Missile Defense Agency (MDA)
2027 Small Business Innovation Research (SBIR) Broad Agency Announcement (BAA)
Release 2
Direct to Phase II
Proposal Submission Instructions

INTRODUCTION

The Missile Defense Agency (MDA) mission is to develop, deploy, and sustain layered and integrated missile defense capabilities as part of a comprehensive missile defeat approach to defend the United States, its deployed forces, allies, and partners from missile attacks in all phases of flight. The MDA Small Business Innovation Research (SBIR) Program is implemented, administered, and managed by the MDA SBIR/Small Business Technology Transfer (STTR) Program Management Office (PMO).

Proposers responding to an MDA topic in this solicitation must follow all general instructions provided in the Department of War (DoW) solicitation. MDA requirements in addition to, or deviating from, the DoW Solicitation are provided in the instructions below.

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

- The full DoW solicitation is available on DSIP at https://www.Dodsbirsttr.mil/submissions/solicitation-documents/active-solicitations. Be sure to select the tab for the appropriate solicitation cycle.
- Register for the DSIP Listserv at: https://www.Dodsbirsttr.mil/submissions/login.

Specific questions pertaining to the administration of the MDA SBIR/STTR Program and these proposal instructions should be directed to the MDA SBIR/STTR PMO via email at mda.sbir-sttr@mail.mil.

Proposals must conform to the terms of the associated DoW solicitation and these MDA-specific requirements. MDA reserves the right to not consider any non-conforming proposals.

To receive an SBIR or STTR award, the awardee must qualify as a Small Business Concern (SBC) as defined by SBA regulations at 13 C.F.R. §§ 701-705. The eligibility requirements for the SBIR/STTR Programs are unique and do not correspond to those of other small business programs. For more information on eligibility requirements, see the Small Business Administration (SBA) SBIR/STTR website at https://www.sbir.gov/faq/eligibility-requirements

In accordance with the SBIR/STTR Policy Directive, the work within the SBIR/STTR contracts are to conduct feasibility-related experimental or theoretical Research/Research and Development (R/R&D) related to described agency requirements. The purpose of Phase II is to further develop and demonstrate the feasibility of a Phase I concept through prototyping and testing to enable eventual transition and commercialization. Phase IIs are anticipated as twenty-four (24) month period of performance.

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Classified Proposals
Classified proposals ARE NOT accepted under the MDA SBIR Program. The inclusion of classified data in an unclassified proposal WILL BE grounds for MDA to determine the proposal as non-responsive and the proposal not to be evaluated. Proposing SBCs currently working under any classified MDA contract must use the security classification guidance (SGC) provided under that contract to verify new SBIR proposals are unclassified prior to submission. If any Direct to Phase II topics required classified work, the proposing SBC must have the appropriate facility clearance (FCL). For more information on facility and personnel clearance procedures and requirements, visit the Defense Counterintelligence and Security Agency (DCSA) website at: https://www.dcsa.mil/mc/ctp/fc/.

Communication
All communication from the MDA SBIR/STTR PMO will originate from the mda.sbir-sttr@mail.mil email address. Please white-list this address in your email spam filters to ensure timely receipt of communications.

Proposal titles, abstracts, anticipated benefits, and keywords of proposals that are selected for negotiation will undergo an MDA Policy and Security Review. Proposal titles, abstracts, anticipated benefits, and keywords are subject to revision and/or redaction by MDA. Final approved versions of proposal titles, abstracts, anticipated benefits, and keywords may appear on DSIP and/or the SBA's SBIR/STTR award site (https://www.sbir.gov/awards).

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

Proposals submitted to an MDA SBIR Direct to Phase II topic must include documentation to substantiate the scientific and technical merit and feasibility described in the Phase I section of the topic has been met and to describe the potential commercial applications. Documentation should include all relevant information including, but not limited to: technical reports, test data, prototype designs/models, and performance goals/results. Work described within the proposal must have been substantially performed by the offeror and/or the Principal Investigator (PI).

A complete Direct to Phase II proposal must contain the following volumes:

Proposal Coversheet (Volume 1)
The proposal coversheet is prepared on DSIP and in accordance with the DoW solicitation.

