DEPARTMENT OF THE NAVY (DON)
25.2 Small Business Innovation Research (SBIR)
Direct to Phase II (DP2) Announcement and Proposal Submission Instructions

IMPORTANT

- **The following instructions apply to Direct to Phase II (DP2) SBIR topic only:**
  - **N252-D09 through N252-D11**
- Submitting small business concerns are encouraged to thoroughly review the DoD SBIR/STTR Program Broad Agency Announcement (BAA) and register for the DSIP Listserv to remain apprised of important programmatic changes.
  - The DoD Program BAA is located at: https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/#announcements. Select the tab for the appropriate BAA cycle.
  - Register for the DSIP Listserv at: https://www.dodsbirsttr.mil/submissions/login.
- The information provided in the DON Proposal Submission Instructions takes precedence over the DoD Instructions posted for this BAA.
- A submitting small business concern **MUST** use the DP2 Phase I Feasibility proposal template for Volume 2. This template is specific to DON DP2 topics and meets DP2 submission requirements. The DP2 Phase I Feasibility proposal template can be found at https://navysbir.com/links_forms.htm.
- Proposing small business concerns that are more than 50% owned by multiple venture capital operating companies (VCOC), hedge funds (HF), private equity firms (PEF) or any combination of these are eligible to submit proposals in response to DON topics advertised in this BAA. Information on Majority Ownership in Part and certification requirements at time of submission for these proposing small business concerns are detailed in the section titled ADDITIONAL SUBMISSION CONSIDERATIONS.
- DON provides notice that Basic Ordering Agreements (BOAs) or Other Transaction Agreements (OTAs) may be used for Phase II awards.
- This BAA is issued under regulations set forth in Federal Acquisition Regulation (FAR) 35.016 and awards will be made under "other competitive procedures". The policies and procedures of FAR Subpart 15.3 shall not apply to this BAA, except as specifically referenced in it. All procedures are at the sole discretion of the Government as set forth in this BAA. Submission of a proposal in response to this BAA constitutes the express acknowledgement to that effect by the proposing small business concern.

INTRODUCTION

The DON SBIR/STTR Programs are mission-oriented programs that integrate the needs and requirements of the DON's Fleet through research and development (R&D) topics that have dual-use potential, but primarily address the needs of the DON. More information on the programs can be found on the DON SBIR/STTR website at www.navysbir.com. Additional information on DON's mission can be found on the DON website at www.navy.mil.

The Department of Defense (DoD), including the Department of the Navy (DON), may issue an SBIR award to a small business concern under Phase II , without regard to whether the small business concern received a Phase I award for such project. Prior to such an award, the head of the agency, or their designee, must issue a written determination that the small business concern has demonstrated the scientific and technical merit and feasibility of the technology solution that appears to have commercial potential (for use by the government or in the public sector). The determination must be submitted to the Small Business Administration (SBA) prior to issuing the Phase II award. As such, DON issues this portion of the BAA in accordance with the requirements of the Direct to Phase II (DP2) authority. Only those proposing small business concerns that are capable of meeting the DP2 proposal requirements may participate in this DP2 BAA. No Phase I awards will be issued to the designated DP2 topic.

For questions regarding this BAA, use the information in Table 1 to determine who to contact for what types of questions.

TABLE 1: POINTS OF CONTACT FOR QUESTIONS REGARDING THIS BAA

Type of Question	**When**	**Contact Information**
Program and administrative	Always	DON SBIR/STTR Program Management Office usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil or appropriate Program Manager listed in Table 2 (below)
Topic-specific technical questions	BAA Pre-release	Technical Point of Contact (TPOC) listed in each topic on the DoD SBIR/STTR Innovation Portal (DSIP). Refer to the Proposal Submission section of the DoD SBIR/STTR Program BAA for details.
	BAA Open	DoD SBIR/STTR Topic Q&A platform (https://www.dodsbirsttr.mil/submissions) Refer to the Proposal Submission section of the DoD SBIR/STTR Program BAA for details.
Electronic submission to the DoD SBIR/STTR Innovation Portal (DSIP)	Always	DSIP Support via email at dodsbirsupport@reisystems.com
Navy-specific BAA instructions and forms	Always	DON SBIR/STTR Program Management Office usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil

TABLE 2: DON SYSTEMS COMMAND (SYSCOM) SBIR PROGRAM MANAGERS

Topic Numbers	Point of Contact	SYSCOM	Email
N252-D09 to N252-D10	Ms. Kristi DePriest	Naval Air Systems Command (NAVAIR)	navair-sbir@us.navy.mil

N252-D11	Mr. Shadi Azoum	Naval Information Warfare Systems Command (NAVWAR)	info@navwarsbir.com

Each DON SBIR DP2 topic requires documentation to determine that Phase I feasibility, described in the Phase I section of the topic, has been met.

The DON SBIR DP2 is a two-step process:

> STEP ONE: Prepare and Submit a Phase I Feasibility Proposal (instructions and link to template provided below). The purpose of the Phase I Feasibility Proposal is for the proposing small business concern to provide documentation to substantiate that both Phase I feasibility and the scientific and technical merit described in the topic have been met. The Phase I Feasibility Proposal must: demonstrate that the proposing small business concern performed Phase I-type research and development (R&D) and provide a concise summary of Phase II objectives, work plan, related research, key personnel, transition/commercialization plan, and estimated costs. Feasibility documentation MUST NOT be solely based on work performed under prior or ongoing federally funded SBIR/STTR work. The government will evaluate Phase I Feasibility Proposals and select small business concerns to submit a Full DP2 Proposal. Demonstrating proof of feasibility is a requirement for a DP2 award. The small business concern must submit a Phase I Feasibility Proposal to be considered for selection to submit a Full DP2 Proposal.
>
> STEP TWO: If selected, the cognizant SYSCOM Program Office will contact the small business concern directly to provide instructions on how to submit a Full DP2 Proposal.

DON SBIR reserves the right to make no awards under this DP2 BAA. All awards are subject to availability of funds and successful negotiations. Proposing small business concerns must read the topic requirements carefully. The Government is not responsible for expenditures by the proposing small business concern prior to award of a contract. For 25.2 topics designated as DP2, DON will accept only Phase I Feasibility Proposals (described below).

DP2 PROPOSAL SUBMISSION REQUIREMENTS

The following section details requirements for submitting a compliant DON SBIR DP2 Proposal to the DoD SBIR/STTR Programs.

(NOTE: Proposing small business concerns are advised that support contract personnel will be used to carry out administrative functions and may have access to proposals, contract award documents, contract deliverables, and reports. All support contract personnel are bound by appropriate non-disclosure agreements.)

