

DEPARTMENT OF THE NAVY (DoN)
25.4 Small Business Innovation Research (SBIR)
Release 1
Catapult Challenge Announcement and Proposal Submission Instructions

IMPORTANT

- The following dates apply to Catapult Challenge topics only N254-C01 through N254-C04
 - 2 October 2024: Topics issued for pre-release
 - 23 October 2024: DoN begins accepting proposals
 - 6 November 2024: Topic Q&A closes to new questions
 - 20 November 2024: Full proposals due no later than 12:00 p.m. ET
- Information on virtual Ask Me Anything event for the Catapult Challenge BAA can be found at https://www.navysbir.com/Catapult_Challenge.htm.
- A submitting small business concern **MUST** use the Catapult Challenge proposal template for Volume 2. This template is specific to DoN Catapult Challenge topics and meets Catapult Challenge submission requirements. The Catapult Challenge proposal template will be posted to https://navysbir.com/links_forms.htm on the Open date of this BAA.
- Submitting small business concerns are encouraged to thoroughly review the DoD Program BAA and register for the DSIP Listserv to remain apprised of important programmatic changes.
 - The DoD Program BAA is located at: <https://www.dodsbirsttr.mil/submissions/login>. 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 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**.
- 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, and primarily address the needs of the DoN. More information on the programs can be found on the DoN SBIR/STTR website at www.navybir.com. Additional information on DoN's mission can be found on the DoN website at www.navy.mil.

The SBIR and STTR Policy Directive section 4(b)(7) allows the DoN to make a subsequent Phase II award to a small business concern that has received a Phase I award under a topic with another agency. The resulting subsequent Phase II contract award must be within the scope of the original topic but not duplicate any previous work. **An eligible small business concern that has received a Phase I or Phase II award to a topic with another agency and the scope of that award aligns to a Catapult Challenge topic identified in this BAA may participate in this Catapult Challenge BAA.** If selected, DoN will request a written determination for cross agency award from the topic's originating agency.

No Phase I awards will be issued to the designated Catapult Challenge topics.

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

TABLE 1: POINTS OF CONTACT FOR QUESTIONS REGARDING THIS BAA

Type of Question	When	Contact Information
Program and administrative	Always	DoN SBIR/STTR Program Management Office usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil or appropriate Program Manager listed in Table 2 (below)
Topic-specific technical questions	BAA Pre-release <i>2 October 2024 - 22 October 2024</i>	Technical Point of Contact (TPOC) listed in each topic on the DoD SBIR/STTR Innovation Portal (DSIP). Refer to the Proposal Submission section of the DoD SBIR/STTR Program BAA for details.
	BAA Open <i>23 October 2024 – 20 November 2024</i>	DoD SBIR/STTR Topic Q&A platform (https://www.dodsbirsttr.mil/submissions) Refer to the Proposal Submission section of the DoD SBIR/STTR Program BAA for details.
Electronic submission to the DoD SBIR/STTR Innovation Portal (DSIP)	Always	DSIP Support via email at dodsbirsupport@reisystems.com
Navy-specific BAA instructions and forms	Always	DoN SBIR/STTR Program Management Office usn.pentagon.cnr-arlington-va.mbx.navy-sbir-sttr@us.navy.mil

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

<u>Topic Numbers</u>	<u>Point of Contact</u>	<u>SYSCOM</u>	<u>Email</u>
N254-C01 to N254-C03	Mr. Jason Schroepfer	Naval Sea Systems Command (NAVSEA)	NSSC_SBIR.fct@navy.mil
N254-C04	Mr. Jon M. Aspinwall III (Acting)	Strategic Systems Programs (SSP)	ssp.sbir@ssp.navy.mil

Each Catapult Challenge submission requires documentation to determine eligibility. Documentation requirements to determine eligibility will be included in the Catapult Challenge proposal template which will be posted to https://navysbir.com/links_forms.htm on the Open date of this BAA.

The DoN SBIR Catapult Challenge is a two-step process:

STEP ONE: Prepare and submit a Catapult Challenge Proposal (instructions and link to template provided below under the heading Technical Volume. Technical Volume template will be posted online on the Open date of this BAA). The purpose of the Catapult Challenge Proposal is for the proposing small business concern to document the technical accomplishments to date of the Phase I or initial (first) Phase II award and describe how the work under that award can be leveraged to meet the needs of a topic identified in this Catapult Challenge BAA.

