of the space environment, and the greatly increased ranges between the sensors and targets.  
• Fusion of data between two or more bundled sensors, to enable exploitation of data in ways not possible on prior payloads with singular sensors.  
  
Emphasis is placed upon rapid tactical operation. The envisioned CONOPs would have a user (in the tactical theatre) issuing an ISR request to the constellation, the satellites autonomously performing data collections as necessary, and then quickly downlinking the results back to the user. Although payload developers are not responsible for the communications infrastructure itself, they should be mindful of the quantities of data that their payloads produce, especially since ISR sensors are typically able to produce large quantities of data in excess of downlink capabilities. If possible, mitigation of the downlink requirements is desirable, for example by extracting and downlinking only key conclusions rather than the entirety of the raw data.  
  
USSOCOM does not pose strict requirements for the usage of any particular satellite host bus, but preference is given to selecting a commercial host bus that follows CubeSat design standards and is 6U in size (ref 1). Similarly, the term “nanosatellite” typically refers to spacecraft with gross mass in the range of 1 kg to 10 kg, but host spacecrafts larger in size will also be considered for this topic (up to 30 kg gross mass). If multiple design options exist for the size of the payload, then the trade space of size versus performance should be presented. USSOCOM will work with the vendor during the SBIR effort to identify a host bus that can both support the payload and allow for high-volume constellation deployment.  
  
PROPOSALS ACCEPTED: Offerors have the option of pursuing either a Phase I award, or a Direct to Phase II award. Direct to Phase II awards are intended to fund efforts for which prior research and development have demonstrated designs with maturity comparable to that of the outcome of a Phase I effort. Direct to Phase II proposals are expected to include feasibility documentation, as described below in the “Feasibility Documentation” section, in lieu of performing a Phase I effort.

PHASE I: For the Phase I effort, offerors shall conduct a feasibility study to assess the art of the possible to satisfy the requirements specified in the above “Description” section. As an outcome of this feasibility study, offerors should include a concept of operations and analyze/quantify potential data that can be provided. Offerors should also include a preliminary payload design and address all viable system design options with respective specifications. Offerors should justify the scientific and technical merit of the technology, especially for components that are innovative or otherwise higher-risk.  
  
Tasking under this phase could include:  
• Identify basic scientific principles for the proposed payload, applications to USSOCOM needs, and notional CONOPs.  
• Establish proof-of-concept of basic principles and applications, either analytically or experimentally.  
• Formulate a preliminary payload design, including packaging and electronics that could feasibly be integrated with a nanosatellite host.  
• Predict performance of the preliminary design by using analysis, modeling, simulation, tests and/or other tools.  
• Estimate the system properties of payload, such as mass, volume, and shape.  
• Estimate the requirements for integration with a host satellite, such as power requirements, attitude control requirements, thermal regulation requirements, computing requirements, and downlink requirements.  
• Verify the integration compatibility of the preliminary design with potential commercial nanosatellite buses of the appropriate form factor.  
• Describe the procedure and algorithms for processing the collected data. At minimum, describe any techniques that are strictly necessary for transforming the raw sensor data into a form that can be consumed by the user. Optionally, describe any more sophisticated techniques that could exploit the data stream to enhance the utility of the data, or reduce the quantity of data that must be downlinked.  
• Define how operators would task the payload, receive payload data, and interpret such data. Wherever possible, automation is preferred, and it is desirable to maximize utility of the data while minimizing burden on the user.  
  
The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study (“Technology Readiness Level 3”) to investigate what is in the art of the possible within the given trade space that will satisfy a needed technology. The feasibility study should investigate all options that meet or exceed the minimum performance parameters specified in this write up. It should also address the risks and potential payoffs of the innovative technology options that are investigated and recommend the option that best achieves the objective of this technology pursuit. The funds obligated on the resulting Phase I SBIR contracts are to be used for the sole purpose of conducting a thorough feasibility study using scientific experiments and laboratory studies as necessary. Operational prototypes will not be developed with USSOCOM SBIR funds during Phase I feasibility studies. Operational prototypes developed with other than SBIR funds that are provided at the end of Phase I feasibility studies will not be considered in deciding what firm(s) will be selected for Phase II.

PHASE II: For the Phase II effort, offerors shall develop and demonstrate the prototype system determined to be the most feasible solution during the Phase I feasibility study. The objective of this phase is to advance the technology readiness of the payload as much as possible, by refining the payload design, building a prototype payload, and testing the prototype in a relevant environment. USSOCOM will coordinate with the vendor to identify a suitable nanosatellite host bus, and one outcome of this phase would be the integration of the prototype payload with hardware and software equipment representative of the selected host bus. Subject to USSOCOM funding and user interest, a flight demonstration mission will also be considered under the scope of this phase.  
  
Tasking under this phase could include:  
• Coordinate with USSOCOM to identify a suitable nanosatellite host bus. Modify payload design as necessary to ensure compatibility with the selected host bus.  
• Perform further analysis, modeling, and simulation to optimize payload design and improve performance.  
• Build a prototype payload.  
• Test the prototype payload and verify its capability to collect mission data on a representative target. Evaluate measured performance characteristics versus expectations and make design adjustments as necessary.  
• Develop software to control the payload, collect/process mission data, and interact with the host bus.  
• Demonstrate operation of the prototype payload in a representative space environment. Validate the robustness of the payload to both the space environment and the launch environment, performing necessary tests (e.g. thermal vacuum, vibration) as guided by an appropriate standard (e.g. ref 2).  
• Integrate the prototype payload with hardware and software equipment representative of the selected host bus. Integration equipment should be procured from the host bus vendor and could be either a flat-sat, a desktop development unit, or an engineering development unit.  
  