DoD SBIR/STTR Innovation Portal (DSIP). Proposing small business concerns are required to submit proposals via the DoD SBIR/STTR Innovation Portal (DSIP); and follow proposal submission instructions in the DoD SBIR/STTR Program BAA on the DSIP at https://www.dodsbirsttr.mil/submissions. Proposals submitted by any other means will be disregarded. Proposing small business concerns submitting through DSIP for the first time will be asked to register. It is recommended that proposing small business concerns register as soon as possible upon identification of a proposal opportunity to avoid delays in the proposal submission process. Proposals that are not successfully certified electronically in DSIP by the Corporate Official prior to BAA Close will NOT be considered submitted and will not be evaluated by DON.

Proposals that are encrypted, password protected, or otherwise locked in any portion of the submission will be REJECTED unless specifically directed within the text of the topic to which you are submitting. Please refer to the DoD SBIR/STTR Program BAA for further information.

Eligibility. Each proposing small business concern must:

- Have demonstrated feasibility of Phase I-type R&D work
- Have submitted a Phase I Feasibility Proposal for evaluation
- Meet Offeror Eligibility and Performance Requirements as defined in the Proposal Fundamentals section of the DoD SBIR/STTR Program BAA
- Comply with primary employment requirements of the principal investigator (PI) during the Phase II award including, employment with the small business concern 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 time is spent in the employ of the small business concern
- Register in the System for Award Management (SAM) as defined in the Certifications and Registrations section of the DoD SBIR/STTR Program BAA. To register, visit https://sam.gov/

Proposal Volumes. The following seven volumes are required.

- **Proposal Cover Sheet (Volume 1).** As specified in DoD SBIR/STTR Program BAA.

- **Technical Volume (Volume 2).**
  - Technical Proposal (Volume 2) must meet the following requirements or the proposal will be REJECTED:
    - A submitting small business concern MUST use the DP2 Phase I Feasibility proposal template for Volume 2. The DP2 Phase I Feasibility proposal template can be found at https://navysbir.com/links_forms.htm.

      This template is specific to DON DP2 topics and meets DP2 submission requirements:
      - Not to exceed 30 pages, regardless of page content; Phase I Proof of Feasibility portion not to exceed 20 pages, Snapshot of Proposed Phase II Effort portion not to exceed 10 pages
      - Single column format, single-spaced typed lines
      - Standard 8 ½" x 11" paper
      - Page margins one inch on all sides. A header and footer may be included in the one-inch margin.
      - No font size smaller than 10-point

  - Additional information:
    - A font size smaller than 10-point is allowable for headers, footers, imbedded tables, figures, images, or graphics that include text. However, proposing small business concerns are cautioned that if the text is too small to be legible it will not be evaluated.

- **Cost Volume (Volume 3).** The text fields related to costs for the proposed effort must be answered in the Cost Volume of the DoD Submission system (at https://www.dodsbirsttr.mil/submissions/), however, proposing small business concerns DO NOT need to download and complete the separate cost volume template when submitting the DON SBIR Phase I Feasibility Proposal. Proposing small business concerns are to include a cost estimate in the Order of Magnitude Cost Estimate Table (example below) within the Snapshot of Proposed Phase II Effort portion of the Technical Volume (Volume 2). Please refer to Table 3 below for guidance on cost and period of performance. Costs for the Base and Option are to be separate and identified on the Proposal Cover Sheet and in the Order of Magnitude Cost Estimate Table in the Technical Volume (Volume 2).

Order of Magnitude Cost Estimate Table			
Line Item – Details	**Estimated Base Amount**	**Estimated Option Amount**	**Total Estimated Amount Base + Option**
Direct Labor (fully burdened) – Prime			
Subcontractors/Consultants			
Material			
Travel & ODC			
G&A			
FCCM			
Fee/Profit			
TABA (NTE $25K, included in total amount)			
Total Estimated Costs			

TABLE 3: COST & PERIOD OF PERFORMANCE

Topic Number	Base		Option		Total (NTE)
	Cost (NTE)	POP (NTE)	Cost (NTE)	POP (NTE)	
N252-D09 to N252-D10	$1,000,000	30 mos.	$300,000	12 mos.	$1,300,000
N252-D11	$750,000	18 mos.	$1,000,000	24 mos.	$1,750,000*

***** Step Two: for the Full Phase II submission, if selected, N252-D1X will require the Phase II Option 1 and Phase II Option 2 to be detailed separately:

- Phase II Option 1: Cost $500,000, Period of Performance 12 months
- Phase II Option 2: Cost $500,000, Period of Performance 12 months

- Additional information:
  - For Phase II a minimum of 50% of the work is performed by the proposing small business concern. The percentage of work requirement must be met in the Base costs as well as in the Option costs. The percentage of work is measured by both direct and indirect costs. To calculate the minimum percentage of work for the proposing small business concern the sum of all direct and indirect costs attributable to the proposing small business concern represent the numerator and the total cost of the proposal (i.e., Total Cost before Profit Rate is applied) is the denominator. The subcontractor percentage is calculated by taking the sum of all costs attributable to the subcontractor as the numerator and the total cost of the proposal (i.e., Total Cost before Profit Rate is applied) as the denominator. **NOTE:** G&A, if proposed, will only be attributed to the proposing small business concern.
  - Provide sufficient detail for subcontractor, material, and travel costs. Subcontractor costs must be detailed to the same level as the prime contractor. Material costs must include a listing of items and cost per item. Travel costs must include the purpose of the trip, number of trips, location, length of trip, and number of personnel.
  - Inclusion of cost estimates for travel to the sponsoring SYSCOM's facility for one day of meetings is recommended for all proposals.
  - The "Additional Cost Information" of Supporting Documents (Volume 5) may be used to provide supporting cost details for Volume 3.

- **Company Commercialization Report (Volume 4)**. DoD collects and uses Volume 4 and DSIP requires Volume 4 for proposal submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details to ensure compliance with DSIP Volume 4 requirements.

- **Supporting Documents (Volume 5).** Volume 5 is for the submission of administrative material that DON may or will require to process a proposal, if selected, for contract award.

  All proposing small business concerns must review and submit the following items, as applicable:
  - **Majority Ownership in Part.** Proposing small business concerns which are more than 50% owned by multiple venture capital operating companies (VCOC), hedge funds (HF), private equity firms (PEF), or any combination of these as set forth in 13 C.F.R. § 121.702, are eligible to submit proposals in response to DON topics advertised within this BAA. Complete the certification as detailed under ADDITIONAL SUBMISSION CONSIDERATIONS.