Technical Volume (Volume 2)
The technical volume is not to exceed 25 pages and must follow the "MDA SBIR/STTR Direct to Phase II Technical Volume Template" (to include any formatting and content requirements). Any pages submitted beyond the 25-page limit will not be evaluated. All

acronyms should be spelled out the first time they are used within the Technical Volume. This will help avoid confusion when proposals are evaluated by technical reviewers.

The MDA SBIR/STTR Direct to Phase II Technical Volume Template requires the following 11 sections:

1. Executive Summary
2. Phase I Proof of Feasibility
3. Description of Proposed Direct to Phase II Technical Effort and Objectives
4. Phase II Technical Objective and Statement of Work
5. Related Work
6. Relations with Future Research or Research and Development
7. Key Personnel
8. Facilities/Equipment
9. Subcontractors/Consultants
10. Prior, Current or Pending Support of Similar Proposals or Awards
11. Commercialization Strategy

If including a Letter(s) of Support and/or Technical and Business Assistance (TABA) request, it must be included as part of Volume 5 and will not count towards the 25-page Technical Volume (Volume 2) limit. Any technical data/information that should be in the Technical Volume (Volume 2) but is contained in other Volumes will not be considered.

Cost Volume (Volume 3)

The Direct to Phase II amount must not exceed $2,000,000 (or not to exceed $2,030,000 if Technical and Business Assistance (TABA) is included). Cost volumes exceeding these amounts will not be evaluated or considered for award.

Please review the updated Percentage of Work (POW) calculation details included in the DoW solicitation. Proposals shall adhere to the Percentage of Work (POW) calculation details included in the DoW solicitation. Occasionally, deviations from these SBIR requirements may occur, and must be approved in writing by the Contracting Officer after consultation with the MDA SBIR/STTR PMO.

Cost Volume MUST be submitted using the "MDA Phase II Cost Volume Template" found on the DSIP "Solicitation Documents & Instructions" page. All proposed costs should be included under Contract Line Item Number (CLIN) 0001.

NOTE: Per MDA Local Clause H-38, no Profit/Fee will be allowed on Travel, Other Direct Costs (ODC), Material, Subcontractor Fee, or Commercial Items as defined in FAR 2.101. Examples of ODC include, but are not limited to: renewable licenses, leases, consultants, special tooling, and royalties. Examples of material include but are not limited to: equipment, hardware and spares/repair parts. In calculating total profit/fee, travel, ODC, Material, Subcontractor Fee and Commercial Item costs should be excluded from the total cost pool. This limitation shall flow down to subcontractors.

Company Commercialization Report (CCR) (Volume 4)
Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoW solicitation for full details on this requirement. Information contained in the CCR will not be considered by MDA during proposal evaluations.

Supporting Documents (Volume 5)
Volume 5 is provided for proposing SBCs to submit additional documentation to support the Coversheet (Volume 1), Technical Volume (Volume 2), and the Cost Volume (Volume 3). Please refer to the DoW solicitation for more information.

a. **Required:** Quality Management Questionnaire. Upload under Volume 5 – "Other" category.

b. **Required:** MDA Foreign Risk Evaluation Program Security Questionnaire. Upload under Volume 5 – "Other" category.

c. **Required:** For MDA SBIR topics that are restricted under export control regulations including the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR) offerors must provide a copy of certified DD Form 2345 or evidence of application submission. The form, instructions, and FAQs may be found at the United States/Canada Joint Certification Program website at https://www.dla.mil/Logistics-Operations/Services/JCP/DD23%2045Instructions/ . Upload under Volume 5 – "Other" category.

d. ***Required:** Provide detailed documentation to support the proposed cost. Upload under Volume 5 – "Other" category.

e. **Optional:** SBIR STTR Phase II Schedule of Milestones and Payments. Must be completed and submitted if proposing a firm-fixed price type contract. Upload under Volume 5 – "Other" category.

f. ****Optional:** Letter(s) of Support. Upload to Volume 5 – "Letter of Support" category.

g. *****Optional:** Request for Technical and Business Assistance (TABA) using the MDA SBIR/STTR Phase II TABA Form (https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHII_TABA_Form.pdf). Upload under Volume 5 – "Other" category.