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 Phase II Proposal to this Catapult Challenge.

DoN SBIR reserves the right to make no awards under this Catapult Challenge 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.

CATAPULT CHALLENGE PROPOSAL SUBMISSION REQUIREMENTS

The following section details requirements for submitting a compliant STEP ONE Catapult Challenge 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.)

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 under STTR may transition in Phase II to SBIR and vice versa. As such, the DoN will accept STEP ONE Catapult Challenge Proposals submissions from small business concerns with Phase I or initial Phase II STTR awards.

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

Eligibility. Each proposing small business concern must:

- Have received a Phase I or an initial Phase II award to a topic that aligns to a Catapult Challenge topic advertised in this BAA, and not yet received a second Phase II award to the same topic
- Have submitted a STEP ONE Catapult Challenge Proposal for evaluation
- Meet Offeror Eligibility and Performance Requirements as defined in the Program Description 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
- Have an active registration in System for Award Management (SAM) as defined in the Certifications and Registration section of the DoD SBIR/STTR Program BAA. To register, visit <https://sam.gov/>

Proposal Volumes. The following volumes are required.

- **Proposal Cover Sheet (Volume 1).** As specified in DoD SBIR/STTR Program BAA.
- **Technical Volume (Volume 2).**
 - Technical Proposal (Volume 2) must meet the following requirements or the proposal will be REJECTED:
 - A submitting small business concern MUST use the Catapult Challenge Proposal template for Volume 2. The Catapult Challenge Proposal template will be posted to https://navysbir.com/links_forms.htm on the Open date of this BAA. This template is specific to DoN Catapult Challenge topics and meets Catapult Challenge submission requirements:
 - Response provided to each section of the template
 - Not to exceed 12 pages, regardless of page content
 - Single column format, single-spaced typed lines
 - Standard 8 ½" x 11" paper
 - Page margins one inch on all sides. A header and footer may be included in the one-inch margin.
 - No font size smaller than 10-point
 - Additional information:
 - A font size smaller than 10-point is allowable for headers, footers, imbedded tables, figures, images, or graphics that include text. However, proposing small business concerns are cautioned that if the text is too small to be legible it will not be evaluated.
- **Cost Volume (Volume 3).** The text fields related to costs for the proposed effort must be answered in the Cost Volume of the DoD Submission system (at <https://www.dodsbirsttr.mil/submissions/>), however, proposing small business concerns DO NOT need to download and complete the separate

cost volume workbook template when submitting the DoN SBIR Catapult Challenge Proposal for STEP ONE. Proposing small business concerns are to include a cost estimate in the Order of Magnitude Cost Estimate Table (example below) within the Technical Volume (Volume 2). Please refer to Table 3 below for guidance on cost and period of performance.

Line Item – Details	Estimated Amount
Direct Labor (fully burdened) – Prime	
Subcontractors/Consultants	
Material	
Travel & ODC	
G&A	
Facilities Capital Cost of Money (FCCM)	
Fee/Profit	
TABA (NTE \$25K, included in total amount)	
Total Estimated Costs	

TABLE 3: COST & PERIOD OF PERFORMANCE

Topic Number	Base	
	Cost (NTE)	POP (NTE)
N254-C01 – N254-C04	\$2,000,000	36 mos.

- Additional information:
 - For Phase II a minimum of 50% of the work is performed by the proposing small business concern. The percentage of work is measured by both direct and indirect costs.
- **Company Commercialization Report (Volume 4).** DoD collects and uses Volume 4 and DSIP requires Volume 4 for proposal submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details to ensure compliance with DSIP Volume 4 requirements.
- **Supporting Documents (Volume 5).** Volume 5 is for the submission of administrative material that DoN may or will require to process a proposal, if selected, for contract award.