  - Additional information:
    - Proposing small business concerns may include the following administrative materials in Supporting Documents (Volume 5); a template is available at https://navysbir.com/links_forms.htm to provide guidance on optional material the proposing small business concern may want to include in Volume 5:
      - Additional Cost Information to support the Cost Volume (Volume 3)
      - SBIR/STTR Funding Agreement Certification
      - Data Rights Assertion
      - Disclosure of Information (DFARS 252.204-7000)
      - Prior, Current, or Pending Support of Similar Proposals or Awards
      - Foreign Citizens
    - Details of Request for Discretionary Technical and Business Assistance (TABA), if proposed, is to be included under the Additional Cost Information section if using the DON Supporting Documents template.
    - Do not include documents or information to substantiate the Technical Volume (Volume 2) (e.g., resumes, test data, technical reports, or publications). Such documents or information will not be considered.
    - A font size smaller than 10-point is allowable for documents in Volume 5; however, proposing small business concerns are cautioned that the text may be unreadable.

- **Fraud, Waste and Abuse Training Certification (Volume 6)**. DoD requires Volume 6 for submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details.

- **Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7)**. In accordance with Section 4 of the SBIR and STTR Extension Act of 2022 and the SBA SBIR/STTR Policy Directive, the DoD will review all proposals submitted in response to this BAA to assess security risks presented by small business concerns seeking a Federally funded award. Small business concerns must complete the Disclosures of Foreign Affiliations or Relationships to Foreign Countries webform in Volume 7 of the DSIP proposal submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details.

DP2 EVALUATION AND SELECTION

The following section details how the DON SBIR/STTR Programs will evaluate Phase I Feasibility proposals.

Proposals meeting DSIP submission requirements will be forwarded to the DON SBIR/STTR Programs. Prior to evaluation, all proposals will undergo a compliance review to verify compliance with DoD and DON SBIR/STTR proposal eligibility requirements. Proposals not meeting submission requirements will be REJECTED and not evaluated.

- **Proposal Cover Sheet (Volume 1).** The Proposal Cover Sheet (Volume 1) will undergo a compliance review to verify the proposing small business concern has met eligibility requirements and followed the instructions for Proposal Cover Sheet as specified in the DoD SBIR/STTR Program BAA.

- **Technical Volume (Volume 2).** The DON will evaluate and select Phase I Feasibility proposals using the evaluation criteria specified in the Method of Selectin and Evaluation Criteria section of the DoD SBIR/STTR Program BAA, with technical merit being most important, followed by qualifications of key personnel and commercialization potential of equal importance. The information considered for this decision will come from Volume 2. This is not a FAR Part 15 evaluation and proposals will not be compared to one another. Cost is not an evaluation criterion and will not be considered during the evaluation process; the DON will only do a compliance review of Volume 3. Due to limited funding, the DON reserves the right to limit the number of awards under any topic.

  The Technical Volume (Volume 2) will undergo a compliance review (prior to evaluation) to verify the proposing small business concern has met the following requirements or the proposal will be REJECTED:
  - A submitting small business concern MUST use the DP2 Phase I Feasibility proposal template for Volume 2. The DP2 Phase I Feasibility proposal template can be found at https://navysbir.com/links_forms.htm.
    This template is specific to DON DP2 topics and meets DP2 submission requirements:
    - Not to exceed 30 pages, regardless of page content; Phase I Proof of Feasibility portion not to exceed 20 pages, Snapshot of Proposed Phase II Effort portion not to exceed 10 pages
    - Single column format, single-spaced typed lines
    - Standard 8 ½" x 11" paper
    - Page margins one inch on all sides. A header and footer may be included in the one-inch margin.
    - No font size smaller than 10-point, except as permitted in the instructions above.

- **Cost Volume (Volume 3).** The Cost Volume (Volume 3) will not be considered in the selection process and will undergo a compliance review to verify the proposing small business concern has met the following requirements or the proposal will be REJECTED:
  - Must not exceed values for the Base and Option (refer to Table 3).
  - Must meet minimum percentage of work; a minimum of 50% of the work is performed by the proposing small business concern. The percentage of work requirement must be met in the Base costs as well as in the Option costs.

- **Company Commercialization Report (Volume 4).** The CCR (Volume 4) will not be evaluated by the DON nor will it be considered in the award decision. However, all proposing small business concerns must refer to the DoD SBIR/STTR Program BAA to ensure compliance with DSIP Volume 4 requirements.

- **Supporting Documents (Volume 5).** Supporting Documents (Volume 5) will not be considered in the selection process and will only undergo a compliance review to ensure the proposing small business

concern has included items in accordance with the DP2 SUBMISSION INSTRUCTIONS section above.

- **Fraud, Waste, and Abuse Training Certificate (Volume 6).** Not evaluated.

- **Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7)**. Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7) will be assessed as part of the Due Diligence Program to Assess Security Risks. Refer to the DoD SBIR/STTR Program BAA to ensure compliance with Volume 7 requirements.

ADDITIONAL SUBMISSION CONSIDERATIONS

This section details additional items for proposing small business concerns to consider during proposal preparation and submission process.

Due Diligence Program to Assess Security Risks. The SBIR and STTR Extension Act of 2022 (Pub. L. 117-183) requires the Department of Defense, in coordination with the Small Business Administration, to establish and implement a due diligence program to assess security risks presented by small business concerns seeking a Federally funded award. Please review the Certifications and Registrations section of the DoD SBIR/STTR Program BAA for details on how DoD will assess security risks presented by small business concerns. The Due Diligence Program to Assess Security Risks will be implemented for all Phases.

Discretionary Technical and Business Assistance (TABA). The SBIR and STTR Policy Directive section 9(b) allows the DON to provide TABA (formerly referred to as DTA) to its awardees. The purpose of TABA is to assist awardees in making better technical decisions on SBIR/STTR projects; solving technical problems that arise during SBIR/STTR projects; minimizing technical risks associated with SBIR/STTR projects; and commercializing the SBIR/STTR product or process, including intellectual property protections. Proposing small business concerns may request, in their Cost Volume (Volume 3), to contract these services themselves through one or more TABA providers in an amount not to exceed the values specified below. The Phase II TABA amount is up to $25,000 per award, is to be included as part of the award amount and is limited by the established award values for Phase II by the SYSCOM (i.e., within the $2,000,000 or lower limit specified by the SYSCOM). The amount proposed for TABA cannot include any profit/fee by the proposing small business concern and must be inclusive of all applicable indirect costs. TABA cannot be used in the calculation of general and administrative expenses (G&A) for the SBIR proposing small business concern. A Phase II project may receive up to an additional $25,000 for TABA as part of one additional (sequential) Phase II award under the project for a total TABA award of up to $50,000 per project. A TABA Report, detailing the results and benefits of the service received, will be required annually by October 30.

Request for TABA funding will be reviewed by the DON SBIR/STTR Program Management Office.