***Supporting cost information:** Proposals should include the following information, as applicable, to support the Government's determination of a fair and reasonable price. There are no page limitations to this information.

Cost Element	Documentation Required
Direct Labor Hours	Provide the Basis of Estimate (BOE) (e.g. historical, estimated based on past efforts, etc.) used to determine the proposed labor hours.
Direct Labor Rates	Provide substantiating documentation to support the proposed direct labor rates (e.g. Forward Pricing Rate Agreement (FPRA), current payroll data, etc.).

Indirect Rates	Provide substantiating documentation to support the proposed direct labor rates and applicable indirect rates (e.g. FPRA, Provisional Billing Rates, etc.).
Materials/Equipment	Provide a detailed Bill of Materials and/or list of equipment, to include a description of how the proposed material or equipment costs were derived (vendor quote, engineering estimate, etc.). Provide a copy of any vendor quotes or agreements.
Travel	Proposed travel must be broken out by purpose, to/from destinations, # of trips, # of people traveling, per-diem rates, etc.
Subcontractors/Consultants	Provide substantiating documentation to support the proposed subcontractor/consultant arrangement and cost (e.g. rough order of magnitude, letter of agreement, etc.). **The proposing SBC must include the appropriate cost and/or price analysis used to establish the reasonableness of the subcontract/consultant price.** If selected for award, subcontractors/consultants may be required to submit a fully disclosed cost proposal.

****Letter(s) of Support:** If including letter(s) of support, they MUST be uploaded using the "Letter of Support" category within Volume 5. A qualified letter of support is from a relevant commercial or Government Agency procuring organization working with MDA, articulating their pull for the technology (i.e., what Missile Defense System need(s) the technology supports and why it is important to fund it), and possible commitment to provide additional funding and/or insert the technology in their acquisition/sustainment program. A letter of support shall not be contingent upon award of a subcontract. **Letters of support from any MDA officials or references to such letters in a proposal WILL NOT be accepted and may result in the rejection of the proposal.**

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)

The Small Business Innovation and Economic Security Act Section 7 mandates agencies to offer TABA. MDA will provide up to $30,000 per Phase II project and up to an additional $20,000 for one sequential Phase II award, for a total of $50,000 per project. Sequential Phase II awards are offered at MDA's discretion.

In addition to the requirements outlined in the DoW solicitation, TABA requests submitted to MDA must use the MDA Phase II TABA form which can be accessed here: (https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHII_TABA_Form.pdf). The TABA form must be included as part of Volume 5 using the "Other" category. MDA will not accept requests for TABA that do not utilize the MDA SBIR/STTR Phase II TABA Form or are not provided as part of Volume 5.

Fraud, Waste and Abuse Training (Volume 6)

Fraud, Waste and Abuse training material can be found in the Volume 6 section of the proposal submission module in DSIP and must be thoroughly reviewed once per year to proceed with proposal submission.

Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7) 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 be aware that the Disclosures of Foreign Affiliations or Relationships to Foreign Countries WILL NOT be accepted as a PDF Supporting Document in Volume 5 of the DSIP proposal submission. Do not upload any previous versions of this form to Volume 5. For additional details, please refer to the DoW solicitation.

EVALUATION AND SELECTION

All Direct to Phase II proposals will be evaluated in accordance with the evaluation criteria outlined below, including potential benefit to the Missile Defense System. Selections will be based on best value to the Government considering the evaluation criteria listed (which are listed in descending order of importance).

Criterion A: The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.

Criterion B: The qualifications of the proposed principal/key investigators, supporting staff, and consultants. Qualifications include not only the ability to perform the research and development but also the ability to commercialize the results.

Criterion C: The potential for commercial (Government or private sector) application and the benefits expected to accrue from its commercialization.

Potential benefit to the Missile Defense System will be considered throughout the evaluation process and in the best value trade-off analysis. When combined, the stated evaluation criteria (A. – C.) are significantly more important than cost or price.