Proposing small business concerns must review and submit the following items, as applicable:

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

- Additional information:

- Proposing small business concerns may include the following administrative materials in Supporting Documents (Volume 5); a template is available at https://navysbir.com/links_forms.htm to provide guidance on optional material the proposing small business concern may want to include in Volume 5:
 - Additional Cost Information
 - SBIR/STTR Funding Agreement Certification
 - Data Rights Assertion
 - Allocation of Rights between Prime and Subcontractor
 - 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 (TABAs), if proposed, is to be included under the Additional Cost Information section if using the DoN Supporting Documents template.
 - Do not include documents or information to substantiate the Technical Volume (Volume 2) (e.g., resumes, test data, technical reports, or publications). Such documents or information will not be considered.
 - A font size smaller than 10-point is allowable for documents in Volume 5; however, proposing small business concerns are cautioned that the text may be unreadable.
- **Fraud, Waste and Abuse Training Certification (Volume 6).** DoD requires Volume 6 for submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details.
 - **Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7).** In accordance with Section 4 of the SBIR and STTR Extension Act of 2022 and the SBA SBIR/STTR Policy Directive, the DoD will review all proposals submitted in response to this BAA to assess security risks presented by small business concerns seeking a Federally funded award. Small business concerns must complete the Disclosures of Foreign Affiliations or Relationships to Foreign Countries webform in Volume 7 of the DSIP proposal submission. Please refer to the Proposal Preparation Instructions and Requirements section of the DoD SBIR/STTR Program BAA for details.

CATAPULT CHALLENGE EVALUATION AND SELECTION

The following section details how the DoN SBIR/STTR Programs will evaluate Catapult Challenge 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 STEP ONE Catapult Challenge Proposals using the evaluation criteria specified in the Method of Selection and Evaluation Criteria

section of the DoD SBIR/STTR Program BAA, with technical merit being most important, followed by qualifications of key personnel and commercialization potential of equal importance. The information considered for this decision will come from Volume 2. This is not a FAR Part 15 evaluation and proposals will not be compared to one another. Cost is not an evaluation criterion and will not be considered during the evaluation process; the DoN will only do a compliance review of costs proposed in the Technical Volume. Due to limited funding, the DoN reserves the right to limit the number of awards under any topic.

The Technical Volume (Volume 2) will undergo a compliance review (prior to evaluation) to verify the proposing small business concern has met the following requirements or the proposal will be REJECTED:

- A submitting small business concern **MUST** use the Catapult Challenge Proposal template for Volume 2. The Catapult Challenge Proposal template will be posted to https://navysbir.com/links_forms.htm on the Open date of this BAA. This template is specific to DoN Catapult Challenge topics and meets Catapult Challenge submission requirements:
 - Response provided to each section of the template
 - Not to exceed 12 pages, regardless of page content
 - 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 (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.
- **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 CATAPULT CHALLENGE PROPOSAL SUBMISSION REQUIREMENT section above.
- **Fraud, Waste, and Abuse Training Certificate (Volume 6).** Not evaluated.
- **Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7).** Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7) will be assessed as part of the Due Diligence Program to Assess Security Risks. Refer to the DoD SBIR/STTR Program BAA to ensure compliance with Volume 7 requirements.

ADDITIONAL SUBMISSION CONSIDERATIONS

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

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

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

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

If the TABA request does not include the following items the TABA request will be denied.

- TABA provider(s) (firm name)
- TABA provider(s) point of contact, email address, and phone number
- An explanation of why the TABA provider(s) is uniquely qualified to provide the service
- Tasks the TABA provider(s) will perform (to include the purpose and objective of the assistance)
- Total TABA provider(s) cost, number of hours, and labor rates (average/blended rate is acceptable)

TABA must **NOT**:

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

TABA requests must be included in the proposal as follows:

- Phase II:
 - DoN Phase II Cost Volume (provided by the DoN SYSCOM) - the value of the TABA request.

- Supporting Documents (Volume 5) – a detailed request for TABA (as specified above) specifically identified as “TABA” in the section titled Additional Cost Information when using the DoN Supporting Documents template.

Proposed values for TABA must NOT exceed:

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

If a proposing small business concern requests and is awarded TABA in a Phase II contract, the proposing small business concern will be eliminated from participating in the 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 Navy STP Kickoff during the first or second year of the Phase II contract. While there are no travel costs associated with this virtual event, Phase II awardees should budget time of up to a full day to participate. STP information can be obtained at: <https://navystp.com>. Phase II awardees will be contacted separately regarding this program.

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

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

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

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

business concern must immediately notify the Contracting Officer, register in the appropriate SBA database, and submit the required certification which can be found on https://navysbir.com/links_forms.htm.

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

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

Human Subjects, Animal Testing, and Recombinant DNA. If the use of human, animal, and recombinant DNA is included under a 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 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. 4021/10 U.S.C. 4022 and related implementing policies and regulations. The DoN may choose to use a Basic Ordering Agreement (BOA) for 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 under a BAA for SBIR may transition in Phase II to STTR and vice versa.

PHASE III GUIDELINES

A Phase III SBIR/STTR award is any work that derives from, extends, or completes effort(s) performed under prior SBIR/STTR funding agreements, but is funded by sources other than the SBIR/STTR programs. This covers any contract, grant, or agreement issued as a follow-on Phase III award or any contract, grant, or agreement award issued as a result of a competitive process where the awardee was an SBIR/STTR firm that developed the technology as a result of a Phase I or Phase II award. The DoN will give Phase III status to any award that falls within the above-mentioned description. Consequently, DoN will assign SBIR/STTR Data Rights to any noncommercial technical data and noncommercial computer software delivered in Phase III that were developed under SBIR/STTR Phase I/II effort(s). Government prime contractors and their subcontractors must follow the same guidelines as above and ensure that companies operating on behalf of the DoN protect the rights of the SBIR/STTR firm.

**Navy SBIR 25.4 Topic Index
Release 1**

- N254-C01 Catapult Challenge: Anti-Submarine Warfare (ASW) Multi-Platform Product Family Architecture
- N254-C02 Catapult Challenge: At-Sea Reload Technologies
- N254-C03 Catapult Challenge: Modular Electronic Warfare Counter- Unmanned Aerial System (C-UAS) Payload
- N254-C04 Catapult Challenge: Modular Alternate Navigation Fusion Architecture for High Speed Systems

N254-C01 TITLE: Catapult Challenge: Anti-Submarine Warfare (ASW) Multi-Platform Product Family Architecture

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Trusted AI and Autonomy;Advanced Computing and Software;Integrated Network Systems-of-Systems

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 architecture that facilitates capabilities to be fielded across Anti-Submarine Warfare (ASW) systems fielded across Maritime Patrol Reconnaissance Aircraft (MPRA), submarines, surface combatants, and seabed protection systems.

DESCRIPTION: The Navy is seeking additional Phase II research and development on previous Phase I and Phase II efforts. The proposing small business concern must detail the previous SBIR/STTR efforts and how they will extend the previous SBIR/STTR effort to meet the requirements of this topic. The Navy desires a multi-platform architecture for Anti-submarine warfare (ASW) that can enable integration of key warfighting capabilities, to include Artificial Intelligence (AI) algorithms, across multiple US Navy Platforms. Multiple Navy enterprises and directorates contribute to undersea warfare. Over the decades, this has led to divergent system architectures. These divergent system architectures degrade the Navy's ability to leverage developments in support of a combined lethal network of capabilities. The combined Anti-Submarine Warfare (ASW) Multi-Platform Product Family Architecture will enable key architectures across constituent ASW acquisition offices to be aligned to enable capability reuse, increasing warfighting capability at reduced acquisition cost and with reduced sailor burden. Hardware required for the architecture shall comply with Modular Open System Architecture (MOSA) and follow open standards for compute, storage, input/output (I/O) and memory. Software contributing to the architecture shall enable integration of key warfighting capabilities, including various AI algorithms, across different combat systems. These combat systems are developed by each of the three Navy enterprises that contribute to Anti-submarine Warfare: The Undersea Enterprise (USE), the Surface Warfare Enterprise (SWE), and the Naval Aviation Enterprise (NAE). In addition, the architecture shall enable integration of capabilities with other DoD entities with a need for Anti-Submarine capabilities, for example the Coast Guard and Homeland Defense to defend against commodities and threats conveyed via submarines or Marine Corps for detecting submarine threats to advanced bases established to defend national interests across the world.

The ASW Multi-Platform Product Family Architecture shall both 1) demonstrate connectivity with at least one of the Navy systems with an Anti-submarine warfare mission (MPRA, SSN, DDG, FFG, or Seabed defense) and 2) be able to demonstrate the feasibility of connectivity with the other ASW systems. The architecture shall enable cyber compliance and support environmental qualification on air, surface, and undersea systems. The architecture shall incorporate standardized interfaces that enable integration of capabilities such as AI, sensor, and unmanned underwater systems modules across platforms with an ASW mission, with the P-8 representing a key system that possesses extended range at speed but with extremely limiting space, weight, power, cost, and cooling (SWAP-C2) constraints.

The small business concern shall demonstrate the ability to deploy Artificial Intelligence (AI) Algorithms developed by Project Harbinger to the P-8 and demonstrate that integration with other platforms with an ASW mission is feasible. In Phase II, the small business concern will define and standardize interfaces to enable affordable and effective integration of ASW capabilities and sensors aboard platforms with an ASW mission. Among the systems of interest, a key focus shall be integration of AI, sensor processing, and unmanned underwater systems modules with systems with a limited computational infrastructure, such as the P-8 Maritime Patrol Reconnaissance Aircraft.

Work produced in Phase II may become classified. Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by 32 U.S.C. § 2004.20 et seq., National Industrial Security Program Executive Agent and Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA) formerly Defense Security Service (DSS). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances. This will allow contractor personnel to perform on advanced phases of this project as set forth by DCSA and 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 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: Catapult leverages prior SBIR/STTR investment to accelerate technology development to meet Naval priorities. Small business concerns should have accomplished the following in their previously funded SBIR/STTR Phase I effort:

1. Demonstrated their architecture derives from efforts that achieved connectivity with at least one of the Navy systems with an Anti-submarine warfare mission (MPRA, SSN, DDG, FFG, or Seabed defense)
2. Demonstrated their architecture supports the feasibility of connectivity with ASW systems from each of the Navy Enterprises (USE, SWE, NAE)
3. Demonstrated that their architecture can specifically support integration of key capabilities, to include AI and unmanned underwater system modules, aboard P-8 Maritime Reconnaissance Patrol Aircraft (MPRA).

PHASE II: The Phase II effort shall develop a standardized interfaces to enable affordable and effective integration of ASW capabilities and sensors aboard platforms with an ASW mission. Building on these standardized interfaces, the awardee shall develop a prototype that enables the P-8 to integrate ASW capabilities, to include

- a) AI developed under Project Harbinger,
- b) processing of distributed sensors, and
- c) unmanned underwater systems modules with systems.

Demonstrate the interfaces are standardized across the family of platforms with an ASW mission, develop a prototype that could be used to field important capability across each major platform with an ASW mission, to include SSNs, SQQ-89 sonars aboard DDGs and FFGs, and Seabed systems.

For each major platform, execute a land-based demonstration of the loose integration of a ASW capability that the platform's organic ASW suite currently lacks. Negotiation of which capability will be demonstrate for each major platform shall be suggested in the Phase II proposal. If the capability the Navy desires integrated for each major platform exceeds the bounds of the Phase II funding, the Navy has the option to add their desired capability for each major platform with mission funds.

The government will evaluate the prototype to determine its capability in meeting the performance goals defined in the Phase II SOW and the current cybersecurity requirements for achieving authority to operate (ATO). The ASW Multi-Platform Product Family Architecture prototype will be delivered at the end of Phase II.

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: The awardee will be expected to support the Navy in transitioning the ASW Multi-Platform Product Family Architecture to support major platforms with ASW missions as well as the need of Homeland Defense and Marine Corps to perform ASW as part of their missions.

The technology will have private sector commercial potential for any family of infrastructure-critical systems where stove-piped development has prohibited capability sharing that is desired but previously not affordable, as may occur for organizations performing disaster response.

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2. Sandeep Katta, "Enterprise AI and Legacy Systems: A Double-Edged Sword on the Path to Modernization," Republished on Medium, 1 Aug 2024. Accessed September 2024 <https://medium.com/snowflake/enterprise-ai-and-legacy-systems-a-double-edged-sword-on-the-path-to-modernization-9f54e1da1fab>
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KEYWORDS: Product Family Architecture; divergent system architectures; increasing warfighting capability; space, weight, power, cost, and cooling (SWAP-C2) constraints; standardized interfaces; detecting submarine threats

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

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OBJECTIVE: Develop a system to improve the Navy's ability to support distributed forces, develop and demonstrate innovative technologies that enable underway ordnance stowage, transportation, handling, transfer, and loading/unloading in elevated sea states.

DESCRIPTION: The Navy is seeking additional Phase II research and development on previous Phase I and Phase II efforts. The proposing small business concern must detail the status of previous SBIR/STTR efforts and how they can be further developed into technology for use.

Ships and submarines are typically reloaded pier side at developed ports or in austere/protected anchorages that may be far from operational areas.

At-Sea reload of MK41 VLS, and other ordnance, close to the point of need is challenging in higher sea states due to the relative motions between supply vessels and Combatants. The weight of ordnance and equipment may limit ability to transfer and shipboard infrastructure may not be sufficient or available.