If the TABA request does not include the following items the TABA request will be denied.
- TABA provider(s) (firm name)
- TABA provider(s) point of contact, email address, and phone number
- An explanation of why the TABA provider(s) is uniquely qualified to provide the service
- Tasks the TABA provider(s) will perform (to include the purpose and objective of the assistance)
- Total TABA provider(s) cost, number of hours, and labor rates (average/blended rate is acceptable)

TABA must NOT:
- Be subject to any indirect costs, profit, or fee by the SBIR proposing small business concern
- Propose a TABA provider that is the SBIR proposing small business concern

- Propose a TABA provider that is an affiliate of the SBIR proposing small business concern
- Propose a TABA provider that is an investor of the SBIR proposing small business concern
- Propose a TABA provider that is a subcontractor or consultant of the requesting small business concern otherwise required as part of the paid portion of the research effort (e.g., research partner, consultant, tester, or administrative service provider)

TABA requests must be included in the proposal as follows:

- Phase II:
  - DON Phase II Cost Volume (provided by the DON SYSCOM) - the value of the TABA request.
  - Supporting Documents (Volume 5) – a detailed request for TABA (as specified above) specifically identified as "TABA" in the section titled Additional Cost Information when using the DON Supporting Documents template.

Proposed values for TABA must NOT exceed:

- Phase II: A total of $25,000 per award, not to exceed $50,000 per Phase II project

If a proposing small business concern requests and is awarded TABA in a Phase II contract, the proposing small business concern will be eliminated from participating in the Navy SBIR Transition Program (STP), the DON Forum for SBIR/STTR Transition (FST), and any other Phase II assistance the DON provides directly to awardees.

All Phase II awardees not receiving funds for TABA in their awards must participate in the virtual Navy STP Kickoff during the first or second year of the Phase II contract. While there are no travel costs associated with this virtual event, Phase II awardees should budget time of up to a full day to participate. STP information can be obtained at: https://navystp.com. Phase II awardees will be contacted separately regarding this program.

Disclosure of Information (DFARS 252.204-7000). In order to eliminate the requirements for prior approval of public disclosure of information (in accordance with DFARS 252.204-7000) under this award, the proposing small business concern shall identify and describe all fundamental research to be performed under its proposal, including subcontracted work, with sufficient specificity to demonstrate that the work qualifies as fundamental research. Fundamental research means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons (defined by National Security Decision Directive 189). A small business concern whose proposed work will include fundamental research and requests to eliminate the requirement for prior approval of public disclosure of information must complete the DON Fundamental Research Disclosure and upload as a separate PDF file to the Supporting Documents (Volume 5) in DSIP as part of their proposal submission. The DON Fundamental Research Disclosure is available on https://navysbir.com/links_forms.htm and includes instructions on how to complete and upload the completed Disclosure. Simply identifying fundamental research in the Disclosure does **NOT** constitute acceptance of the exclusion. All exclusions will be reviewed and, if approved by the Government Contracting Officer, noted in the contract.

Majority Ownership in Part. Proposing small business concerns that are more than 50% owned by multiple venture capital operating companies (VCOC), hedge funds (HF), private equity firms (PEF), or any combination of these as set forth in 13 C.F.R. § 121.702, **are eligible** to submit proposals in response to DON topics advertised within this BAA.

For proposing small business concerns that are a member of this ownership class the following must be satisfied for proposals to be accepted and evaluated:

a. Prior to submitting a proposal, proposing small business concerns must register with the SBA Company Registry Database.
b. The proposing small business concern within its submission must submit the Majority-Owned VCOC, HF, and PEF Certification. A copy of the SBIR VC Certification can be found on https://navysbir.com/links_forms.htm. Include the SBIR VC Certification in the Supporting Documents (Volume 5).
c. Should a proposing small business concern become a member of this ownership class after submitting its proposal and prior to any receipt of a funding agreement, the proposing small business concern must immediately notify the Contracting Officer, register in the appropriate SBA database, and submit the required certification, which can be found on https://navysbir.com/links_forms.htm.

System for Award Management (SAM). It is strongly encouraged that proposing small business concerns register in SAM, https:// sam.gov, by the Close date of this BAA, or verify their registrations are still active and will not expire within 60 days of BAA Close. Additionally, proposing small business concerns should confirm that they are registered to receive contracts (not just grants) and the address in SAM matches the address on the proposal. A small business concern selected for an award MUST have an active SAM registration at the time of award or they will be considered ineligible.

Notice of NIST SP 800-171 Assessment Database Requirement. The purpose of the National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171 is to protect Controlled Unclassified Information (CUI) in Nonfederal Systems and Organizations. As prescribed by DFARS 252.204-7019, in order to be considered for award, a small business concern is required to implement NIST SP 800-171 and shall have a current assessment uploaded to the Supplier Performance Risk System (SPRS) which provides storage and retrieval capabilities for this assessment. The platform Procurement Integrated Enterprise Environment (PIEE) will be used for secure login and verification to access SPRS. For brief instructions on NIST SP 800-171 assessment, SPRS, and PIEE, please visit https://www.sprs.csd.disa.mil/nistsp.htm. For in-depth tutorials on these items please visit https://www.sprs.csd.disa.mil/webtrain.htm.

Human Subjects, Animal Testing, and Recombinant DNA. If the use of human, animal, and recombinant DNA is included under a DP2 proposal, please carefully review the requirements at: https://www.nre.navy.mil/work-with-us/how-to-apply/compliance-and-protections/research-protections. This webpage provides guidance and lists approvals that may be required before contract/work can begin.

International Traffic in Arms Regulation (ITAR). For topics indicating ITAR restrictions or the potential for classified work, limitations are generally placed on disclosure of information involving topics of a classified nature or those involving export control restrictions, which may curtail or preclude the involvement of universities and certain non-profit institutions beyond the basic research level. Small businesses must structure their proposals to clearly identify the work that will be performed that is of a basic research nature and how it can be segregated from work that falls under the classification and export control restrictions. As a result, information must also be provided on how efforts can be performed in later phases if the university/research institution is the source of critical knowledge, effort, or infrastructure (facilities and equipment).

SELECTION, AWARD, AND POST-AWARD INFORMATION

Notifications. Email notifications for proposal receipt (approximately one week after the Phase I BAA Close) and selection are sent based on the information received on the proposal Cover Sheet (Volume 1). Consequently, the e-mail address on the proposal Cover Sheet must be correct.

Debriefs. Requests for a debrief must be made within 15 calendar days of select/non-select notification via email as specified in the select/non-select notification. Please note debriefs are typically provided in writing via email to the Corporate Official identified in the proposal of the proposing small business concerns within 60 days of receipt of the request. Requests for oral debriefs may not be accommodated. If contact information for the Corporate Official has changed since proposal submission, a notice of the change on company letterhead signed by the Corporate Official must accompany the debrief request.