Technical reviewers will base their conclusions only on information contained in the proposal. It should not be assumed that reviewers are acquainted with the firm or key individuals or any referenced experiments. Relevant supporting data such as journal articles, literature, including Government publications, etc., should be listed in the proposal and will count toward the applicable page limit.

MDA reserves the right to select none, one, or more than one proposal under any topic. MDA is not responsible for any money expended by the proposing SBC in responding to this solicitation. Due to funding limitations, MDA reserves the right to limit awards under any topic and only those proposals of superior scientific and technical quality, as determined by MDA, will be funded. MDA reserves the right to withdraw from negotiations at any time prior to award for any reason including matters of national security (foreign persons, foreign influence or ownership, inability to clear the firm or personnel for security clearances, or other related issues).

AWARD AND CONTRACT INFORMATION

Contracting Officer
The MDA Contracting Office will issue any resulting contract awards. The MDA Contracting Officer is the only Government official authorized to enter into any binding agreement or contract on behalf of the Government.

Contract Type
It is anticipated for Phase II efforts to be awarded as a firm-fixed-price or cost-reimbursement type contract. Cost-reimbursement contracts require the contractor to have an accounting system determined adequate by the Defense Contract Management Agency (DCMA) and that determination must be in place prior the contract award. Account system audit requirements and standards are available on the Defense Contract Audit Agency (DCAA) website at: http://www.dcaa.mil

Offerors proposing a cost-reimbursement type contract must have an accounting system determined adequate by the Defense Contract Management Agency (DCMA). It is strongly encouraged that an adequate accounting system be in place prior to the Direct to Phase II proposal submission timeframe. For more information on Defense Contract Audit Agency (DCAA) accounting system audits and requirements visit https://www.dcaa.mil/Customers/Small-Business.

Deliverables
A Phase II effort is not intended to have any formal end-item contract delivery nor ownership by the Government of the awardee's hardware, computer software, or rights in technical data. As a result, proposals should not contain any reference to the term "Deliverables" when referring to hardware, computer software, or technical data. Instead use the term: "Products for Government Testing, Evaluation, Demonstration, and/or possible destructive testing."

The standard deliverables for a Phase II are:
- Report of Invention(s), Contractor, and/or Subcontractor(s) // Patent Application for Invention
- Status Report // Quarterly Status Report
- Meeting Minutes
- Presentation Materials
- Information Management Control Plan
- Contract Funds Status Report // Quarterly Report (required on contracts at or above $2,000,000)
- Contract Summary Report // Final Report
- Contract Summary Report // Phase III Plan
- Certification of Compliance // Life Cycle Certification
- Final Summary Chart // SBIR STTR Transition Summary Chart
- Computer Software Product // Product Description (if applicable)
- Technical Report // Prototype Design and Operation Document (if applicable)
- Government Property Inventory Report // Government Furnished Property (GFP) and Contractor Acquired Property (CAP) Listing

ADDITIONAL INFORMATION

Notices and Feedback

Firms will be notified of selection or non-selection for negotiation towards a Direct to Phase II award within ninety (90) days of the closing date of the solicitation. The MDA SBIR/STTR PMO will distribute selection and non-selection email notices to all firms who submit an MDA SBIR proposal. Notification of selection or non-selection will be provided via email from the mda.sbir-sttr@mail.mil email address and sent to the Corporate Official and Principal Investigator identified in the proposal. MDA is not responsible for firms that provide incorrect contact information or changes to such information after proposal submission.

MDA will provide written feedback to unsuccessful offerors regarding their proposals upon request. Requests for feedback must be submitted in writing to the MDA SBIR/STTR PMO within 30 calendar days of non-selection notification. Non-selection notifications will provide instructions for requesting proposal feedback. Only firms that receive a non-selection notification are eligible for written feedback.

Refer to the DoW solicitation for procedures on pre-award and post-award protests. For the proposes of a protest related to a particular topic selection, non selection, or award decisions, as further prescribed in FAR 33.106(b), FAR 52.233-3, protests should be served to the MDA SBIR/STTR Program Manager, Candace Wright at mda.sbir-sttr@mail.mil.