The Navy seeks innovation solutions that support and enable underway at-sea reloading of ordnance from Combat Logistics Force ships to surface combatants in Sea State 3 and above conditions.

Ship to Ship Ordnance Handling, Integration and Enabling Technology Focus Areas:

- Shipboard cranes
- Connected Replenishment systems
- Motion Compensation
- Improved Ordnance Handling Equipment and PHS&T
- Advanced Materials and Manufacturing for Weight reduction
- Ship to Ship communications & data transfer
- Sensors/monitoring for reload systems, relative ship motions and operational decision making
- Intra-ship ordnance and Reload equipment handling
- Advanced maintenance support and training systems

Work produced in Phase II may become classified. Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by 32 U.S.C. § 2004.20 et seq., National Industrial Security Program Executive Agent and Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA) formerly Defense Security Service (DSS). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances. This will allow contractor personnel to perform on advanced phases of this project as set forth by DCSA and 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 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: Catapult leverages prior SBIR/STTR investment to accelerate technology development to meet Naval priorities. The Navy is seeking additional Phase II research and development on previous Phase I and Phase II efforts. The proposing small business concern must detail the status of previous SBIR/STTR Phase I or Phase II efforts and how they can be further developed into technology solutions that support and enable underway at-sea reloading.

PHASE II: Develop, demonstrate and deliver a prototype that demonstrates innovative technologies that enable underway ordnance stowage, transportation, handling, transfer, and loading/unloading in elevated sea states. Develop plans for full-scale testing in an open water environment in Phase III. 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: Support the Navy in transitioning the technology for Navy use. Perform full-scale testing in shipboard operational environments and further refine the technology for Navy use.

Technologies needed to support ship-to-ship at-sea reload of ordnance can also be used for other Navy ship-to-ship transfers, as well as offshore oil and wind industry applications.

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KEYWORDS: Reload at sea; ordnance storage; ordnance transportation; ordnance transfer; ordnance loading/unloading; motion compensation

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N254-C03 TITLE: Catapult Challenge: Modular Electronic Warfare Counter- Unmanned Aerial System (C-UAS) Payload

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

OBJECTIVE: Develop a low Size, Weight, and Power (SWaP) modular payload to deploy on an Unmanned Aircraft System/Unmanned Surface Vehicle (UAS/USV) platform to counter adversarial class I commercial Unmanned Aircraft System (UAS) 5G Radio Frequency (RF) Command and Control (C2) links.

DESCRIPTION: The growing threat of adversarial Unmanned Aircraft Systems (UAS) of various sizes and shapes to US Navy Vessels and operational areas has increased at an expeditious pace. The Navy has sought various methods to defend vessels against potential attacks and reconnaissance. However, with their advantages in ease of operation and low cost, the widespread availability of UASs and advances in technology continues to pose significant security threats to Navy vessels and operating areas. To defeat such threats, one effective Navy Counter-UAS technique is to employ electronic warfare to negate UAS threats and deny access to US Navy vessels and operating areas.

The Navy is seeking additional Phase II research and development on previous Phase I and Phase II efforts. The proposing small business concern must detail the status of previous SBIR/STTR efforts and how they can be further developed into technology for use.

The Navy is seeking additional modular payloads for counter UAS platforms. Potential capabilities could include, but are not limited to detection, identification, tracking, and defeat of class I commercial UASs. The Navy is also seeking to expand the capability to counter future commercial UAS platforms that utilize 5G cellular Frequency Range (FR) 2 & FR3 standalone C2 links.

The proposed solution should be a low SWaP modular electronic warfare payload for deployment on UAS and Unmanned Surface Vehicles (USV) that can counter adversarial UAS to provide force protection capabilities. The payload should be compatible with the Zynq UltraScale+ RFSoc based Government-owned Software Defined Radio (SDR) to utilize existing C-UAS electronic warfare functions. The Government-owned SDR is dual half duplex transceiver with a 3U form factor size, has a C5ISR Modular Open Suite of Standards (CMOSS) interface, and requires 38 Watts of power.

The vendor will integrate payload with SDR. It is anticipated that the payload will contain a single board computer, RF front end electronics, antennas, UAS/USV RF C2 link, SDR C2 link, housing, and power supply. RF Front end key parameters:

- Transmit power: 5 watts
- Transmit switching time: 10 microseconds
- Maximum RF input: 15dBm
- Dynamic range: 72 db (12 bit) or 95 db (14 bit)
- Max duty cycle: 100%
- 2nd harmonic level suppression: -40dBc

Payloads footprint must be no larger than 500 cubic inches and shall weigh no more than 10 lbs. Additionally, power consumption shall not exceed 100W. The payload should maximize the effective radiated power within these SWaP limits. The payload size is to be deployable on a UAS and USV platform in maritime environments.

The performer will be required are to demonstrate the C-UAS capability on an UAS platform as a modular payload and deploy a C-UAS RF capability for 5G cellular FR2 & FR3 standalone C2 links

utilizing the Government furnished SDR, software, and techniques. The focus of the technology should be on developing a low SWaP modular payload that can be deployed on UAS/USV and is capable of countering small UAS and providing force protection capabilities. Performance parameters to bound the scope of research include the ability to demonstrate the C-UAS capability on an UAS platform, and a C-UAS RF capability for 5G cellular FR2 & FR3 standalone C2 links utilizing the Government furnished SDR, software, and techniques. Additionally, the performer should identify alternative UAS and USV platforms to rapidly integrate and deploy the C-UAS modular payload.

Work produced in Phase II may become classified. Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by 32 U.S.C. § 2004.20 et seq., National Industrial Security Program Executive Agent and Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA) formerly Defense Security Service (DSS). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances. This will allow contractor personnel to perform on advanced phases of this project as set forth by DCSA and 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 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: The Government expects that the small business concern has developed a concept for a workable prototype or design to address, at a minimum, the basic requirements of the stated objective above in their previously funded SBIR/STTR phase I effort. The below actions would be required in order to satisfy the requirements of Phase I:

Proposals must demonstrate that the small business concern understands the current state of the art in digital and RF electronics and explain how the proposed approach will advance the state of the art. Proposals must describe in detail the small business concern's concept for electronic warfare payloads. The proposal should clearly explain the rationale for the selection of the proposed concept for next-generation autonomy and how it will satisfy the capabilities of this topic within the constraints stated in the Description section above. This rationale must be clearly supported by, for example, analysis, testing in simulation, and/or small scale-model testing.

PHASE II: Develop and deliver a prototype for evaluation as appropriate. The prototype will be evaluated to determine its capability in meeting the performance goals defined in the Phase II SOW and the Navy requirements for the counter UAS modular payload. Demonstrate performance with a detailed analysis, and live demonstration in a test environment as part of the evaluation. Provide detailed technical documentation of the design, including an interface control drawing and interface specification, to allow successful transition of the product. Prepare a Phase III development plan to transition the technology to Navy use.

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

PHASE III DUAL USE APPLICATIONS: Transition of this product includes C-UAS force protection rolls that require expanded coverage areas and that adapts to future threat requirements for critical expeditionary and afloat personnel and operations.

Dual use applications include C-UAS capabilities to support Federal law enforcement and National Special Security Events.

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KEYWORDS: Unmanned Aerial Vehicle; Uncrewed Aerial Vehicle; Unmanned Aerial System; Uncrewed Aerial System; Modular; Networked; Software Defined Radio; Platform Integration; Force Protection; C2

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N254-C04 TITLE: Catapult Challenge: Modular Alternate Navigation Fusion Architecture for High Speed Systems

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Computing and Software; Hypersonics; Integrated Network Systems-of-Systems

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: A Testing Open System Architecture (TOSA) is required to develop and evaluate alternate navigation capabilities. The TOSA solutions shall include a reference architectural diagram and definitions as well as Open System Models to enable modeling, simulation, and analysis (MS&A) of proposed technologies.

DESCRIPTION: Most flight systems are Global Positioning Systems (GPS)-aided flight systems. To be more resilient when GPS may not be available, systems need to leverage additional alternate navigation sensors. However, flight system and subsystem architectures are often closed, proprietary, or otherwise not built to receive new capability subsystems. To open innovation, advanced capability programs require a Modular Open Systems Architecture (MOSA) architecture to evaluate S&T or Advanced Capability subsystem performance for high-speed flight alternate navigation. The Testing Open System Architecture (TOSA) will be available to technology developers to develop their technologies to the testing standard. TOSA will also provide the government the tools needed to evaluate sensors developed to the TOSA. This architecture shall incorporate and be compatible with Weapons Open System Architecture (WOSA) and Sensor Open Systems Architecture (SOSA). This architecture shall give common standards to capability developers for hypersonic and supersonic weapon systems. TOSA shall be transitioned to The Multi-Service Advanced Capability Hypersonic Test Bed (MACH-TB) to be implemented on Sub-Scale Tests (SSTs) and Full Scale Tests (FSTs) to enable the rapid transition of experimental prototype capability into Programs of Record for the US Navy, US Army, and US Air force.