Protests. Interested parties have the right to protest in accordance with the procedures in FAR Subpart 33.1.

Pre-award agency protests related to the terms of the BAA must be served to: osd.ncr.ousd-r-e.mbx.SBIR-STTR-Protest@mail.mil. A copy of a pre-award Government Accountability Office (GAO) protest must also be filed with the aforementioned email address within one day of filing with the GAO.

Protests related to a selection or award decision should be filed with the appropriate Contracting Officer for an Agency Level Protest or with the GAO. Contracting Officer contact information for specific DON Topics may be obtained from the DON SYSCOM Program Managers listed in Table 2 above. For protests filed with the GAO, a copy of the protest must be submitted to the appropriate DON SYSCOM Program Manager and the appropriate Contracting Officer within one day of filing with the GAO.

Awards. Due to limited funding, the DON reserves the right to limit the number of awards under any topic. Any notification received from the DON that indicates the proposal has been selected does not ultimately guarantee an award will be made. This notification indicates that the proposal has been selected in accordance with the evaluation criteria and has been sent to the Contracting Officer to conduct cost analysis, confirm eligibility of the proposing small business concern, and to take other relevant steps necessary prior to making an award.

Contract Types. In addition to the negotiated contract award types listed in the section of the DoD SBIR/STTR Program BAA titled Additional Considerations, for Phase II awards the DON may (under appropriate circumstances) propose the use of an Other Transaction Agreement (OTA) as specified in 10 U.S.C. 4021/10 U.S.C. 4022 and related implementing policies and regulations. The DON may choose to use a Basic Ordering Agreement (BOA) for Phase I and Phase II awards.

Contract Deliverables. Contract deliverables are typically progress reports and final reports. Required contract deliverables must be uploaded to https://www.navysbirprogram.com/navydeliverables/.

Transfer Between SBIR and STTR Programs. Section 4(b)(1)(i) of the SBIR and STTR Policy Directive provides that, at the agency's discretion, projects awarded a Phase I under a BAA for SBIR may transition in Phase II to STTR and vice versa.

PHASE III GUIDELINES

A Phase III SBIR/STTR award is any work that derives from, extends, or completes effort(s) performed under prior SBIR/STTR funding agreements, but is funded by sources other than the SBIR/STTR programs. This covers any contract, grant, or agreement issued as a follow-on Phase III award or any contract, grant, or agreement award issued as a result of a competitive process where the awardee was an SBIR/STTR firm that developed the technology as a result of a Phase I or Phase II award. The DON will give Phase III status to any award that falls within the above-mentioned description. Consequently, DON will assign

SBIR/STTR Data Rights to any noncommercial technical data and noncommercial computer software delivered in Phase III that were developed under SBIR/STTR Phase I/II effort(s). Government prime contractors and their subcontractors must follow the same guidelines as above and ensure that companies operating on behalf of the DON protect the rights of the SBIR/STTR firm.

Navy SBIR 25.2 Direct to Phase II
Topic Index

N252-D09	DIRECT TO PHASE II: F0-Wideband Acoustic Receiver and Source (F0-WARS) Sonobuoy
N252-D10	DIRECT TO PHASE II: High-Density Energy Storage System
N252-D11	DIRECT TO PHASE II: Advanced Interference Mitigation (AIM) Techniques

N252-D09 TITLE: DIRECT TO PHASE II: F0-Wideband Acoustic Receiver and Source (F0-WARS) Sonobuoy

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Integrated Sensing and Cyber

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with the Announcement. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: Develop and demonstrate an updated and evolved air-deployable source and receiver combination sonobuoy that can collect target strength in the F0 Frequency range.

DESCRIPTION: The U.S. Navy requires a new F0-Wideband Acoustic Receiver and Source (F0-WARS) Sonobuoy to facilitate the collection of acoustic information on enemy targets from Navy anti-submarine warfare (ASW) platforms. A new F0-WARS Sonobuoy will provide enhanced operational capability with improvements in directional information and enhanced echolocation in 3-dimensional (3D) space with incorporation of the directional and depth estimation features. Beyond the F0-WARS Sonobuoy mission lies its potential application to tactical ASW with the use of 3D tracking, shallow water echo parameter estimation, and Roll-On/Roll-Off Mission Processing. Together, a new F0-WARS Sonobuoy will provide significant capability not currently satisfied by legacy, enhanced legacy or other WARS activity, bringing significant tactical capability to the fixed- and rotary-wing ASW missions. As part of the development, the F0-WARS Sonobuoy will be enhanced with the incorporation of NATO-compatible upper electronics, enhanced in-buoy signal processing and associated circuit board consolidation, in a true A-size form factor. End-to-end testing will be performed in water. Environmental testing and over-the-side and air-drop testing of the F0-WARS Sonobuoy will be performed in a representative environment.

The capabilities of current frequency transmitter/receiver sensors do not provide a calibrated, coherent source/receiver combination tailored for target strength collection. Innovative sensor technologies are sought with enhanced electromechanical property ceramics for the F0 frequency and responsiveness gaps for the transmitter and receiver elements that are capable of transmitting, collecting, and processing surveillance information. The Navy and other DoD agencies need to collect active target strength data from enemy targets to achieve key ASW measurement capabilities at F0. The output power source levels are indicated in the classified Annex for the sonobuoy specification. Selected firms need a clearance to view this information after the contract is awarded.

The objective of this SBIR topic is to develop and demonstrate an updated and evolved air-deployable source and receiver combination sonobuoy that can collect active target strength data in the F0 Frequency range. The unit must be capable of both shallow and deep-water operations deploying the active and passive sensing elements through 500 ft (152.4 m) and have a minimum one-hour life (or 50 pulse seconds). Coherent signals of interest are in the High-Frequency range, to include but not be limited to, continuous waveforms (CW) and frequency modulation (FM) waveforms. Communication between the aircraft and sensor unit will be compliant with the NATO digital uplink format, STANAG 4718.
This expendable sensor solution must be low power and sized to fit within an "A" size sonobuoy. A-size sonobuoy standards are: dimensions of 4.88 in. (12.39 cm) diameter x 36 in. (91.44 cm) length and weight of 40 lb. (18.14 kg) or less.

PHASE I: For a Direct to Phase II topic, the Government expects that the small business would have accomplished the following in a Phase I-type effort and developed a concept for a workable prototype or design to address, at a minimum, the basic requirements of the stated objective above. The below actions would be required to satisfy the requirements of Phase I:
The small business awardee interested in participating in Direct to Phase II must include in their response to this topic Phase I feasibility documentation that substantiates the scientific and technical merit (i.e., the small business must have performed Phase I-type research and development related to the topic NOT solely based on work performed under prior or ongoing federally funded SBIR/STTR work) and describe the potential commercialization applications. The documentation provided must validate that the small business has completed development of technology as stated above. Documentation should include all relevant information including, but not limited to technical reports, test data, prototype designs/models, and performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the offeror and/or the principal investigator (PI). Read and follow all of the DON SBIR 25.2 Direct to Phase II Broad Agency Announcement (BAA) Instructions. Phase I proposals will NOT be accepted for this topic.

FEASIBILITY DOCUMENTATION: Offerors interested in participating in Direct to Phase II must include in their response to this topic Phase I feasibility documentation that substantiates the scientific and technical merit and Phase I feasibility described in Phase I above has been met (i.e., the small business must have performed Phase I-type research and development related to the topic NOT solely based on work performed under prior or ongoing federally funded SBIR/STTR work) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology as stated in Phase I above.

PHASE II: Develop and fabricate an over-the-side prototype unit(s) required to span the F0 Frequency range and demonstrate in both acoustic facilities and the ocean environment. Throughout this development phase, emphasize a comprehensive evaluation of the prototype's performance under high-ambient and low-source level conditions, ensuring its adaptability and resilience in diverse acoustic settings. Collaborate with similarly focused domain experts and utilize feedback from preliminary tests to further refine and optimize the system at F0 Frequency. Explore integration pathways with existing Navy Maritime Patrol and Reconnaissance infrastructure to maximize system collaboration. Demonstrate the prototype's ability to attain desirable ASW measurement capabilities at High Frequency and provide a roadmap for iterative improvements and integration based on and feedback. Finalize the concept design and make recommendations for Phase III production-oriented designs, detailing potential challenges and solutions for scalable manufacturing.

PHASE III DUAL USE APPLICATIONS: Transition over-the-side prototype unit(s) into an air deployable sonobuoy system. Ensure that the sensor meets A-size packaging requirements specified in the PMA-264 Production Sonobuoy Specification. Perform required testing to verify that the sensor passes all required environmental, structural, and operational tests to include, but not be limited to, Environmental Exposure, Air Certification, Hazards of Electromagnetic Radiation to Ordnance (HERO), and Office of Naval Intelligence (ONI) certification. Note: Upon successful testing, Low-Rate Initial Production (LRIP) will need to be successful for transition to the platform.

This technology/topic can benefit any entity such as the Office of Naval Intelligence (ONI) that requires calibrated active target strength measurements within the underwater environment.

REFERENCES:

1. Urick, R. J. "Principles of underwater sound for engineers (3rd ed.)." Peninsula Publishing. 1983. https://www.worldcat.org/title/8688952

2. Holler, R. A.; Horbach, A. W. and McEachern, J. F. "The ears of air ASW: a history of US Navy sonobuoys." Navmar Applied Sciences Corporation, 2008. https://www.worldcat.org/title/720627294
3. Ultra Electronics Maritime Systems. "Sonobuoys." Ultra Electronics, 2009. https://web.archive.org/web/20110419103757/http:/www.ultra-uems.com/sonobuoys.html
4. Wignall, A. "An overview of ASW sonobuoy types and trends." Ultra Electronics, Ltd., 2006. https://web.archive.org/web/20071010170351/http://www.ultra-scs.com/resources/whitepapers/asw.pdf
5. "Standardization agreement: STANAG 4718: Sonobuoy digital telemetry (Ed. 1)." North Atlantic Treaty Organization, The NATO Standardization Office (NSO), 4 November 2020. https://nso.nato.int/nso/nsdd/main/standards?search=4718

KEYWORDS: Anti-Submarine Warfare; Sonobuoy; Low Frequency; Navy Underwater Active Multiple Ping; NUAMP; Acoustics; Intelligence

N252-D10 TITLE: DIRECT TO PHASE II: High-Density Energy Storage System

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Materials; Directed Energy (DE); Renewable Energy Generation and Storage

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with the Announcement. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: Develop a high-density energy storage system (HESS) for use with an existing medium voltage motor drive system.

DESCRIPTION: The Navy requires a +/- 1000 VDC, split bus HESS to deliver energy to a medium voltage motor drive. The system must store at minimum 1.1 megajoule (MJ) (Threshold) of energy, 5.5 MJ (Objective) and have a system capacitance that exceeds 2.3 Farad (F) (Threshold (T)), 11 F (Objective (O)). The energy storage system must be capable of both delivering power to a motor via a three-level neutral point clamped (NPC) inverter and accepting power from regenerative braking of the motor. Energy is supplied to the motor for approximately 0.5 seconds, with regenerative braking occurring over a span of 3-5 seconds. Then, energy is supplied to the motor for approximately 20 seconds, the bus is recharged, and the cycle repeats with variable time delay between cycles.

The HESS must be modular, meaning you can add or remove additional HESS units to change overall system capacitance. An individual unit should be no larger than 93in x 45in x 81.5in. Military standards should be referenced for shock (MIL-DTL-901E [Grade A]) [Ref 5], vibration (MIL-STD-167-1A [Type 1]) [Ref 6], electromagnetic interference (MIL-STD-461G) [Ref 4], and environmental factors (MIL-STD-810H) [Ref 3] since the system must be rugged to be viable.

The energy storage system must also interface with a charging power supply. Existing charging power supplies are capable of outputting 90 kW to each bus at 30 amperes; however, this likely will not be sufficient to charge a highly energy-dense bus in the time required. Therefore, an alternate charging system design, intermediate power electronics between the existing charging power supply and energy storage system, or a hybrid energy storage approach (e.g., using components with different characteristics to promote fast charging during initial motor start-up and maximum energy capture during regenerative braking) are all acceptable approaches and considered within scope. If a new charging system is proposed, it must accept 440 Volts (V), 3 phase AC power. The bus must be charged in 60 seconds (T) or 10 seconds (O) at start up. The charging system can be contained within the HESS cabinet, or a separate cabinet that should be no larger than 48in x 63in x 38in.

The HESS must have a locally operable disconnect switch that can be monitored. The system must be capable of being discharged to 0 V via an existing energy dump (resistor bank), must be maintainable, and must not prohibit maintenance of connected equipment. It must have a means of verifying that discharged components have a voltage value less than +/- 20 VDC.

The energy density of the system must surpass the limits of typical capacitors. _ The system must aim to minimize weight and volume. If applicable, a battery management system, or equivalent for alternate technologies, must be incorporated to monitor, control, balance, collect data, facilitate safe use of the

system, and extend its life. Mean time between failures (MTBF) of the HESS must be greater than or equal to 27,000 operational hours that can be demonstrated via modeling.

Capacitors, as a commonly used method of energy storage, may be limited in energy density and ability to quickly store generated energy. Advances in supercapacitors, ultracapacitors, batteries, hybrid energy storage solutions, and other related technologies associated with high-density energy storage may be relevant. A modular or scalable approach is preferred to promote applicability for additional military and commercial use cases.

The proposed technology should also ensure that the prototype device can be:

1. integrated seamlessly in place of, or in addition to, an existing energy storage system with minimal modifications to upstream/downstream power equipment and controls.
2. scalable for smaller or larger applications in the long term.
3. manufactured at a cost-effective price point at scale.
4. maintainable by sailors.
5. safe to operate/manage.

PHASE I: For a Direct to Phase II topic, the Government expects that the small business would have accomplished the following in a Phase I-type effort and developed a concept for a workable prototype or design to address, at a minimum, the basic requirements of the stated objective above. The below actions would be required to satisfy the requirements of Phase I:

1. Developed a conceptual design, workable prototype or scalable solution for a high-density energy storage system (HESS) capable of meeting the requirements outlined in the description.
2. Demonstrated that the proposed HESS technology offers a higher energy density and more efficient energy storage capability compared to existing capacitor-based solutions.

FEASIBILITY DOCUMENTATION: Offerors interested in participating in Direct to Phase II must include in their response to this topic Phase I feasibility documentation that substantiates the scientific and technical merit and Phase I feasibility described in Phase I above has been met (i.e., the small business must have performed Phase I-type research and development related to the topic NOT solely based on work performed under prior or ongoing federally funded SBIR/STTR work) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology as stated in Phase I above.

PHASE II: Develop a subscale prototype HESS. Validate and demonstrate that the proposed HESS technology meets requirements for charging, storage, delivering energy in a medium voltage motor drive system, and receiving energy generated by the motor. Develop plans for how the technology can be scaled to meet full-scale system requirements.

Assess the prototype focused on energy storage capacity, energy efficiency, heat dissipation, safety, maintainability, and integration compatibility with other system components. Scalability and cost-effectiveness of the proposed technology will also be explored and evaluated.

PHASE III DUAL USE APPLICATIONS: Develop a full-scale HESS design and integrate it into the existing medium voltage motor drive system, test the new system, and prepare for acquisition into the corresponding program of record.

Energy storage for vehicles and renewable energy storage are potential commercial markets for this technology.

REFERENCES:

1. Raza, W.; Ali, F.; Raza, N.; Luo, Y.; Kim, K. H.; Yang, J.; Kumar, S.; Mehmood, A. and Kwon, E. E. "Recent advancements in supercapacitor technology." Nano Energy 52, 2018, pp. 441-473. https://www.sciencedirect.com/science/article/pii/S2211285518305755
2. Jagadale, A.; Zhou, X.; Xiong, R.; Dubal, D. P.; Xu, J. and Yang, S. "Lithium ion capacitors (LICs): Development of the materials." Energy Storage Materials 19, 2019, pp. 314-329. https://www.sciencedirect.com/science/article/pii/S2405829718315174
3. "MIL-STD-810H w/Change 1: Department of Defense test method standard: Environmental engineering considerations and laboratory tests". MIL-STD-810 Working Group, 18 May 2022. https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=35978
4. "MIL-STD-461G: Department of Defense interface standard: Requirements for the control of electromagnetic interference characteristics of subsystems and equipment." U.S. Air Force, 11 December 2015. http://everyspec.com/MIL-STD/MIL-STD-0300-0499/MIL-STD-461G_53571/
5. "MIL-DTL-901E: Detail specification: Shock tests, H. I. (High-Impact) shipboard machinery, equipment, and systems, requirements for." Naval Sea Systems Command, 20 June 2017. http://everyspec.com/MIL-SPECS/MIL-SPECS-MIL-DTL/MIL-DTL-901E_55988/
6. "MIL-STD-167-1A: Department of Defense test method standard: Mechanical vibrations of shipboard equipment (Type I—environmental and Type II—internally excited)". Naval Sea Systems Command, 2 November. http://everyspec.com/MIL-STD/MIL-STD-0100-0299/MIL-STD-167-1A_22418/

KEYWORDS: Energy storage; High power density; Capacitors; Supercapacitors; Energy; Power; Batteries; HESS

N252-D11 TITLE: DIRECT TO PHASE II: Advanced Interference Mitigation (AIM) Techniques

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Integrated Network Systems-of-Systems; Integrated Sensing and Cyber; Space Technology

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with the Announcement. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: Develop and demonstrate innovative receive-side sensitivity enhancements that improve signal acquisition, noise suppression, and interference mitigation for Multifunctional Information Distribution System (MIDS) terminals. This effort focuses on maximizing receiver performance independent of transmission power, leveraging advanced adaptive filtering, diversity techniques, and low-noise reception strategies to ensure reliable communication in contested and degraded environments. Solutions must be Field Programmable Gate Array (FPGA)-compatible, maintain low latency (=10µs), and integrate seamlessly into existing MIDS systems without degrading performance.

DESCRIPTION: The MIDS Program Office (MPO) is responsible for advancing tactical data link (TDL) communications, including Link-16 and Tactical Targeting Network Technology (TTNT). As modern battlefields become increasingly congested with electromagnetic interference, adversarial jamming, and spectrum competition, the ability to maintain a high-sensitivity, interference-resistant reception is critical to mission success.

This effort focuses on achieving significant sensitivity gains, enhancing the receiving capability of MIDS terminals by separating and improving the receive-side performance independent of transmitter-based enhancements. Current limitations in receiver sensitivity restrict the ability to capture and process weak signals, particularly in contested environments where interference mitigation and adaptability are crucial.

To address this, the Navy is seeking innovative solutions that integrate:

- Advanced signal processing for adaptive filtering and interference suppression
- Optimized low-noise reception to amplify weak signals while minimizing distortion
- Novel antenna configurations that enhance signal gain through spatial, frequency, or polarization techniques

These enhancements will fundamentally improve the resilience and efficiency of MIDS terminals, enabling more robust signal acquisition and improved signal-to-noise ratio (SNR) under degraded conditions. Unlike traditional solutions that focus on boosting transmission power, this effort is uniquely centered on maximizing the effectiveness of the receiver itself, ensuring clear, uninterrupted reception even in challenging operational environments.