Use of Federally Funded Research and Development (FFRDC) and Support Contractors

Only Government personnel with active non-disclosure agreements (NDA) will evaluate proposals. Non-Government technical consultants (“consultants”) to the Government may review and provide support during proposal evaluations. Non-Government consultants may have access to the proposals, may be utilized to review proposals, and may provide comments and recommendations to the Government decision makers. Non-Government consultants will not make decisions regarding the selection or non-selection of a proposal. They are also expressly prohibited from competing for MDA SBIR awards in the SBIR topics they review and/or on which they provide advisement to the Government.

All Non-Government consultants are required to comply with procurement integrity laws. These consultants will not have access to proposals or pages of proposals that are properly labeled by the offeror as "Government Only." Pursuant to FAR 9.505-4, the MDA contracts with the organizations to which these consultants are employed, include a clause which requires them to (1) protect the offerors’ information from unauthorized use or disclosure for as long as it remains proprietary and (2) refrain from using the information for any purpose other than that for which it was furnished. In addition, MDA requires all Consultants to execute NDAs. These NDAs remain on file with the MDA SBIR/STTR PMO.

Non-Government consultants will only be authorized to access those portions of the proposal data and participate in discussions that are necessary to enable them to perform their respective

duties. In accomplishing their duties related to the evaluation process, consultants may require access to proprietary information contained in the offerors' proposals.

Organizational Conflict of Interest (OCI)
The general OCI rules for contractors that support development and oversight of SBIR topics are covered in FAR 9.505-1 through FAR 9.505-4 and DFARS 209.505 through DFARS 209.571-8 as the means of avoiding, neutralizing, or mitigating organizational conflicts of interest. All applicable rules under the FAR 9.5 and DFARS 209.5 apply.

If you, or another employee in your company, developed or assisted in the development of any SBIR requirement or topic, please be advised that your company may have an OCI. Your company could be precluded from an award under this solicitation if your proposal contains anything directly relating to the development of the requirement or topic. Before submitting your proposal, please examine any potential OCI issues that may exist with your company to include subcontractors. Understand that if any actual or potential OCI exist, your company may be required to submit an acceptable OCI mitigation plan prior to award.

In addition, FAR 3.101-1 states that Government business shall be conducted in a manner above reproach and, except as authorized by statute or regulation, with complete impartiality and with preferential treatment for none. The general rule is to avoid strictly any conflict of interest or even the appearance of a conflict of interest in Government-contractor relationships. An appearance of impropriety may arise where an offeror may have gained an unfair competitive advantage through its hiring of, or association with, a former Government official if there are facts indicating the former Government official, through their former Government employment, had access to non-public, competitively useful information. (See *Health Net Fed. Svcs*, B-401652.3; *Obsidian Solutions Group*, LLC, B-417134, 417134.2). The existence or the appearance of an unfair competitive advantage may result in an offeror being disqualified and this restriction cannot be waived.

It is MDA policy to ensure all appropriate measures are taken to resolve OCIs arising under FAR 9.5 and unfair competitive advantages arising under FAR 3.101-1 to prevent the existence of conflicting roles that might bias a contractor’s judgment and deprive MDA of objective advice or assistance, and to prevent contractors from gaining an unfair competitive advantage.

Foreign Nationals
Through submission of a proposal, the proposing SBC acknowledges access to MDA Controlled Unclassified Information (CUI) and legacy For Official Use Only (FOUO) shall be limited to U.S. Persons and dual citizens that do not violate the Countries list in 22 CFR 126.1. Foreign Nationals (as defined in the DoW solicitation) will not be approved for access to MDA CUI and legacy FOUO. Exceptions may be granted in limited circumstances by the Contracting Officer in coordination with the MDA SBIR/STTR PMO.