The small business concern shall develop and promulgate a Testing Open System Architecture (TOSA) that will be representative for high-speed systems and sensor suites. The TOSA shall include:

1. TOSA Input from Technology [See input A on notional block diagram linked below]: data interfaces for technologies to provide sensor navigation information to a notional flight computer;
2. TOSA input to technology [See input B on notional block diagram linked below]: data interfaces to a navigation sensor from a representative flight computer
3. Sensor stimuli model to a sensor technology [See input C on notional block diagram linked below]: publicly available data interface by sensor type (GPS, celestial, resident space objects, digital elevation map(s))

Link to Notional Block Diagram:

https://navysbir.com/n25_4/R1/N254-C04-Notional_Block_Diagram.pdf

The problem most technology developers have is that they do not understand the constraints they should consider when developing a solution for the government. The objective is to develop a reference to which

all developers can explore technology solutions to and to also enable the government to evaluate their performance without having to explore complex weapon system integration.

Related State of the Art Technologies: The TOSA should be able to support stimulation and assessment of various alternate navigation technologies:

1. Celestial Aided Navigation
2. Doppler Aided Navigation
3. GPS aided navigation
4. Inertial Aided Navigation
5. Terrain Aided Navigation
6. Clock aided navigation

Performance parameters: The TOSA should represent supersonic and hypersonic flight profiles over land and water.

Work produced in Phase II may become classified. Note: The prospective contractor(s) must be U.S. owned and operated with no foreign influence as defined by 32 U.S.C. § 2004.20 et seq., National Industrial Security Program Executive Agent and Operating Manual, unless acceptable mitigating procedures can and have been implemented and approved by the Defense Counterintelligence and Security Agency (DCSA) formerly Defense Security Service (DSS). The selected contractor must be able to acquire and maintain a secret level facility and Personnel Security Clearances. This will allow contractor personnel to perform on advanced phases of this project as set forth by DCSA and SSP 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: In Phase I, feasibility of the technology shall have superior accuracy over long distances to TOSA dead reckoning navigation systems. In order to design to success the following SWaP constraints should be considered:

Compliant with Modular Open Systems Architecture (MOSA), Sensor Open System Architecture (SOSA), Weapon Open System Architecture (WOSA), and the USAF Resilient-Embedded GPS/INS (R-EGI) open architecture

- Provide ability to port ALTNAV algorithms between manned and unmanned high speed platforms
- Develop MOSA-compliant interface specifications to be demonstrated on the Multi-Service Hypersonic Test Bed (MACH-TB)

These considerations should be treated as bare minimum requirements, and may change based on the type of technology selected.

PHASE II: In Phase II, the awardee shall develop any hardware and/or software required to demonstrate a refined prototype solution for the advanced dead reckoning navigation system addressed in the previous SBIR or STTR award. The refined prototype shall not use any known external references other than initial starting position and IMU data, unless previously approved by the Government Technical Point of Contact (TPOC). The Phase II Statement of Work (SOW) should identify a work plan that provides proof of concept to meet the performance goals and reduce SWaP from Phase I. Work should focus on reduced SWaP and increased accuracy of modular alternative navigation algorithms while operating in a hypersonic regime. The prototype hardware, software, all modeling and simulation, and shall be delivered to show technical, measurable improvements to dead reckoning navigation. By the end of Phase II, the

final prototype is intended to be integrated into test asset(s) for verification and validation of the technology.

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: If the demonstration in Phase II is deemed to be of high interest to the government, the small business concern will be expected to support the government in transitioning the technology for government use. The transitioned product is expected to be able to support current and future weapon and space systems, as well as a wide range of other air, land, and sea-based systems.

Commercial applications should be considered for transition (i.e., ocean exploration, space exploration, commercial autonomous vehicles, and mapping systems). The primary objective of this project is for transition to defense contractors for high-speed weapons and space systems. To meet these needs, maturation and packaging of the technology to meet practical size, weight, and power constraints will be required. Extreme environments may require special considerations to conform to airframe shape and shielding from the aerothermal environment.

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KEYWORDS: Hypersonic; Modular Alternate Navigation; High Speed Systems

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