The Navy seeks mature solutions (Technology Readiness Level (TRL) 5 or higher) that can be implemented in FPGA architectures, allowing for real-time adaptation and rapid deployment. Proposed solutions should be capable of:

- Demonstrating =10dB improvement in receive sensitivity
- Maintaining low-latency processing (=10µs) for real-time applications
- Efficiently utilizing FPGA resources (=10% overhead)
- Ensuring compatibility with existing MIDS systems without degradation of performance

Of particular interest are adaptive diversity techniques, such as maximal ratio combining (MRC), spatial diversity, and multi-path fading mitigation, which can independently improve receive performance in highly dynamic environments. These innovations will provide a separate and robust receive-side enhancement, ensuring a more resilient and high-sensitivity reception capability for tactical data links. The successful transition of these technologies will provide independent, receiver-focused improvements that support long-range, interference-resistant communication. This SBIR topic seeks vendors who have already demonstrated initial feasibility and validation of sensitivity enhancement techniques, with the goal of integrating these advancements into the MIDS terminal for operational deployment.

Work produced in Phase II may become classified . Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by 32 U.S.C. § 2004.20 et seq., National Industrial Security Program Executive Agent and Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA) formerly Defense Security Service (DSS). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances. This will allow contractor personnel to perform on advanced phases of this project as set forth by DCSA and NAVWAR in order to gain access to classified information pertaining to the national defense of the United States and its allies; this will be an inherent requirement. The selected company will be required to safeguard classified material during the advanced phases of this contract IAW the National Industrial Security Program Operating Manual (NISPOM), which can be found at Title 32, Part 2004.20 of the Code of Federal Regulations.

PHASE I: Feasibility documentation MUST NOT be solely based on work performed under prior or ongoing federally funded SBIR/STTR work. Demonstrating proof of feasibility is a requirement for a Direct to Phase II award.

For this Direct to Phase II topic, the Government expects that the small business would have accomplished the following in a Phase I-type effort:

- Assessed the feasibility of developing, integrating, and demonstrating diversity gain and interference mitigation techniques. Their prior work should include theoretical analysis, simulation studies, and experimental validation, as well as feasibility assessments and identification of key challenges.
- Conducted a survey of existing algorithms and established baseline figures of merit for selecting algorithms implementable in a FPGA.
- Developed simulations to quantify improvements in SNR or signal reliability achieved through diversity techniques, specifying the additional SNR gained under defined channel conditions.

FEASIBILITY DOCUMENTATION: Offerors interested in proposing to this Direct to Phase II topic must include in their response Phase I feasibility documentation that substantiates the scientific and technical merit; proof that Phase I feasibility (described in Phase I above) has been met (i.e., the small business must have performed Phase I-type research and development related to the topic, but feasibility documentation must not be solely based on work performed under prior or ongoing federally funded SBIR/STTR work.); and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed Phase I-type development of technology as stated above. Documentation should include all relevant information including, but not limited to: technical reports, test data, prototype designs/models, and performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the offeror and/or the principal investigator (PI).

PHASE II: The contract type for topic N252-D11 will be Cost-Plus-Fixed-Fee.

The selected small business will design, develop, and prototype receive-side sensitivity enhancements aimed at improving the signal acquisition and interference mitigation capabilities of MIDS terminals. The primary focus is to implement and validate high-sensitivity reception techniques that operate independently of transmitter-based improvements, ensuring more reliable communications in contested and degraded operational environments:

1. Algorithm Development & FPGA Integration:
   - Design, develop, and implement advanced signal processing algorithms for adaptive filtering, diversity gain, and low-noise reception.
   - Ensure that algorithms can be efficiently integrated into a FPGA-based architecture with minimal processing overhead (=10% FPGA resource utilization).
   - Maintain low latency (=10µs) to support real-time tactical applications.
2. Prototype Development & SDR Testing:
   - Develop a software prototype implementing the proposed sensitivity enhancement techniques for evaluation.
   - Conduct initial software-in-the-loop (SIL) simulations to assess the performance of new receiver algorithms in varied signal environments, including high-interference scenarios.
   - Transition from software testing to hardware implementation by integrating the algorithms into an SDR-based prototype.
3. Performance Validation & Testing:
   - Evaluate the prototype's ability to achieve a =10 dB improvement in receive sensitivity through controlled laboratory testing and simulation.
   - Validate algorithm performance against real-world modulations and emulated threat signal sets, assessing:
   - SNR improvements
   - Interference suppression and adversarial jamming resilience
   - Long-range reception capability
   - Perform extensive testing to ensure that the receive enhancements do not degrade link integrity or negatively impact existing MIDS system performance.
   - Government may provide threat signal data for additional testing and may also conduct independent verification at a Government facility.
4. Prototype Hardware Demonstration:
   - Implement and test the prototype within a MIDS Joint Tactical Radio System (JTRS) laboratory environment.
   - Assess integration feasibility with existing MIDS terminals, ensuring modular, scalable deployment without adverse effects on system operations.
   - Evaluate final FPGA resource utilization, latency, and computational efficiency to ensure compliance with Navy requirements.
5. Phase III Transition Planning:
   - Develop a detailed technology transition and commercialization strategy for Phase III implementation.
   - Engage with MIDS prime vendors and key stakeholders to ensure seamless integration into operational systems.
   - Identify any additional system modifications or optimizations needed for full deployment within Navy platforms.

It is probable that the work under this effort will be classified under Phase II (see Description section for details).

PHASE III DUAL USE APPLICATIONS: Transition the developed technology for Navy deployment:

1. Refine and validate final algorithms for full-scale implementation.

2. Ensure compliance with Information Assurance (IA) standards for Navy systems.
3. Support SDR integration and full mission capability testing.
4. Provide comprehensive training and documentation for seamless transition.
5. Partnership with MIDS prime vendors is encouraged to support final production and deployment.

Advanced interference mitigation techniques have applications beyond military systems, including:

- 5G/6G wireless communications
- Satellite and deep-space communications
- Secure networking in high-interference commercial environments

REFERENCES:

1. D. Wang, J. Wang, X. You, Y. Wang, M. Chen, and X. Hou, "Spectral efficiency of distributed MIMO systems," IEEE Journal on Selected Areas in Communications, vol. 31, no. 10, pp. 2112–2127, 2013. https://ieeexplore.ieee.org/document/7564722
2. S. Sedighi and E. Ayanoglu, "Bit-interleaved coded multiple beamforming in millimeter-wave massive MIMO systems," IEEE Transactions on Communications, vol. 68, no. 10, pp. 6174–6185, 2020. https://ieeexplore.ieee.org/document/9133524
3. D. Yu, S. Xu, and H. H. Nguyen, "Diversity gain of millimeter-wave massive MIMO systems with distributed antenna arrays," EURASIP Journal on Wireless Communications and Networking, vol. 54, pp. 1–13, 2019. https://jwcn-eurasipjournals.springeropen.com/articles/10.1186/s13638-019-1366-8

KEYWORDS: Receive sensitivity; diversity gain; beamforming; Multiple Input Multiple Output; MIMO