

**DEPARTMENT OF THE NAVY (DON)**  
**23.2 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 topics only:**
  - **N232-D07 through N232-D09**
- **The information provided in the DON Proposal Submission Instruction document takes precedence over the DoD Instructions posted for this Broad Agency Announcement (BAA).**
- **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.**
- A DP2 Phase I Feasibility proposal template (for Volume 2), unique to DP2 topics, and a Supporting Documents template (Volume 5) are available at [https://www.navysbir.com/links\\_forms.htm](https://www.navysbir.com/links_forms.htm).
- 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](http://www.navysbir.com). Additional information on DON’s mission can be found on the DON website at [www.navy.mil](http://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.

**Digital Engineering.** DON desires the ability to design, integrate, and test naval products by using authoritative sources of system data, which enables the creation of virtual or digital models for learning and experimentation, to fully integrate and test actual systems or components of systems across disciplines to support lifecycle activities from concept through disposal. To achieve this, digital engineering innovations will be sought in topics with titles leading with DIGITAL ENGINEERING.

The Director of the DON SBIR/STTR Programs is Mr. Robert Smith. 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	Program Managers list in Table 2 (below)
Topic-specific technical questions	BAA Pre-release	Technical Point of Contact (TPOC) listed in each topic. Refer to the Proposal Fundamentals section of the DoD SBIR/STTR Program BAA for details.
	BAA Open	DoD SBIR/STTR Topic Q&A platform ( <a href="https://www.dodsbirsttr.mil/submissions">https://www.dodsbirsttr.mil/submissions</a> ) Refer to the Proposal Fundamentals 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 <a href="mailto:dodsbirsupport@reisystems.com">dodsbirsupport@reisystems.com</a>
Navy-specific BAA instructions and forms	Always	Navy SBIR/STTR Program Management Office <a href="mailto:usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil">usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil</a>

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

Topic Numbers	Point of Contact	SYSCOM	Email
N232-D07	Ms. Kristi DePriest	Naval Air Systems Command (NAVAIR)	<a href="mailto:navair-sbir@us.navy.mil">navair-sbir@us.navy.mil</a>
N232-D08 to N232-D09	Mr. Jason Schroepfer	Naval Sea Systems Command (NAVSEA)	<a href="mailto:NSSC_SBIR.fct@navy.mil">NSSC_SBIR.fct@navy.mil</a>

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 23.2 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); 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. 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 Proposal Fundamentals section of the DoD SBIR/STTR Program BAA. To register, visit <https://sam.gov/>

**Proposal Volumes.** The following six 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:
    - 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:
    - It is highly recommended that proposing small business concerns use the DP2 Phase I Feasibility proposal template at [https://navysbir.com/links\\_forms.htm](https://navysbir.com/links_forms.htm) to meet DP2 Technical Volume (Volume 2) requirements.
    - 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)	
N232-D07	\$1,000,000	24 mos.	\$300,000	12 mos.	\$1,300,000
N232-D08 to N232-D09	\$600,000	12 mos.	\$1,200,000*	24 mos.*	\$1,800,000*

\* Step Two: for the Full Phase II submission, if selected, topics N232-D08 and N232-D09 will require the Phase II Option 1 and Phase II Option 2 to be detailed separately:

- Phase II Option 1: Cost \$600,000, Period of Performance 12 months
- Phase II Option 2: Cost \$600,000, Period of Performance 12 months

o 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 Phase I Proposal 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:

- **Telecommunications Equipment Certification.** Required for all proposing small business concerns. The DoD must comply with Section 889(a)(1)(B) of the FY2019

National Defense Authorization Act (NDAA) and is working to reduce or eliminate contracts, or extending or renewing a contract with an entity that uses any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As such, all proposing small business concerns must include as a part of their submission a written certification in response to the clauses (DFAR clauses 252.204-7016, 252.204-7018, and subpart 204.21). The written certification can be found in Attachment 1 of the DoD SBIR/STTR Program BAA. This certification must be signed by the authorized company representative and is to be uploaded as a separate PDF file in Volume 5. Failure to submit the required certification as a part of the proposal submission process will be cause for rejection of the proposal submission without evaluation. Please refer to the instructions provided in the Phase I Proposal section of the DoD SBIR/STTR Program BAA.

- **Disclosure of Offeror’s Ownership or Control by a Foreign Government.** All proposing small business concerns must review to determine applicability. In accordance with DFARS provision 252.209-7002, a proposing small business concern is required to disclose any interest a foreign government has in the proposing small business concern when that interest constitutes control by foreign government. All proposing small business concerns must review the Foreign Ownership or Control Disclosure information to determine applicability. If applicable, an authorized representative of the proposing small business concern must complete the Disclosure of Offeror’s Ownership or Control by a Foreign Government (found in Attachment 2 of the DoD SBIR/STTR Program BAA) and upload as a separate PDF file in Volume 5. Please refer to instructions provided in the Phase I Proposal section of the DoD SBIR/STTR Program BAA.
  - **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 certification as detailed under ADDITIONAL SUBMISSION CONSIDERATIONS.
- o 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](https://navysbir.com/links_forms.htm) to provide guidance on optional material the proposing small business concern may want to include in Volume 5:
    - o Additional Cost Information to support the Cost Volume (Volume 3)
    - o SBIR/STTR Funding Agreement Certification
    - o Data Rights Assertion
    - o Allocation of Rights between Prime and Subcontractor
    - o Disclosure of Information (DFARS 252.204-7000)
    - o Prior, Current, or Pending Support of Similar Proposals or Awards
    - o Foreign Citizens
  - 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 Phase I Proposal 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 Phase I Proposal 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 criteria 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:

- 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 Navy nor will it be considered in the Navy's 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.

### **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 Program Description section of the DoD SBIR/STTR Program BAA for details on how DoD will assess security risks presented by small business concerns.

**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. The TABA amount, of up to \$25,000, 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 \$1,800,000 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 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 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 DON SBIR/STTR 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 DON 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](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](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](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.

**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 Proposal Fundamentals, 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. 2371/10 U.S.C. 2371b 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.navybirprogram.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 23.2 Direct to Phase II Topic Index**

N232-D07	DIRECT TO PHASE II - Augmented Reality for Live Flight Training
N232-D08	DIRECT TO PHASE II – Direct Delivery of Commercial Earth Observation Data to DoD Using Proliferated Low Earth Orbit Transport Layer
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N232-D07 TITLE: DIRECT TO PHASE II - Augmented Reality for Live Flight Training

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Human-Machine Interfaces;Sustainment;Trusted AI and Autonomy

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 Augmented Reality (AR) to provide a potential solution for reducing the need for costly, live, multi-ship scenarios by integrating visible constructive entities via AR presentations during live flight training events.

**DESCRIPTION:** Technology has greatly outpaced updates to aviation training, and though many aerospace corporations are embracing different forms of Extended Reality (XR) for use in aircrew and maintenance training [Ref 1], most of the Navy's current training syllabi have remained unchanged for decades. With fleet aircraft also becoming more complex, the basic piloting skills being taught at the undergraduate level are not preparing students adequately for the more advanced critical thinking and mission planning required for Fleet Replacement Squadron (FRS) training. With XR technologies improving exponentially, while also becoming cheaper, the traditional focus on the accumulation of flight hours to develop basic airmanship skills is no longer the optimal method to train effectively and efficiently, both in terms of quality and cost. Shifting away from a time-based to a competency-based approach to training with the incorporation of XR technology could provide a higher-level of training that would meet FRS entry-level requirements at a lower cost.

To make this shift, the Navy started Naval Aviation Training Next (NATN), a broad initiative focused on producing higher quality aviators in a more efficient manner. A primary catalyst behind NATN is the use of XR technologies. To date, the effort has been focused on virtual reality (VR) to provide students an immersive, lower cost platform capable of practicing procedures before doing them in the aircraft, better preparing them for flight events, which in turn allows flight events to focus on higher complexity or more difficult scenarios. This crawl-walk-run approach with VR has been demonstrated to successfully train flight procedures in a lower cost platform before demonstrating the same procedures in an aircraft [Refs 2, 3], where resources are scarce, and costs are high. Under this crawl-walk-run framework of training [Ref 4], the VR training is allowing students to shift the historical 'crawling' during initial flights to 'walk' or 'run' training in the aircraft, with the 'crawling' accomplished in VR. With the ability to execute any syllabus maneuvers in a VR device, NATN training has rapidly shown to be more efficient while also building higher quality pilots [Ref 5]. A natural extension of the VR training is to incorporate AR into actual aircraft training, as flight time gained in actual aircraft is invaluable and greatly reinforces skills learned during ground training.

AR has the potential to provide more efficient and effective training for undergraduate pilots to increase their capabilities during flight events while reducing resource requirements. An important factor for AR is its ability to 'overlay information at the point of need' [Ref 6] making it a potentially very powerful training tool for nearly any flight training scenario by either inserting visible constructive entities, or guiding student attention to specific areas. For example, undergraduate jet training incorporates significant formation training to develop skills that are foundational for fleet assignments and missions.



AR could supplement this training by utilizing a visible, constructive, formation partner in early stages of training instead of relying on another live aircraft, improving safety by avoiding possibilities of mid-air collisions while lowering overhead costs associated with utilizing multiple aircraft for training, ultimately reducing overall training time and cost by re-allocating live flight resources to other student naval aviators (SNAs) and events. Additionally, AR can improve training quality by allowing more practice opportunities for students to develop these important skillsets and fit into NATN's methods for immersive 'crawl-walk-run' training by facilitating the 'walk' to 'run' in live flight: the student is able to practice the basics of formation flying to better prepare for events with actual partner aircraft. Other logical areas in which AR could facilitate training include more advanced tactical formation flying, basic fighter tactics, aerial refueling, weapons deployment visuals, air-to-air engagement, air-to-surface missions, and other mission sets involving interaction with outside entities increasing the training capabilities and ability to introduce more complicated scenarios earlier in training.

In this Direct to Phase II SBIR topic, the Navy seeks an AR solution that would provide high-fidelity, behaviorally accurate, and visible constructive entities for live flights within the training pipeline successfully integrated into a military aircraft. Primary focus will be on demonstrating capability to support training scenarios with constructive entities in a military aircraft by successfully integrating an AR system into a Navy training aircraft and aviator gear for safe use in flight. At this stage, the AR system it is not expected (but is encouraged if meeting milestones) to be flown in military aircraft, but shall be demonstrated as capable for in-flight use by other means to provide evidence of reliability and functionality in the dynamic flight environment. Careful consideration should be given to scenario development and behaviorally accurate models of any constructive entities developed. Other items to consider should be system performance measures and assessment, integration into Navy data and grading systems, and methods for debrief utilizing scenario data from constructive entities. It is anticipated this technology would expand the NATN competency-based instructional model into live aircraft flight training, lowering training overhead while increasing training efficiency and output, by supplementing various training scenarios requiring multiple aircraft.

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. It must have developed a concept for a workable prototype or design to address at a minimum the basic requirements of the stated objective. The below actions would be required in order to successfully satisfy the requirements of Phase I:  
Designed a proof-of-concept technology that demonstrates high-fidelity virtual aircraft within an AR environment with high-quality real-world visuals.

Determined the technical feasibility of integrating virtual lead aircraft visuals for an aviator in full aviator gear in an actual aircraft cockpit.

Determined the feasibility of the technology meeting Risk Management Framework guidelines [Ref 7] to support cybersecurity compliance outlined in Defense Federal Acquisition Regulation Supplement (DFARS) and published in National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171 "Protecting Unclassified Information in Non-federal Information Systems and Organizations" [Ref 8].

Determined the technical feasibility to incorporate performance assessment capabilities for After Action Review (AAR).

**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. 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 23.2 Direct to Phase II Broad Agency Announcement (BAA) Instructions. Phase I proposals will NOT be accepted for this topic.

**PHASE II:** Develop a prototype of the AR flight training system integrated into a Navy military training aircraft (e.g., T-45) capable of presenting in an aviators visual field accurate and dynamic digital entities. By integration, the AR system should be fully functional and usable by an aviator without impeding any operation of the aircraft by the aviator or limiting access or function of aircrew gear. Major areas to consider include, but are not limited to: power supply; required computer processing; size, weight, and location of components; and interaction with aircrew gear. Consider and adhere to the Risk Management Framework guidelines during the development to support information assurance compliance [Ref 7]. Demonstrate the prototype integrated into the military aircraft in a relevant but safe environment (e.g., ground demonstration).

**PHASE III DUAL USE APPLICATIONS:** Develop hardened system architecture and complete the Risk Management Framework process to gain cybersecurity accreditation for system deployment. Demonstrate the ability to integrate transition-specific content for initial training capability transition for use during live flight in a Navy military training aircraft. Demonstrate the ability to incorporate product into a learning management system (LMS) for sustainment. Undergo safety of flight evaluations for approval for use during flight.

Development of AR technology for use during flight will present new training capabilities for commercial industry, providing civilian training programs with safer and more immersive training methodologies for scenarios like potential bird strikes, high traffic patterns, landmark identifications, and more. Additionally, once demonstrated as beneficial in an unclassified training context, the AR capability can be expanded to multiple military training platforms to aid not only training but mission rehearsal and planning across all aircraft, significantly reducing flight hour costs and time to train.

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**KEYWORDS:** augmented reality; AR; extended reality; XR; aviation training; training systems; aircraft integration; live-virtual-constructive

N232-D08 TITLE: DIRECT TO PHASE II – Direct Delivery of Commercial Earth Observation Data to DoD Using Proliferated Low Earth Orbit Transport Layer

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Space Technology; Trusted AI and Autonomy

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 an Intersatellite Link (ISL) capability to deliver secure data to the Navy via Government communication transport satellites to reduce latency of data delivery to warfighters.

DESCRIPTION: The warfighters need data in near real time to perform mission planning in areas of naval conflict. In order for this to be achieved, ISLs can be used to reduce the latency of data delivery to the warfighter, reduce the complexity of direct downlink (DDL) coordination, and increase access to areas of interest (AOIs) by removing the constraints for ground stations being required to be located in the same geographic area as the observation point. Traditional satellite data delivery exploits radio frequency (RF) communications between satellites and ground stations. In order for satellites to communicate with each other, a ground station must route the data received from one satellite's downlink to another satellite's uplink. Current data delivery methods entail a significant latency of 30 to 90 minutes. This is because satellites must wait until they pass over a fixed ground station to downlink the data. The Space Development Agency (SDA) is currently reaching out to industry for help increasing capabilities amongst Proliferated Low Earth Orbit (pLEO) satellites by using ISLs. ISLs create an orbital mesh network between hundreds of satellites. Using ISLs allows satellites to directly communicate with each other rather than having to downlink to a ground station then uplink to another satellite. The government seeks a solution to accept direct delivery of commercial earth observation to a government owned pLEO system with an initial focus on the emerging SDA tranche 1 transport layer. Currently nothing exists to provide this solution.

SDA has developed the Transport Layer, an experimental military LEO satellite constellation designed to transfer data more rapidly, to get the tactical information needed to the warfighter. This constellation is planned to have 300 to 500+ LEO satellites. Typical delivery methods of commercial observation data from commercial companies to DoD customers comprises downlinking sensor data to a fixed commercial ground station and delivering products to Government data repositories 30 minutes to 12 hours after observation. With the advent of DoD pLEO constellations there is an opportunity for inter-orbit delivery of commercial earth observation data to DoD pLEO transportation layers. This will require link acquisition between the commercial company and the transportation layer, routing of the data, and negotiation of bandwidth and link resources.

The Transport Layer is designed to connect DOD sensors and combat systems by utilizing earth observation satellites and ground stations. It is envisioned with a full constellation to have at least two satellites in view of 95% of locations on earth at any given time, while 99% will have at least one satellite in view (i.e., constant coverage). SDA is expected to launch Tranche 0 in 2023, which will consist of 20 satellites and have a limited networked capability. Tranche 1 is expected to launch in 2024 and will have 126 satellites. Tranche 1 will leverage the capabilities demonstrated in Tranche 0 while also integrating capabilities using Link-16 and Integrated Broadcast System (IBS). Leveraging these capabilities in

conjunction with the ISLs to interoperate with commercial sensing systems will enhance warfighter capabilities by providing near real-time critical target information and reducing latency and path loss of downlinked data within 60 seconds of observation and = 5 minutes for fully rendered images. By leveraging these capabilities the tasking, collection, processing, exploitation, and dissemination (TCPED) kill-chain gains impact from direct uplink from MTC - A/X, and is able to evaluate end-to-end impacts to existing commercial architecture. The Transport layer is expected be able to reach an altitude between 900-1100 km as well achieve a crosslink in the SDA Optical Communications Terminal which will be provided during contract award.

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 DOD 5220.22-M, National Industrial Security Program Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances, in order to perform on advanced phases of this contract as set forth by DCSA and NAVSEA 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 IAW DoD 5220.22-M during the advance phases of this contract.

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 in order to satisfy the requirements of Phase I:

- Develop an ISLs concept for a low latency secure data delivery capability between earth observation satellites and the Government.
- Demonstrate key attributes of the concept feasibility to meet the Navy needs as stated in the Description. Key attributes include, but are not limited to, tasking, collection, processing, exploitation, and dissemination (TCPED) performance gains by adding the ISL capability to the space layer, impact from Direct Uplink from MTC-A/X, and evaluating end-to-end impacts to existing commercial architecture.
- Feasibility must be demonstrated through modeling and analysis.

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. 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 23.2 Direct to Phase II Broad Agency Announcement (BAA) Instructions. Phase I proposals will NOT be accepted for this topic.

PHASE II: Develop and deliver an ISL prototype for a low latency secure data delivery capability between earth observation satellites and the Government. The prototype will be evaluated to determine the capability meets performance goals defined in the Phase II development plan and the Navy requirements.

Additionally, develop a Phase III development plan with performance goals and key technical milestones that scales the ISL solution across the earth observation satellite constellation.

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:** Clearly identify and describe the expected transition of the product/process/service within the government as a result of the Phase II in which the small business will participate under a Phase III.

Support the Navy in transitioning the technology for use in MTC-A/X. Develop the ISL for evaluation to determine its effectiveness in providing faster more secure data delivery to the warfighter. Support the Navy for testing and validation to certify and qualify the capability for Navy use.

Integrate ISL solution across all future commercial earth observation satellites that are replenishing the constellation pending results from the prototype integration events.

As technology continues to be improved over time, cloud-based applications are increasing services. This requires a constant reliable connection in order to receive and transmit data wherever operational. This is especially important with mobile and remote operations, similar to ships at sea. ‘Always on’ data delivery is also often used in the oil and gas industry for a “digital oilfield” where they need to consistently and rapidly move large quantities of data around the world.

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**KEYWORDS:** Satellite Downlink; Transport Layer; Proliferated Low Earth Orbit; Space Development Agency; Orbital Mesh Network; Intersatellite Links; Latency.



N232-D09 TITLE: DIRECT TO PHASE II – Observation Cone Enhancements for Low-earth Orbit Satellites

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Space Technology; Trusted AI and Autonomy

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 capability that improves coverage gaps of Areas of Interest (AOIs) of existing and future naval conflict.

DESCRIPTION: Current Field of Regard (FOR) limits the taskability for commercial assets to  $\pm 30^\circ$  due to the spatial resolution on the extreme slants. The Navy seeks software development incorporating georectification techniques for commercial Low-earth Orbit (LEO) satellites that allow improved taskability of these sensors to support Naval missions, providing more tactically relevant information to the warfighter. This capability does not currently exist.

High revisit rates of remote sensing imagery are of high importance to the Navy. One of the factors that determine this revisit rate is the extent off-nadir that imagery satellites can make collections. Existing remote sensing imagery collects for commercial LEO satellites are limited to the satellite observation cone available due to the spatial resolution at boundaries (i.e., the off-nadir limitations). Though there is variation among commercial systems, the Navy observes typical off-nadir extents for commercial LEO satellites at approximately  $\pm 30^\circ$ . By increasing the revisit rates to multiple revisits per day information characterizing rapid change or unusual activity can be captured. This information allows the warfighter to make critical decisions and resource allocation. Large off-nadir collections ( $> \pm 30^\circ$ ) offer the possibility to increase these revisit rates at the risk of lower fidelity images. The capability must demonstrate trading performance on the National Image Interpretability Rating Scale (NIIRS for Electro-Optical, also Radar NIIRS or RNIIRS for Synthetic Aperture Radar) for increased area coverage improves tactical relevance while still achieving data fidelity requirements for maritime applications. The solution will require a demonstration of increased FOR in a test environment where ground software is able to georectify beyond the baseline observation cone. Desired performance is = 1 km georectification for extended range over open ocean and = 5 m ground resolution.

The Navy recognizes that space vehicle and payload design constraints as well as data processing algorithms may impede off-nadir experimentation. In addition to spatial resolution on Earth's surface, one key AOI is geolocation accuracy. Geolocation refers to the ability to accurately locate an image on a coordinate system. It consists of 3 major parts: (i) position, velocity, and pointing data from the satellite to coarsely locate the image; (ii) georectification to take the image and match it to landmarks and identifiable features; and (iii) orthorectification to remove sensor, terrain, atmospheric, and terrain related geometric distortions. By enhancing satellite data, orthorectification, and georectification algorithms, the observation cone can be increased allowing for a wider FOR with validated accuracy.

Software development to increase the extent of off-nadir collections and positional accuracy of the AOI can increase the taskability and revisit rate of commercial assets to support DoD missions. LEO satellites take between 90 minutes to 2 hours to complete one orbit and are only communicating with a ground

station for 5 - 10 minutes at a time. An increased FOR delivers more tactically relevant data to the warfighter during ground station communication. This software should be able to georectify the data over open ocean when observing the earth at extreme slant angles.

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 DOD 5220.22-M, National Industrial Security Program Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances, in order to perform on advanced phases of this contract as set forth by DCSA and NAVSEA 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 IAW DoD 5220.22-M during the advance phases of this contract.

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 in order to satisfy the requirements of Phase I:

- Develop a concept to significantly increase the off-nadir collection capability of commercial LEO high-resolution imaging satellites over open ocean within existing baseline operating limits. Submitting small business concerns must provide current off-nadir collection capabilities as the baseline.
- Demonstrate the key attributes of the concept feasibility to meet the Navy needs. Key attributes include but are not limited to the capability to collect imagery at angles significantly greater than  $\pm 30^\circ$  off-nadir, successful georectify and orthorectify the image, and determine its geolocation accuracy.
- Feasibility must be demonstrated through modeling and analysis.

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. 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 23.2 Direct to Phase II Broad Agency Announcement (BAA) Instructions. Phase I proposals will NOT be accepted for this topic.

PHASE II: Develop and deliver a prototype of the software and demonstrate an increased observation cone for commercial LEO satellites from concept development in Phase I. The prototype will be evaluated in operationally relevant exercises to determine the capability in meeting performance goals defined in the description and the Navy requirements.

PHASE III DUAL USE APPLICATIONS: Support the Navy in transitioning the technology for use in wartime environment. Develop software for commercial LEO satellites for evaluation to determine its

effectiveness in increasing taskability options of these satellites. Support the Navy for testing and validation of software in MTC-A/X to certify and qualify the capability for Navy use. Improved revisit rates using off-nadir imagery collection with accurate geolocation would benefit multiple commercial and civil applications such as providing relief during natural disasters and locating assets in a mishap at sea.

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KEYWORDS: Satellite Observation Cone; Field of Regard; observation at extreme slant angles; off-Nadir; Georectify; Low-Earth Orbit; National Image Interpretability Rating Scale.