Export Control Regulations
All MDA SBIR topics are restricted under export control regulations including the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR). ITAR

controls the export and import of listed defense-related material, technical data and services that provide the United States with a critical military advantage. EAR controls military, dual-use and commercial items not listed on the United States Munitions List or any other export control lists. EAR regulates export controlled items based on user, country, and purpose. The proposing SBC must ensure their firm complies with all applicable export control regulations. Refer to the following URLs for additional information: https://www.pmddtc.state.gov/ and https://www.bis.doc.gov/index.php/regulations/export-administration-regulations-ear.

A copy of the certified DD Form 2345, Military Critical Technical Data Agreement, or evidence of application submission must be provided as part of Volume 5: Supporting Documents.

Data Assertions
10 U.S.C. 3772(a) requires, to the maximum extent practicable, an identification prior to delivery of any technical data (and computer software) to be delivered to the Government with restrictions on use. Should a proposal be selected for award, the proposing SBC and its subcontractors will be responsible to identify any technical data and/or computer software that will be delivered to the Government under the effort with restrictions on use. The offeror's rights in technical data and/or computer software delivered, developed or generated during performance of this SBIR effort are detailed in DFARS 252.227-7018 – current version can be found here: https://www.acquisition.gov/dfars/part-252-solicitation-provisions-and-contract-clauses

FLOW-DOWN CLAUSES

The following MDA Local contract clauses apply to the prime offeror and must be flowed to any research partners (including universities and educational institutions) and/or subcontractors on the effort. Note: This list does not include all contract clauses which must be flowed to the subcontract level. The prime offeror is responsible for the review of all contract terms and conditions.

MDA H-08 PUBLIC RELEASE OF INFORMATION (AUG 2024)

a. In addition to the requirements of 32 CFR § 117, NISPOM Rule, any official MDA information/materials that a contractor or subcontractor intends to release to the public that pertains to any work under performance of this contract must receive a pre-publication review by the Missile Defense Agency (MDA) and must be authorized for release by MDA. At a minimum, these information/materials may be technical papers, presentations, articles for publication, key messages, talking points, speeches, and social media or digital media, such as press releases, photographs, fact sheets, advertising, posters, videos, etc.

b. Subcontractor public information/materials must be submitted for approval through the prime contractor to MDA.

c. Upon request to the MDA Procuring Contracting Officer (PCO), contractors shall be provided the "Request for Industry Media Engagement" form (or any superseding MDA form).

d. At least 45 calendar days prior to the desired release date, the contractor must submit the required form and information/materials to be reviewed for public release to the appropriate MDA Program Office and simultaneously provide courtesy copy to the appropriate PCO and mda.press-operations@mail.mil. (Additional distribution emails can be added by the Program Office to ensure proper internal coordination and tracking of public release requests.)

e. All information/materials submitted for MDA review must be an exact copy of the intended item(s) to be released, must be of high quality, and free of tracked changes and/or comments. Photographs must have captions, and videos must have the intended narration included. All items must be marked with the applicable month, day, and year.

f. No documents or media shall be publicly released by the Contractor without MDA Public Release approval.

g. Once information has been cleared for public release, it resides in the public domain and must always be used in its originally cleared context and format. Information previously cleared for public release but containing new, modified or further developed information must be re-submitted in accordance with this clause.

(End of Clause)

MDA H-09 ORGANIZATIONAL CONFLICT OF INTEREST (APR 2020)

a. Purpose: The purpose of this clause is to ensure that:

(1) the Contractor is rendering impartial assistance and advice to the Government at all times under this contract and related Government contracts;

(2) the Contractor's objectivity in performing work under this contract or related Government contracts is not impaired; and

(3) the Contractor does not obtain an unfair competitive advantage by virtue of its access to non-public Government information, or by virtue of its access to proprietary information belonging to others.

b. Scope: The Organizational Conflict of Interest (OCI) rules, procedures and responsibilities described in FAR 9.5 "Organizational and Consultant Conflicts of Interest", FAR 3.101-1 "Standards of Conduct – General, DFARS 209.5 "Organizational and Consultant Conflicts of Interest," and in this clause are applicable to the prime Contractor (including any affiliates and successors-in-interest), as well as any co-sponsor, joint-venture partner, consultant, subcontractor or other entity participating in the performance of this contract. The Contractor shall flow this clause down to all subcontracts, consulting agreements, teaming agreements, or other such arrangements which have OCI concerns, while modifying the terms "contract", "Contractor", and "Contracting Officer" as appropriate to preserve the Government's rights.

c. Access to and Use of Nonpublic Information: If in performance of this contract the contractor obtains access to nonpublic information such as plans, policies, reports, studies, financial plans, or data which has not been released or otherwise made available to the public, the Contractor agrees it shall not use such information for any private purpose or release such information without prior written approval from the Contracting Officer.

d. Access to and Protection of Proprietary Information: The Contractor agrees to exercise due diligence to protect proprietary information from misuse or unauthorized disclosure in accordance with FAR 9.505-4. The Contractor may be requested to enter into a written non-disclosure agreement with a third party asserting proprietary restrictions, if required in the performance of the contract.

e. In accordance with FAR 3.101-1, the Contractor shall also take all appropriate measures to prevent the existence of conflicting roles that might bias the Contractor's judgement, give the Contractor an unfair competitive advantage, and deprive MDA of objective advice or assistance that can result from hiring former Government employees. (See Health Net Fed. Svcs, B-401652.3).

f. Restrictions on Participating in Other Government Contract Efforts. <<<Contracting Officer fill-in. If there are no restrictions, then fill in "NONE".>>>

g. OCI Disclosures: The Contractor shall disclose to the Contracting Officer all facts relevant to the existence of an actual or potential OCI, using an OCI Analysis/Disclosure Form which the Contracting Officer will provide upon request. This disclosure shall include a description of the action the Contractor has taken or plans to take to avoid, neutralize or mitigate the OCI.

h. Remedies and Waiver:

(1) If the contractor fails to comply with any requirements of FAR 9.5, FAR 3.101-1, DFARS 209.5, or this clause, the Government may terminate this contract for default, disqualify the Contractor from subsequent related contractual efforts if necessary to neutralize a resulting organizational conflict of interest, and/or pursue other remedies permitted by law or this contract. If the Contractor discovers and promptly reports an actual or potential OCI subsequent to contract award, the Contracting Officer may terminate this contract for convenience if such termination is deemed to be in the best interest of the Government, or take other appropriate actions.

(2) The parties recognize that the requirements of this clause may continue to impact the contractor after contract performance is completed, and that it is impossible to foresee all future impacts. Accordingly, the Contractor may at any time seek an OCI waiver from the Director, MDA by submitting a written waiver request to the Contracting Officer. Any such request shall include a full description of the OCI and detailed rationale for the OCI waiver.

(End of Clause)

MDA H-28 DISTRIBUTION CONTROL OF TECHNICAL INFORMATION (AUG 2014)

a. The following terms applicable to this clause are defined as follows:

1. DoW Official. Serves in DoW in one of the following positions: Program Director, Deputy Program Director, Program Manager, Deputy Program Manager, Procuring Contracting Officer, Administrative Contracting Officer, or Contracting Officer's Representative.

2. Technical Document. Any recorded information (including software) that conveys scientific and technical information or technical data.

3. Scientific and Technical Information. Communicable knowledge or information resulting from or pertaining to the conduct or management of effort under this contract. (Includes programmatic information).

4. Technical Data. As defined in DFARS 252.227-7013.

b. Except as otherwise set forth in the Contract Data Requirements List (CDRL), DD Form 1423 the distribution of any technical documents prepared under this contract, in any stage of development or completion, is prohibited outside of the contractor and applicable subcontractors under this contract unless authorized by the Contracting Officer in writing. However, distribution of technical data is permissible to DOW officials having a "need to know" in connection with this contract or any other MDA contract provided that the technical data is properly marked according to the terms and conditions of this contract. When there is any doubt as to "need to know" for purposes of this paragraph, the Contracting Officer or the Contracting Officer's Representative will provide direction. Authorization to distribute technical data by the Contracting Officer or the Contracting Officer's Representative does not constitute a warranty of the technical data as it pertains to its accuracy, completeness, or adequacy. The contactor shall distribute this technical data relying on its own corporate best practices and the terms and conditions of this contract. Consequently, the Government assumes no responsibility for the distribution of such technical data nor will the Government have any liability, including third party liability, for such technical data should it be inaccurate, incomplete, improperly marked or otherwise defective. Therefore, such a distribution shall not violate 18 United States Code § 1905.

c. All technical documents prepared under this contract shall be marked with the following distribution statement, warning, and destruction notice identified in sub-paragraphs 1, 2 and 3 below. When it is technically not feasible to use the entire WARNING statement, an abbreviated marking may be used, and a copy of the full statement added to the "Notice To Accompany Release of Export Controlled Data" required by DoW Directive 5230.25.

1. DISTRIBUTION - [PCO, Insert the appropriate distribution statement and complete the statement, if necessary, to include the applicable controlling office.]

2. WARNING - This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751, et seq.) or the Export Administration Act

of 1979 (Title 50, U.S.C., App. 2401 et seq), as amended. Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoW Directive 5230.25

3. DESTRUCTION NOTICE - For classified documents follow the procedures in DOW 5220.22-M, National Industrial Security Program Operating Manual, February 2006, Incorporating Change 1, March 28, 2013, Chapter 5, Section 7, or DoWM 5200.01-Volume 3, DoW Information Security Program: Protection of Classified Information, Enclosure 3, Section 17. For controlled unclassified information follow the procedures in DoWM 5200.01-Volume 4, Information Security Program: Controlled Unclassified Information.

d. The Contractor shall insert the substance of this clause, including this paragraph, in all subcontracts.

(End of Clause)

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MDA SBIR DOW 2027 BAA
Topic Index
Release 2

MDA27BZ02-DV001	Low Cost Infrared Seeker
MDA27BZ02-DV002	Rapidly Deployable Aerial Interdiction Cluster
MDA27BZ02-DV003	High Speed Low Size, Weight, and Power (SWaP) Radio Frequency (RF) Communications Systems for Space-to-Space and Space-to-Terrestrial Applications
MDA27BZ02-DV004	Modeling UV/VIS/near-IR Observables of Dim Hypersonic Configurations
MDA27BZ02-DV005	Mobile Sea-Based Launch Platform
MDA27BZ02-DV006	Performance Enhancement of Solid Rocket Motors Applied to Existing Systems
MDA27BZ02-DV007	Low Cost / Rapidly Producible Booster Insulation Methods
MDA27BZ02-DV008	Virtualization Bridge for Kubernetes: Enabling Complex Legacy Applications
MDA27BZ02-DV009	Configurable Operator Decision Models for Constructive Test and Evaluation Simulations
MDA27BZ02-DV010	Multi-Fidelity Transfer Learning for Defense Applications

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MDA27BZ02-DV001 TITLE: Low Cost Infrared Seeker

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Scaled Hypersonics (SHY)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Hypersonics; Microelectronics; Integrated Network Systems-of-Systems; Advanced Materials

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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

OBJECTIVE: Provide novel infrared (IR) seeker solutions that significantly reduce costs compared to the state-of-the-art onboard interceptor applications.

DESCRIPTION: Develop a cost-effective IR interceptor seeker through methods such as novel material development, advanced manufacturing and/or scalability, novel commercial-off-the-shelf (COTS) integration, or other innovations that could reduce costs and maintain acceptable seeker performance. Both full seeker solutions and novel seeker components (focal plane array, readout integrated circuit, cooling system, telescope optics, etc.) are acceptable so long as cost savings are explicitly quantified in the proposal. A "full seeker" solution should include: Cover (if applicable), telescope assembly/ optical system (lenses, mirrors, filters, etc.), the IR sensor (filter, Focal Plane Arrays (FPAs) Readout Integrated Circuit, cooling systems (if applicable, etc.), gimbal system (as applicable), signal processing electronics, and the Final seeker production cost should be less than $150,000 for objective cost or less than $250,000 for threshold. Proposed solutions should be amenable to repeatable high throughput production processes. Proposal should include a plan for demonstration of seeker performance in a ground test facility. