DEPARTMENT OF THE NAVY (DON)
DoW 2027 Small Business Innovation Research SBIR (SBIR) BAA
Release 2
Direct to Phase II (DP2)
Proposal Submission Instructions

IMPORTANT

- **Effective October 1, 2026, the Department of the Navy transformed from a Systems Command-centric model to a centralized development pipeline, directly integrated with the Portfolio Acquisition Executive (PAE) framework to ensure alignment to naval priorities.**

- **The following instructions apply to Direct to Phase II (DP2) SBIR topic only:**
  - **DON27BZ02-DV026- DON27BZ02-DV029**

- Submitting small business concerns (SBCs) are encouraged to thoroughly review the DoW SBIR/STTR Program Broad Agency Announcement (BAA) and register for the DSIP Listserv to remain apprised of important programmatic changes.
  - The DoW 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 DoW Instructions posted for this BAA.

- DoW has established proposal limitations on a per-topic basis. SBCs may submit only one (1) proposal in response to a single topic. Please review the DoW SBIR/STTR Program BAA for further information.

- A submitting SBC **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 SBCs 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 SBCs are detailed in the section titled ADDITIONAL SUBMISSION CONSIDERATIONS.

- The DON may consider the following FAR and Non-FAR contracting strategies when issuing Phase II awards: Cost Plus Fixed Fee (CPFF), Firm Fixed Price (FFP), Basic Ordering Agreement (BOA), or Prototype Other Transaction (OT).

- 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 SBC.

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 War (DoW), including the Department of the Navy (DON), may issue an SBIR award to an SBC under Phase II, without regard to whether the SBC 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 SBC 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 SBCs 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	Navy SBIR/STTR Program Management Office DON_SBIR_STTR@us.navy.mil or appropriate participating Command listed in Table 2 (below)
Topic-specific technical questions	BAA Pre-release	Technical Point of Contact (TPOC) listed in each topic on the DoW SBIR/STTR Innovation Portal (DSIP). Refer to the Proposal Submission section of the DoW SBIR/STTR Program BAA for details.
	BAA Open	DoW SBIR/STTR Topic Q&A platform (https://www.dodsbirsttr.mil/submissions) Refer to the Proposal Submission section of the DoW SBIR/STTR Program BAA for details.
Electronic submission to the DoW 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 DON_SBIR_STTR @us.navy.mil

TABLE 2: DON SBIR PARTICIPATING COMMANDS

Topic Numbers	Point of Contact	Participating Command	Email
DON27BZ02-DV026-DON27BZ02-DV029	Shadi Azoum	Mission Systems	pae_ms_sbir@us.navy.mil

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 SBC 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 SBC 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 SBCs to submit a Full DP2 Proposal. Demonstrating proof of feasibility is a requirement for a DP2 award. The SBC must submit a Phase I Feasibility Proposal to be considered for selection to submit a Full DP2 Proposal.
>
> STEP TWO: If selected, the cognizant Participating Command Program Office will contact the SBC 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 SBCs must read the topic requirements carefully. The Government is not responsible for expenditures by the proposing SBC prior to award of a contract. For 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 DoW SBIR/STTR Programs.

(NOTE: Proposing SBCs 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.)

DoW SBIR/STTR Innovation Portal (DSIP). Proposing SBCs are required to submit proposals via the DoW SBIR/STTR Innovation Portal (DSIP); and follow proposal submission instructions in the DoW SBIR/STTR Program BAA on the DSIP at https://www.dodsbirsttr.mil/submissions. Proposals submitted by any other means will be disregarded. Proposing SBCs submitting through DSIP for the first time will be

asked to register. It is recommended that proposing SBCs 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 DoW SBIR/STTR Program BAA for further information.

Eligibility. Each proposing SBC 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 DoW SBIR/STTR Program BAA
- Comply with primary employment requirements of the principal investigator (PI) during the Phase II award including, employment with the SBC at the time of award and during the conduct of the proposed project. Primary employment means that more than one-half of the PI's time is spent in the employ of the SBC
- Register in the System for Award Management (SAM) as defined in the Certifications and Registrations section of the DoW 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 DoW 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 SBC 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 SBCs 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 DoW Submission system (at https://www.dodsbirsttr.mil/submissions/), however, proposing SBCs DO NOT need to download and complete the separate cost volume template when submitting the DON SBIR Phase I Feasibility Proposal. Proposing SBCs 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)	
DON27BZ02-DV027-DON27BZ02-DV030	$750,000	18 mos.	$1,000,000[1]	24 mos.	$1,750,000

[1]SBCs should propose an Option NTE $1,000,000. Cost matching (1:1) with non-SBIR/STTR funding for the Option will be identified by PAE Mission Systems prior to end of Base period; SBIR Option contribution shall not exceed $750,000 and total SBIR contribution for the total award shall not exceed $1.5M.

- Additional information:
  - For Phase II a minimum of 50% of the work is performed by the proposing SBC. 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 SBC the sum of all direct and indirect costs attributable to the proposing SBC 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 SBC.
  - 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 participating Command'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)**. DoW 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 DoW 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 SBCs must review and submit the following items, as applicable:
  - **Majority Ownership in Part.** Proposing SBCs 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 SBCs 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 SBC 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 SBCs are cautioned that the text may be unreadable.

- **Fraud, Waste and Abuse Training Certification (Volume 6)**. DoW requires Volume 6 for submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoW 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 DoW will review all proposals submitted in response to this BAA to assess security risks presented by SBCs seeking a Federally funded award. SBCs 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 DoW 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 DoW 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 SBC has met eligibility requirements and followed the instructions for Proposal Cover Sheet as specified in the DoW 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 DoW 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 SBC has met the following requirements or the proposal will be REJECTED:
  - A submitting SBC 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 SBC 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 SBC. 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 SBCs must refer to the DoW 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 SBC 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 Foreign Risk Evaluation (FRE) Program to Assess Security Risks. Refer to the DoW SBIR/STTR Program BAA to ensure compliance with Volume 7 requirements.

ADDITIONAL SUBMISSION CONSIDERATIONS

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

Foreign Risk Evaluation (FRE) Program to Assess Security Risks. 15 U.S.C. §638(vv) requires the Department of War, in coordination with the Small Business Administration, to establish and implement a due diligence program, known as Foreign Risk Evaluation (FRE) Program, to assess and, when possible, mitigate security risks presented by SBCs seeking a Federally funded award. Please review the Certifications and Registrations section of the DoW SBIR/STTR Program BAA for details on how DoW will assess security risks presented by SBCs. The FRE Program to Assess Security Risks will be implemented for all Phases.

Discretionary Technical and Business Assistance (TABA).

The Small Business Innovation and Economic Security Act Section 7 mandates agencies offer TABA. 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; commercializing the SBIR/STTR product or process, including intellectual property protections and cybersecurity assistance; and screening for potential foreign involvement in technology development or commercialization activities. TABA services can be provided through vendor(s) selected by the SBC or the SBC may propose use of TABA funding to hire new staff, augment staff, or direct staff to conduct or participate in training activities consistent with the purpose of TABA as detailed above. The Phase II TABA amount, if proposed, cannot include any profit/fee by the proposing SBC 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 SBC. An SBC receiving TABA will be required to submit a report detailing the results and benefits of the service received. This TABA report will be due at the time of submission of the final report.

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

If proposing a TABA Provider, the following MUST be included in the request or be subject to denial.
- Provider(s)
- Provider(s) point of contact, email address, and phone number
- An explanation of the provider's unique qualifications to provide the TABA service
- Tasks that will be performed by the provider (to include the purpose and objective of the assistance)
- Total provider(s) cost, number of hours, and labor rates (average/blended rate is acceptable)

If proposing TABA funding to hire new staff, augment staff, or direct staff to conduct or participate in training activities consistent with the purpose of TABA, the following MUST be included or be subject to denial.
- Name(s), position(s), business need to be filled, and/or training to be provided
- Number of employees to be hired, augmented, or directed to participate in training activities

- Qualifications of employees hired or augmented, or detailed need for training
- Tasks that will be performed (to include the purpose and objective of the assistance)
- Total staff/training cost, number of hours, and labor rates (average/blended rate is acceptable)

TABA requests must be included in the proposal as follows:

- Phase II:
  - — DON Phase II Cost Volume (provided by the DON) - 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, included in the Phase II award amount.

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 SBC 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). An SBC 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 SBCs 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 SBCs 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 SBCs must register with the SBA Company Registry Database.
b. The proposing SBC 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 SBC become a member of this ownership class after submitting its proposal and prior to any receipt of a funding agreement, the proposing SBC 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 SBCs 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 SBCs should confirm that they are registered to receive contracts (not just grants) and the address in SAM matches the address on the proposal. An SBC selected for an award MUST have an active SAM registration at the time of award or they will be considered ineligible.

Cybersecurity Maturity Model Certification (CMMC) Program. DoW has established the CMMC Program to verify that awardees have implemented required security measures necessary to safeguard Federal Contract Information (FCI) and Controlled Unclassified Information (CUI). CMMC Level requirements are identified within each topic and must be met prior to award. Proposing SBCs should carefully review and consider the CMMC requirements as compliance may impact proposed costs and technical approach. Please review the DoW SBIR/STTR Program BAA for additional information on the CMMC Program.

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 252.240-7997, in order to be considered for award, an SBC 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 SBCs 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 Point of Contact for the participating Command listed in Table 2 above. For protests filed with the GAO, a copy of the protest must be submitted to the appropriate Point of Contact for the participating Command 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 SBC, and to take other relevant steps necessary prior to making an award.

Contract Types. The DON will consider the following for award: Cost Plus Fixed Fee (CPFF), Firm Fixed Price (FFP), Basic Ordering Agreement (BOA), or Prototype Other Transaction (OT).

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.

Navy SBIR Transition Program (STP). Phase II awardees have the opportunity to 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.

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.

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Release 2

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DON27BZ02-DV026 TITLE: DIRECT TO PHASE II: Frequency-Based Persistent Super Intelligence Tracking and Surveillance Capability

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Artificial Intelligence (AAI)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Integrated Network Systems-of-Systems;Integrated Sensing and Cyber;Trusted AI and Autonomy

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

OBJECTIVE: Develop and demonstrate a super intelligence (SI)-driven signal processing framework that leverages high-dimensional spectral feature extraction, adaptive neural control loops, and secure human-machine teaming to detect, classify, and characterize covert and agile waveforms in complex electromagnetic environment.

DESCRIPTION: The Navy faces acute operational challenges in intercepting and characterizing covert, highly agile adversarial emissions across dense electromagnetic operational environments. Modern threat systems increasingly utilize Low Probability of Intercept and Low Probability of Detection (LPI/LPD) techniques—such as Direct-Sequence Spread Spectrum (DSSS), ultra-fast frequency hopping (UFLH), wideband Linear Frequency Modulation (LFM), Costas frequency coding, and polyphase pulse compression (e.g., Frank, P1–P4 codes)—deliberately depressing emission power densities below the thermal noise floor [Refs 1, 2]. Consequently, conventional Electronic Support Measures (ESM) and wideband radiometer/energy-detection receivers exhibit severe performance degradation, failing to detect stealth radar transmissions, covert datalinks, and distributed sensor relays. This visibility shortfall undermines the tactical sensor-to-shooter timelines foundational to Combined Joint All-Domain Command and Control (CJADC2) and Distributed Maritime Operations (DMO).

To counter advanced stealth emitters, an AI-driven signal processing framework can draw upon several modular algorithmic pathways and candidate techniques, such as:
Sub-Noise-Floor Cyclostationary Analysis: For instance, computing the spectral correlation density (SCD) or cyclic autocorrelation can expose covert signal periodicities (e.g., symbol rates, chipping sequences, and carrier modulation artifacts), isolating structured LPI/LPD waveforms from stationary thermal background noise and Gaussian interference [Refs 3, 4].

Time-Frequency Deep Learning Architectures: As an example for intra-pulse modulation recognition, raw wideband In-phase/Quadrature (I/Q) samples can be transformed into high-resolution time-frequency representations—such as Wigner-Ville Distributions (WVD) or Continuous Wavelet Transforms (CWT)—and processed by deep convolutional or recurrent neural networks (CNN/RNN) to classify polyphase or frequency-coded pulses without requiring prior waveform templates [Refs 5, 6].

Adaptive Multi-Channel De-interleaving: For high-density pulse environments, candidate approaches include reinforcement-learning-guided spectral search or adaptive filter banks to isolate agile hopping channels and separate co-channel, overlapping LPI signals across wide instantaneous bandwidths [Ref 7].
Calibrated Operator Decision Metrics: To support tactical watchstanders, Bayesian neural networks or conformal prediction methods can be applied to generate uncertainty bounds alongside extracted parameters (e.g., pulse repetition intervals, modulation bandwidths, chirp rates), providing validated, interpretable indicators of stealth emitter activity.

SWaP-Constrained Edge Optimization: Potential implementation paths for tactical platforms include neural network quantization, weight pruning, and tensor acceleration to facilitate low-latency inference on Size, Weight, and Power (SWaP)-constrained naval edge computing hardware.

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 and/or subcontractor 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: For a Direct to Phase II topic, the Government expects that the small business will 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 following actions would be required to satisfy the requirements of Phase I:

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 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.

DIRECT TO PHASE II: Demonstrated the feasibility and foundational algorithm performance of an AI-driven signal processing approach for the blind detection, classification, or characterization of Low Probability of Intercept/Low Probability of Detection (LPI/LPD) waveforms in simulated or captured sub-noise-floor electromagnetic spectrum environments, establishing clear metrics for signal-to-noise ratio (SNR) thresholds, probability of detection and probability of false alarm (Pd/Pfa), classification/characterization accuracy, signal density and agility, instantaneous bandwidth, processing latency, and computational viability for tactical hardware deployment. It is advantageous—and expected in the feasibility documentation and prototype concept—to state the minimum values of these metrics that apply to the prototype demonstration. These parameters are coupled: instantaneous bandwidth, signal density/agility, and processing latency determine compute and data-rate load; SNR and Pd/Pfa determine integration time and detector thresholds; and classification/characterization accuracy depends on the detections and features obtained under that load. A single, internally consistent demonstration envelope, tied to defined test conditions (waveform family, observation interval, simulated versus captured data, and platform), provides an objective success criterion for the prototype without treating the demonstration minima as full operational requirements. Values should be supported by Phase I-type results and set at or modestly beyond what that work already achieved.

PHASE II: Develop, mature, integrate, and demonstrate a working prototype that utilizes AI-driven signal processing algorithms to provide measurable improvements in the blind detection, characterization, parameter estimation, de-interleaving, and classification of adversarial LPI/LPD waveforms under contested and congested electromagnetic spectrum conditions. Validate the proposed capability within a

representative laboratory or simulated operational environment, demonstrating performance against sub-noise-floor and highly agile emitters.

(Note: Prototype demonstrations may include integration with representative software-defined radio (SDR) front-ends, open architecture signal processing frameworks, electronic warfare/electronic support (EW/ES) testbeds, or relevant tactical edge computing hardware.)

Prepare a final report that includes comprehensive performance characterization data (e.g., probability of detection, false alarm rates, parameter estimation accuracy, and latency), a platform transition strategy, deployment and SWaP-C considerations, a sustainment approach, and a commercialization plan.
Work in Phase II may become classified. Please see note in the Description.

PHASE III DUAL USE APPLICATIONS: Support transition of the developed AI-driven LPI/LPD signal detection and characterization capability to Fleet operators and associated Electronic Warfare (EW), Information Warfare (IW), and maritime surveillance Programs of Record.

Commercial organizations increasingly require the ability to detect, de-interleave, identify, and monitor low-power, transient, and covert signals across congested and noisy radio frequency (RF) environments. Technologies developed under this topic may have broad applicability in 5G/6G dynamic spectrum sharing and network optimization, commercial satellite communications interference mitigation, autonomous transportation and maritime shipping collision avoidance, commercial aviation RF monitoring, passive counter-unmanned aerial system (C-UAS) sensing, critical infrastructure perimeter surveillance, and federal/industrial spectrum management.

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1. Pace, P. E. “Detecting and Classifying Low Probability of Intercept Radar (2nd ed.).” Artech House Radar Library, 2009. https://www.amazon.com/dp/1580533221?lv=shuf&channelId=500&plpRedirect=mhFallback
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KEYWORDS: AI: Quantum-Resiliency: Frequency-Based Cryptography: Adaptive-Security: Reliability: Human-Machine Teaming

DON27BZ02-DV027 TITLE: DIRECT TO PHASE II: Ultra-Low Latency Technology for Radio Applications 5G

COMPONENT TECHNOLOGY PRIORITY AREA(S): Advanced Computing and Software;FutureG;Space Technology

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

OBJECTIVE: Develop ultra-low latency audio data obscuration techniques optimized for Internet Protocol (IP)-based communications over Fifth Generation (5G) frequency bands to enhance the resilience and operational effectiveness of Command and Control, Communications (C3).

DESCRIPTION: Modern C3 operations increasingly depend on commercial 5G and IP-based network infrastructures, which are vulnerable to latency, jitter, packet loss, and adversarial interference. As highlighted in recent industry consensus on how 5G technology is going to transform the Department of War (DoW) [Ref 2], in contested and congested environments, these challenges jeopardize mission-critical data flows, particularly time-sensitive audio communications essential for tactical decision-making. While the Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) is the current standard for secure, jam-resistant tactical data links, it must be modernized to interoperate with these evolving network environments.

To maintain a strategic advantage in alignment with the National Defense Strategy (NDS), the Department of Defense Private 5G Deployment Strategy [Ref 1], and Joint All-Domain Command and Control (JADC2) initiatives, the Navy seeks to design, develop, and prototype a software-only solution for ultra-low latency audio data obscuration. This technology must be tailored for IP-based communications operating across 5G and Open Radio Access Network (O-RAN) environments and be seamlessly integrable into existing MIDS JTRS platforms.

These software-only innovations will strengthen C3 links in real-time operational scenarios, drawing technical parallels from critical commercial capabilities such as ultra-reliable low-latency 5G for industrial automation [Ref 3] to support high-precision activities including cooperative motion control, video-guided remote operations, and node-to-node tactical communications. By integrating these technologies into existing communication infrastructures, the DoW aims to ensure robust, secure, and resilient communication channels, even in congested spectrum environments or under adversarial jamming and electronic interference.

The proposed solution should:
Achieve Ultra-Low Latency Audio Transmission: Develop software-based obscuration methods capable of delivering secure, intelligible audio over IP-based 5G networks. The threshold goal is an end-to-end latency of under 20 milliseconds, with an objective goal of 1 millisecond to meet JADC2 and NDS real-time operational requirements.

