Office of the Under Secretary of Defense for Research and Engineering
FutureG & 5G
23.4 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

July 11, 2023: Topics issued for pre-release
July 25, 2023: OUSD(R&E) begins accepting proposals via DSIP
August 15, 2023: DSIP Topic Q&A closes to new questions at 12:00 p.m. ET
August 29, 2023: Deadline for receipt of proposals no later than 12:00 p.m. ET

INTRODUCTION

The Office of the Undersecretary of Defense, Research and Engineering (OUSD(R&E) FutureG & 5G aims to ensure DoD can securely operate through or make use of existing commercial 5G network in any environment by delivering clear and actionable security assurances and providing enhancements and augmentation to a combination of the end user device and the existing communications infrastructure.

Proposers responding to a topic in this BAA must follow all general instructions provided in the Department of Defense (DoD) SBIR Program BAA. OUSD(R&E) FutureG & 5G requirements in addition to or deviating from the DoD Program BAA are provided in the instructions below.

Proposers are encouraged to thoroughly review the DoD Program BAA and register for the DSIP Listserv to remain apprised of important programmatic and contractual changes.

- The DoD Program BAA is located at: https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/ and https://www.defensesbirsttr.mil/SBIR-STTR/announcements. Be sure to select the tab for the appropriate BAA cycle.
- Register for the DSIP Listserv at: https://www.dodsbirsttr.mil/submissions/login.

Specific questions pertaining to the administration of the OUSD(R&E) FutureG & 5G SBIR Program and these proposal preparation instructions should be directed to: Brian D. Saunders at Brian.D.Saunders2.ctr@mail.mil.

This release contains an open topic. As outlined in section 7 of the SBIR and STTR Extension Act of 2022, innovation open topic activities—

(A) Increase the transition of commercial technology to the Department of Defense;
(B) Expand the small business nontraditional industrial base;
(C) Increase commercialization derived from investments of the Department of Defense; and
(D) Expand the ability for qualifying small business concerns to propose technology solutions to meet the needs of the Department of Defense.

Unlike conventional topics, which specify the desired technical objective and output, open topics can use generalized mission requirements or specific technology areas to adapt commercial products or solutions to close capability gaps, improve performance, or provide technological advancements in existing capabilities.

A small business concern may only submit one (1) proposal to each open topic. If more than one proposal from a small business concern is received for a single open topic, only the most recent proposal to be certified and submitted prior to the submission deadline will receive an evaluation. All prior proposals submitted by the small business concern for the same open topic will be marked as nonresponsive and will not receive an evaluation.

PHASE I PROPOSAL GUIDELINES
The Defense SBIR/STTR Innovation Portal (DSIP) is the official portal for DoD SBIR/STTR proposal submission. Proposers are required to submit proposals via DSIP; proposals submitted by any other means will be disregarded. Detailed instructions regarding registration and proposal submission via DSIP are provided in the DoD SBIR Program BAA.

Technical Volume (Volume 2)
The technical volume is not to exceed twelve (12) pages of written text. Eight (8) additional pages of content such as graphics and charts that describe aspects of the solution and the company are allowed but not required. Technical volume beyond the twenty (20) pages will not be considered for evaluation purposes.

Additional formatting and content requirements are provided in the DoD Program BAA.

Cost Volume (Volume 3)
The Phase I Base amount must not exceed $295,000 for a six (6) month period of performance. Costs must be clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3.

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. OUSD(R&E) FutureG & 5G will occasionally accept deviations from the POW requirements with written approval from the Funding Agreement officer.

Company Commercialization Report (CCR) (Volume 4)
Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoD SBIR Program BAA for full details on this requirement. Information contained in the CCR will be considered by OUSD(R&E) FutureG & 5G during proposal evaluations.

Supporting Documents (Volume 5)
All proposing small business concerns are REQUIRED to submit the following documents to Volume 5:

1. Contractor Certification Regarding Provision of Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment
2. Disclosures of Foreign Affiliations or Relationships to Foreign Countries
3. Disclosure of Funding Sources

Please refer to the DoD Program BAA for more information.

PHASE II PROPOSAL GUIDELINES
Phase II proposals may only be submitted by Phase I awardees. Phase I awardees will receive a separate notification with detailed instructions and timelines for Phase II proposal submission.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)
OUSD (R&E) FutureG & 5G will not provide technical and business assistance for this open topic.

EVALUATION AND SELECTION
All proposals will be evaluated in accordance with the evaluation criteria listed in the DoD SBIR Program BAA.

Proposing firms will be notified of selection or non-selection status for a Phase I award within 90 days of the closing date of the BAA. All notifications will be made to the corporate official and principal investigator identified on the proposal coversheet.

Refer to the DoD SBIR Program BAA for procedures to protest the Announcement.
As further prescribed in FAR 33.106(b), FAR 52.233-3, protests after award should be submitted to:

Brian D. Saunders
Brian.D.Saunders2.ctr@mail.mil

Defense SBIR/STTR Program Office
osd.ncr.ousd-r-e.mbx.SBIR-STTR-Protest@mail.mil

END

OUSD(R&E)
FutureG & 5G SBIR 23.4 Topic Index
Release 1

OSD234-P001 5G RF Radio Frequency (RF) Coverage in Challenging Interior Spaces Open Topic

OSD234-P001 TITLE: 5G RF Radio Frequency (RF) Coverage in Challenging Interior Spaces Open Topic

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): FutureG; Sustainment & Logistics

OBJECTIVE: Identify, assess, develop, and demonstrate 5G RF (Radio Frequency) coverage solutions to provide an RF based communications for interior structures. The primary use case is in support of real-time logistic operations. Solutions should support data, voice, video, IoT (Internet of Things) and machine to machine-based applications.