Subject to USSOCOM funding and user interest, tasking under this phase could also include:  
• Integrate a prototype payload with a flight unit of the selected host bus, in preparation for launch of a demonstration mission.  
• Support on-orbit test, demonstration, and evaluation.  
• Train government operators as required to command the payload, interpret mission data, and evaluate payload capabilities.

PHASE III DUAL USE APPLICATIONS: This system could be used in a broad range of military applications where there are requirements for timely collection of ISR data from spaceborne assets. A potential transition path could involve fielding of this payload on tens or hundreds of satellites in a coordinated multi-plane constellation, achieving frequent revisit rates and unprecedented data delivery latencies. Depending on the nature and specifics of the payload, the capabilities developed could also be used in other missions by commercial companies or other government organizations.

REFERENCES:

1. CubeSat Design Specification, California Polytechnic State University, http://cubesat.org/

2. NASA General Environmental Verification Standard (GEVS), GFSC-STD-7000, Rev A, Goddard Space Flight Center, https://standards.nasa.gov/standard/gsfc/gsfc-std-7000

KEYWORDS: USSOCOM, space, satellite, nanosatellite, cubesat, payload, imagery, remote sensing, ISR

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| SOCOM193-002 | TITLE: Small Arms Spotting Round |

TECHNOLOGY AREA(S): Air Platform, Ground/Sea Vehicles, Weapons

ACQUISITION PROGRAM: Lightweight 338 Medium Machine Gun, Lightweight Assault Machine Gun, and Advanced Sniper Rifle

OBJECTIVE: The objective of this topic is to develop an innovative small arms marking round to replace tracers in adjusting machine gun fire.

DESCRIPTION: USSOCOM is seeking 7.62mm x 51 NATO spotting rounds to replace tracers for adjusting machine gun fire, both day and night, producing a flash and /or smoke signature visible at 800m-1200m. Current tracers allow gunners to observe the trajectory of the rounds and make aiming corrections without observing the impact of the rounds fired and without using the sights of the weapon. However, these rounds give away the gunners position, burn out before the maximum range of the machine gun and draws enemy fire. Replacing tracers with marking or spotting pyrotechnic rounds enables the gunner to directly control the impact on to the target, shows target coverage, and does not disclose the shooters location. This will increase the accuracy of machine gun fire, save ammunition, and increase gunner survivability.  
  
Key Attributes: Threshold (T), Objective (O)  
  
 a. Visible day and night at 600m (T) -1500m (O)  
 b. 7.62mm (T) , 7.62, 6.5mm and .338 (O)  
 c. Ballistic trajectory match the 147 gr 7.62mm x 51mm M80 Ball (T), 6.5mm 130grs Open Tip Match (OTM), and 300gr 338 Norma Magnum OTM.  
 d.. 90% flash on hard surfaces (T), 70 % function on soft ground (O).  
 e. Fire hazard no worse than current tracers.  
 f. Meet environmental, health and safety limits.  
  
While traditional incendiary projectile have some of these attributes, they have unacceptably thick jackets and tend to function only against hard surfaces. The pyrotechnic mix is optimized for incendiary effects rather than maximizing visual effects with minimum incendiary effects. Projectile weight, shape, combination of materials, and loading will have to be adjusted to achieve a ballistic match.

PHASE I: Conduct a feasibility study to assess what is in the art of the possible that satisfies the requirements specified in the above paragraph entitled “Description.”  
  
The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study (“Technology Readiness Level 3”) to investigate what is in the art of the possible within the given trade space that will satisfy a needed technology. The feasibility study should investigate all options that meet or exceed the minimum performance parameters specified in this write up. It should also address the risks and potential payoffs of the innovative technology options that are investigated and recommend the option that best achieves the objective of this technology pursuit. The funds obligated on the resulting Phase I SBIR contracts are to be used for the sole purpose of conducting a thorough feasibility study using scientific experiments and laboratory studies as necessary. Operational prototypes will not be developed with USSOCOM SBIR funds during Phase I feasibility studies. Operational prototypes developed with other than SBIR funds that are provided at the end of Phase I feasibility studies will not be considered in deciding what firm(s) will be selected for Phase II.

PHASE II: Develop, install, and demonstrate a prototype system determined to be the most feasible solution during the Phase I feasibility study on a 7.62mm Marking Round.

PHASE III DUAL USE APPLICATIONS: This system could be used in a broad range of military applications where sensing and adjusting the target impact is critical. The new rounds are most applicable to effective long range machine gun and/or achieving second round hits when sniping at extreme long range.

REFERENCES:

1. Jean Huon, “Military Rifle and Machine Gun Cartridges”, .50 caliber Spotter, M48, pages 329-330, dated 1 June 1990

2. Headquarters, Department of the Army, Technical Manual, TM 43-0001-27 “Army Ammunition Data Sheets Small Caliber Ammunition” FSC 1305, dated April 1994

3. https://www.army.mil/article/130675/engineers\_developing\_safer\_more\_accurate\_tracer\_round, Engineers Developing Safer, More Accurate Tracer Round, By Audra Calloway, Picatinny Public Affairs July 28, 2014

4. Bev Fitchett's Guns Magazine, “Chemical Analysis of Firearms”, https://www.bevfitchett.us/chemical-analysis-of-firearms/incendiary-bullets.html, Incendiary Bullets, 27 Mar 2019

KEYWORDS: Small Arms Ammunition, Machine Gun Fire Control, Incendiary Ammunition, Marking Rounds, Spotting Rounds, Machine Gun Techniques of Fire