Enhance Resilience in Contested Environments: Ensure audio data integrity and communication continuity in environments affected by spectrum congestion, electromagnetic interference, or intentional jamming, using robust data hiding and spread-spectrum techniques.
To satisfy PMO requirements, system resilience and audio intelligibility must be demonstrated and verified against the following representative operational profiles:

1. Network Packet Loss Resilience: The software-based recovery and reconstruction algorithms must maintain communication continuity under severe channel degradation:
    - Threshold Target: Maintain continuous link and zero audio stream dropouts under a continuous random packet loss profile of up to 10%.

- Objective Target: Maintain link alignment and intelligibility under burst/consecutive packet loss profiles of up to 30%.

2. Spectrum Congestion Performance: Under simulated high-traffic 5G slice congestion (congested multi-user IP environments):
   - Threshold Target: End-to-end processing and transmission latency must remain under 20 milliseconds.
   - Objective Target: End-to-end processing and transmission latency must remain under 1 millisecond.

3. Jamming and Interference Immunity: The spread-spectrum and data-hiding layers must resist intentional electromagnetic interference:
   - Threshold Target: Maintain link stability and synchronization under narrow-band and barrage jamming up to a Jamming-to-Signal (J/S) ratio of 15 dB.
   - Objective Target: Maintain link stability under dynamic tracking jamming up to a J/S ratio of 30 dB.

4. Audio Intelligibility Standards: Restored and unobscured audio streams must meet standard military voice intelligibility baselines:
   - Threshold Target: Achieve a Perceptual Evaluation of Speech Quality (PESQ) score of 3.0 or higher (providing fully intelligible, clear voice communication).
   - Objective Target: Achieve a PESQ score of 4.0 or higher (delivering excellent, high-fidelity voice reproduction).

Enable Scalable Integration with Existing DoW Systems: Design modular, software-defined solutions for seamless integration into platforms such as the MIDS JTRS SDR, supporting the modernization of tactical communication networks under the MIDS Program Office.

Support Seamless Transition to Operational Systems: Ensure the final solution supports a seamless transition to operational systems, including full integration into the MIDS JTRS platform.
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 and/or subcontractor 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: For a Direct to Phase II topic, the Government expects that the small business will 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 following actions would be required to satisfy the requirements of Phase I:
Crucially, the evidence of this foundational research MUST NOT rely exclusively on previous or active federally funded SBIR/STTR contracts. Tangible proof of feasibility is an absolute prerequisite for award consideration.

To satisfy these Phase I prerequisites, the submitted documentation must substantiate that the offeror has successfully executed the following:

1. Audio Obscuration & Data-Hiding Feasibility: Developed and simulated at least two software-based audio obscuration or data-hiding techniques (such as Echo Hiding or Spread Spectrum). The proposal must provide empirical modeling and simulation results showing these techniques can secure IP-based audio communications over simulated 5G and O-RAN networks.
2. Real-Time Signal Processing (DSP) Implementation: Demonstrated the capability to execute real-time digital signal processing algorithms on general-purpose processors (GPPs) or heterogeneous compute environments (such as multi-core CPUs). The offeror must show that these software-only methods do not require custom FPGA or dedicated hardware acceleration to run.
3. Performance Baseline Modeling: Documented via simulation that the conceptual software architecture can meet the threshold latency of under 20 milliseconds, with jitter constrained to less than 2 milliseconds and resilience to packet-loss rates of up to 0.03%, while preserving voice intelligibility.
4. Modular Platform Integration Design: Completed a high-level software architecture design and a preliminary Interface Control Document (ICD). This documentation must detail how the software-only obscuration layer will interface with standard IP-based network stacks and integrate modularly into tactical SDR systems like the MIDS JTRS.

PHASE II: Design, develop, and integrate a real-time, software-only implementation of the specified audio data obscuration and recovery algorithms utilizing a Software-Defined Radio (SDR) and network Software Development Kit (SDK). Validate that the target general-purpose processor (GPP) processing core on the SDR host platform can natively execute the obscuration software, verifying the latency, throughput, and modularity advantages of a software-defined security layer.

1. Architectural Integration: Port and optimize the modular audio obscuration software to run directly on standard GPP and SDR processing cores, maximizing instruction-set efficiency, minimizing processing overhead, and achieving parallel thread execution.
2. Network and Functional Verification: Conduct over-the-air or over-the-wire IP-based voice transmission testing of the obscured audio data over 5G and O-RAN emulated network environments using representative SDR hardware and network testbeds.
3. Performance Acceptance: Execute a comprehensive, multi-point validation campaign in accordance with a government-approved acceptance test plan to confirm functional latency boundaries, packet-loss recovery resilience, and restored voice intelligibility (PESQ) compliance in congested and contested network environments.

PHASE III DUAL USE APPLICATIONS: Transition the mature, software-only audio obscuration solution into a commercially viable product for widespread use.

Dual-Use Commercialization Strategy:
The technology developed has significant applications in both military and commercial sectors.

1. Military and Government Transition:

- Integration with Program of Record: Transition the software to the MIDS Program Office for integration into the MIDS JTRS platform and successor systems. Work with prime contractors to integrate the software into the official SDR software baseline.
- JADC2 and Joint Force Application: Market the software to other DoW branches (Army, Air Force, Marines) and federal agencies for integration into their respective C3 and tactical communication systems, supporting the broader Joint All-Domain Command and Control (JADC2) framework.

- Operational Fielding and Support: Provide the necessary support for operational testing, certification, and accreditation (C&A) to achieve an Authority to Operate (ATO) on DoW networks, to include providing software updates, patches, and long-term technical support.

2. Commercial Market Applications:
   - 5G and Telecommunications: Licensed to telecommunications providers as a value-added service for enterprise customers requiring end-to-end secure, low-latency communications for applications like financial trading or executive communications.
   - Industrial IoT and Remote Operations: Industries such as manufacturing, mining, and energy for the real-time, secure remote control of autonomous vehicles, drones, and heavy machinery, where low latency is critical for safety and precision.
   - Telemedicine: A secure and reliable channel for mission-critical medical applications, such as remote surgery and real-time diagnostics, where audio and data integrity are paramount.
   - First Responders and Public Safety: Adapted for public safety networks (e.g., FirstNet), providing secure and resilient voice communications for first responders during emergencies when commercial networks may be congested or compromised.

Successful completion of Phase III would see this software becoming a standard component in next-generation tactical radios and a trusted solution for secure communications in various commercial industries.

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KEYWORDS: Fifth Generation; 5G; Internet Protocol-based command and control; IP-Based C3; Audio data obscuration; O-RAN; Multi-functional Information Distribution System Joint Tactical Radio System; MIDS JTRS; Contested electromagnetic environment resilience

DON27BZ02-DV028 TITLE: DIRECT TO PHASE II: Advanced Multi-User Signal Separation for Tactical Waveforms

COMPONENT TECHNOLOGY PRIORITY AREA(S): Advanced Computing and Software

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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 a robust multi-user signal separation for tactical waveforms to improve the quality of likelihoods prior to being processed by soft-decision decoding algorithms.

DESCRIPTION: The Program Office championing this effort is PMW/A 101 that manages and delivers advanced, secure tactical communication systems for naval platforms. A core mandate of this office is to continuously integrate next-generation capabilities that enhance waveform resilience, increase spectral efficiency, and ensure robust connectivity for warfighters operating in highly congested and contested electromagnetic environments. The technology developed under this SBIR Direct to Phase II topic is intended to transition directly into the PMW 101 portfolio of tactical radio systems.

In modern tactical networks, the proliferation of friendly assets creates a dense signal environment where simultaneous transmissions on the same frequency cause multi-user collisions and limit operational effectiveness. This problem is exacerbated in contested domains where very low Signal-to-Noise Ratios (SNRs) are common. Current baseline receiver systems typically treat these overlapping friendly signals as insurmountable noise. Because legacy systems lack the ability to untangle these collisions, they simply drop the packets or fail to decode them entirely, which severely limits network throughput and the real-time data exchange required for mission-critical operations.

To overcome these limitations and maintain a critical operational advantage, this SBIR Direct to Phase II topic seeks the development of an advanced signal processing core capable of robust multi-user signal separation for tactical waveforms. By enabling non-orthogonal multiple access-like schemes, this capability will significantly increase network capacity and user count without requiring additional spectrum.

The goal is to deliver high-quality soft signal likelihoods recovered from simultaneous-user collisions to downstream soft-decision decoding algorithms. To achieve close-to-optimal performance in two-user collisions, proposed approaches must operate effectively at very low SNRs and mitigate intermittent interference by dynamically detecting burst collisions and nullifying compromised likelihood data. While advanced joint demodulation represents one viable pathway, proposers are highly encouraged to suggest any innovative framework that targets an approximate 3dB improvement over current baselines. The targeted improvement will be measured against the current baseline receiver under comparable two-user collision conditions and will reflect improvement in multi-user separation and downstream decoding performance rather than overall receiver sensitivity. This 3dB gain will translate directly to longer communication ranges, higher data rates, and increased resilience against jamming.
This effort requires the performer to:

Develop an advanced algorithm for multi-user separation that is effective in low SNR and interference-prone environments.

Generate high-quality Log-Likelihood Ratios (LLRs) for modern soft-decision forward error correction (FEC) decoders, utilizing novel, proposer-defined technical approaches.
Implement a mechanism to detect burst collisions and erase or correct corrupted likelihood data to prevent decoder failure.
Design, implement, and test the algorithm within a modular Field Programmable Gate Array (FPGA) core based on open-systems principles.

The successful transition of this capability will fundamentally improve the resilience of tactical networks. By delivering a modular FPGA core built on open-systems principles, the solution could be seamlessly integrated into a wide range of current and future Original Equipment Manufacturer (OEM) radio platforms, which could significantly reduce the life-cycle costs associated with developing entirely new systems to achieve these capabilities. This Direct to Phase II effort seeks proposers who can rapidly demonstrate these advanced receiver techniques with a clear transition path into operational military hardware.

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 and/or subcontractor 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:

- Vendor must have assessed the feasibility of developing and implementing multi-user signal separation algorithms for tactical waveforms. Prior work should include theoretical analysis, detailed simulation studies (e.g., MATLAB, C++, Python), and performance characterization that substantiates the potential for a ~3dB gain.
- Vendor must have demonstrated a strong history of digital signal processing, modern coding/modulation techniques, and FPGA development for high-performance communications systems.

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. The documentation should include technical reports, simulation results, performance data, and analysis of the proposed algorithms. Work submitted must have been substantially performed by the offeror and/or the principal investigator (PI).

PHASE II: Develop, implement, and physically demonstrate the multi-user separation algorithms developed in a Phase I-equivalent effort within a tangible hardware environment. Deliver a fully functional FPGA core, integrated into a physical hardware testbed, demonstrating real-time signal separation capabilities. Provide comprehensive design documentation and test reports.
Phase II Tasks

- Hardware Implementation: Develop, refine, and decompose the Phase I-equivalent signal separation and likelihood erasure algorithms into hardware-description language (VHDL/Verilog). Implement and optimize the complete algorithm within an FPGA core, balancing performance with resource utilization.
- Testbed Construction: Design and assemble a tangible hardware testbed utilizing Software-Defined Radios (SDRs) or equivalent RF hardware capable of generating and receiving physical, two-user signal collisions and intermittent interference at low SNRs.
- Real-Time Demonstration: Physically integrate the developed FPGA core with a representative radio system host within the testbed. Conduct a real-time, functional demonstration proving the core's ability to separate colliding signals.
- Performance Validation: Develop and execute a comprehensive test plan utilizing the physical testbed. Provide empirical data validating the algorithm's performance against a baseline receiver system, confirming the targeted ~3dB performance improvement.
- Documentation Deliverables: Deliver the developed FPGA core files (VHDL/Verilog) alongside a Comprehensive Final Report detailing the hardware architecture, algorithm decomposition, resource utilization metrics, and complete results from acceptance testing.
- Transition Strategy: Deliver a comprehensive Phase III Transition Plan detailing the technical milestones, prime OEM partnerships, and programmatic pathways required to transition the modular FPGA core into PMW 101’s tactical radio portfolio, specifically targeting the MIDS JTRS Program of Record.

Work in Phase II may become classified. Please see note in Description section.

PHASE III DUAL USE APPLICATIONS: Further develop and validate the modular multi-user separation FPGA IP core on a tactical surrogate testbed in partnership with the OEM to prove a 3dB receiver sensitivity gain. Integrate the validated firmware into the MIDS JTRS (PMW 101) operational flight terminal baseline to support both current and next-generation OEM radio platforms. (Note: Ultimately, this transition pathway enables PMW 101 to deploy the advanced signal-untangling capability across the active fleet via cost-effective, software-defined firmware field upgrades that completely bypass the need for physical hardware redesigns.)

Beyond military acquisition, this technology possesses significant dual-use commercial potential. The ability to successfully separate multi-user signals in highly congested spectrums at low SNRs is a critical requirement for several private-sector markets. The algorithms and FPGA cores developed under this effort can be directly commercialized for:

- 5G/6G Cellular Networks: Improving network capacity, spectral efficiency, and call quality in dense urban environments where signal overlap is frequent.
- Commercial Satellite Communications (SATCOM): Enhancing throughput for Low Earth Orbit (LEO) internet constellations managing thousands of simultaneous user terminals.

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3. “National Industrial Security Program Executive Agent and Operating Manual (NISP), 32 U.S.C. § 2004.20 et seq. 1993”. https://www.ecfr.gov/current/title-32/subtitle-B/chapter-XX/part-2004

KEYWORDS: Multi-User Detection, Signal Separation, Interference Cancellation, Tactical Waveforms, Field-Programmable Gate Array, FPGA, Soft Decoding, Log-Likelihood Ratio, LLR, Contested Communications

DON27BZ02-DV029 TITLE: DIRECT TO PHASE II: Modular Software Reference Implementation for Waveforms

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Artificial Intelligence (AAI)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Advanced Computing and Software;Microelectronics;Space Technology

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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 a modular software reference implementation of a government-specified tactical waveform on a Digital Transceiver to establish an open architecture that leverages novel processing to transition from legacy Field-Programmable Gate Array (FPGA)-based systems.

DESCRIPTION: The Multifunctional Information Distribution System (MIDS) Program Office (PMA/PMW-101) is driving a critical architectural pivot in tactical data link (TDL) communications. Historically, the defense sector has relied heavily on FPGAs to host complex tactical waveforms due to strict RF timing constraints. However, as noted in recent software-defined radio (SDR) surveys, this hardware-centric approach suffers from severe developmental friction [Ref 1]. Programming FPGAs via Hardware Description Languages (HDL) requires lengthy synthesis, complex place-and-route cycles, and difficult timing closures. Because software compilation bypasses these physical routing and synthesis barriers, transitioning from HDL to high-order software languages (C/C++) on general-purpose architectures typically reduces development timelines by 50% to 80%—compressing multi-year hardware upgrade cycles into a matter of months.

To overcome legacy constraints, this initiative mandates a transition toward a modular open systems architecture (MOSA). By decoupling the physical layer (PHY) from the underlying hardware, containerized Software-Defined Waveforms (SDWs) can be deployed across modern processing. Because standard Central Processing Units (CPUs) often lack the deterministic throughput required for heavy RF pipelines, modern SDR frameworks dynamically offload computationally intensive PHY tasks to coprocessors like GPUs, Neural Processing Units (NPUs), or adaptive System-on-Chips (SoCs).

This heterogeneous approach enables the execution of highly parallel mathematical pipelines via software Application Programming Interfaces (APIs), including:
Vectorized Signal Processing on GPUs or NPU cores:

- Executing Fast Fourier Transforms (FFTs)
- High-throughput Forward Error Correction (FEC)
- Matrix Multiplications

AI-Driven Cognitive Radio: As demonstrated by O'Shea and Hoydis [Ref 2], traditional heuristic PHY blocks can be replaced by "neural receivers" and deep learning autoencoders. By reusing embedded AI

inference blocks, radios can perform real-time channel estimation, signal classification, and non-linear error correction at the tactical edge.

By migrating to this software-first model, the Navy ensures rapid portability across joint-force platforms to provide highly scalable parallelism, allowing waveforms and AI-enhanced microservices to execute, reconfigure, and recover dynamically, ensuring maximum resiliency in contested electronic warfare environments.

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 and/or subcontractor 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: For a Direct to Phase II topic, the Government expects that the small business will 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 following actions would be required to satisfy the requirements of Phase I:
Crucially, the evidence of this foundational research MUST NOT rely exclusively on previous or active federally funded SBIR/STTR contracts. Tangible proof of feasibility is an absolute prerequisite for award consideration.

To satisfy these Phase I prerequisites, the submitted documentation must substantiate that the offeror has successfully executed the following:

- Validation of Feasibility: Comprehensive preliminary research into the development, integration, and demonstration of software-defined waveforms. This must be backed by empirical evidence, including theoretical modeling, simulation results, physical experimentation, and a clear mapping of anticipated technical risks.
- Proven Engineering Capabilities: A documented track record in advanced digital signal processing (DSP) and the engineering of modular, hardware-agnostic software waveforms. Offerors must detail their practical experience in optimizing these waveforms for modern, heterogeneous compute environments—specifically multi-core CPUs, GPUs, and NPUs—and demonstrate scalability from enterprise server environments down to constrained tactical radio form factors.
- Standardization and Interoperability: A deep, working knowledge of the governing interoperability standards for the specified military waveform family, ensuring the firm is fully equipped to engineer the required operational variants.

PHASE II: Design, develop, and integrate a real-time, software-defined physical layer implementation of the government-specified waveform utilizing a Digital Transceiver Software Development Kit (SDK). Validate that the Domain-Specific Architecture (DSA) processing core on the transceiver can natively host the specified waveform family, verifying the performance, agility, and modularity advantages of a software-defined physical layer.

1. Architectural Integration: Port and optimize the modular waveform software to run directly on the transceiver's processing core, maximizing instruction-set efficiency and parallel execution.
2. Spectral Verification: Conduct over-the-air or over-the-wire RF transmission testing of the waveform using the transceiver SDK test set.
3. Performance Acceptance: Execute a comprehensive, multi-point validation campaign in accordance with a government-approved acceptance test plan to confirm functional communication limits, latency, and spectral compliance.

Work in Phase II may become classified. Please see note in the Description.

PHASE III DUAL USE APPLICATIONS: Complete operational testing, interoperability verification against the government reference waveform, and transition the waveform baseline for deployment on MIDS Joint Tactical Radio System (JTRS) and other approved tactical radio platforms via the government's accredited integration and release pipeline.

Commercial organizations increasingly require the ability to rapidly deploy, update, and scale high-performance wireless communications without relying on inflexible, proprietary hardware. Technologies developed under this topic may have broad applicability in 5G/6G telecommunications (Virtualized Radio Access Networks), commercial satellite communications (SATCOM), Non-Terrestrial Networks (NTN), private enterprise networks, emergency responder communications, autonomous vehicle networks, and industrial Internet of Things (IIoT) infrastructure.

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KEYWORDS: Software-Defined Waveform; SDW; Modular Open Systems Approach; MOSA;, Forward Error Correction; FEC; Signal Processing; Vector Processor