DESCRIPTION: The Office of the Under Secretary of Defense (OUSD) for Research and Engineering (R&E) FutureG initiative seeks RF coverage solutions for challenging dynamic interior spaces such as warehouses, supply vessels, and hanger bays. Common characteristics of these spaces include dense interiors with metal dividers and barriers. Further, these spaces may be frequently reconfigured, creating new RF environments and new propagation challenges. For example, a previously empty of area of a warehouse, ship hold, or hanger may be loaded with pallets of dense material. Later those pallets are distributed, returning that to an empty space. Providing coverage in these types of spaces will require unique solutions to ensure that the RF propagation supports performance requirements such as throughput, latency, and reliability.

Successful deployment solutions should provide high network capacity in small areas while minimizing compromises in latency, reliability, and overall performance. This topic does not seek a specific fixed network capacity, but instead seeks a solution that anticipates demands for network capacity in these areas will vary over time. Building on the example above, an empty region will typically include few (if any) devices, change from empty to hundreds of devices as pallets of dense materials are moved to the area, and then decrease down to tens of devices as those pallets are distributed.

Successful solutions will be assessed by focusing on four (4) metrics. Metric One (1) is the ability to support dynamic changes in network density, as measured by number of active devices that can be supported in a small region of the interior space. Preferred solutions will allow large changes in network density. Metric two (2) is ability to minimize changes in overall performance (such as latency and reliability) as the network density changes. Preferred solutions will have minimal changes in overall performance as density increases. Metric three (3) measures the overall cost of deployment, including both installation/capital expense (CAPEX) costs and operating expense (OPEX) costs. Metric four (4) measures the complexity of initial configuration and ongoing operations. An example of a complexity metric would be how many manual tasks are reduced or eliminated by automation or potential numbers of tasks that are handled by AI (Artificial Intelligence). Metrics are a key/critical tool in evaluating the overall effectiveness of a proposal's implementation. Low metrics with a solid get-well plan are as good as high metrics. No solution is ever perfect. The general metrics described here should be expanded into more granular metrics during the development of the proposal.

This topic does not require a specific technical approach. However, two approaches are discussed for illustrative purposes. One approach could be to deploy and/or reconfigure Distributed Antenna Systems (DAS) in response to high network capacity demands. However, accomplishing this in a dynamic environment requires substantial reconfiguration and/or extensions of an existing network. Another approach could deploy and/or reconfigure small cells to address the challenge of high density in small areas. However, deploying large numbers of small cells requires a corresponding large number of equipment (and hence cost). More importantly, in a dynamic environment this can compromise latency, reliability and overall performance due to a high number of hand-offs between cells. Neither DAS nor small cells are required. These approaches are intended only to illustrate the trade-offs between supporting high capacity while minimizing compromises in latency, reliability, and overall performance.

PHASE I: Develop an initial concept design and plan for practical deployment of 5G RF coverage solutions. Phase I will be a 6-month Period of Performance (PoP). During this period there will be a kickoff, Technical Interchange Meeting (TIM), and a Preliminary Design Review (PDR). Prior to the end of Phase I, the performer will develop and present a proposed, detailed plan related to how they expect to address Phase II prototype production, test, and evaluation efforts.

PHASE II: During Phase II, the performer will begin the prototype production and test and evaluation process for transition. Phase II will be a 12-month PoP with a Critical Design Review at month six (6) and prototype demonstration at month nine (9) which is 3 months before contract end at month twelve (12).

Prototype demonstration will be conducted at a DoD selected location, during which the prototype's capabilities must be successfully demonstrated. For budget and planning purposes, proposals should assume the test facility will be a DoD provided environment which will be a surface vessel or an environment which is identical in physical properties to a surface vessel. Test facilities may vary and will be determined as part of an award. A partial solution may be determined to be successful if the DoD determined it to be effective in a limited role. A Final Technical Report of the prototype capabilities as demonstrated at the Final Demonstration will also be required. Extended user evaluations or additional prototypes may be pursued to determine military utility.

PHASE III DUAL USE APPLICATIONS: The solution described in this topic has potential direct application to commercial applications such as container ships and cruise ships. These commercial environments have logistic tracking requirements that require RF solutions that deliver connectivity in very complex RF propagation environments. Additional military applications include multi-level underground and undersea mobile and fixed environments. Adaptability and flexibility in design and engineering of the solution is an additional benefit as these aspects will create more opportunities to solve similar coverage issues that were not initially identified.

REFERENCES:

1. U.S. Patent US009766321B2 "INDOOR POSITIONING WITH RADIO FREQUENCY CHIRP SIGNAL PROPAGATION DELAY MEASUREMENT" is an example of a potential technical consideration that a small business might utilize in their solution for this topic. The topic author is not endorsing this reference solution but is provided merely for reference purposes. https://patents.google.com/patent/US9766321

KEYWORDS: 5G, RF coverage, Interior, Structure, Network.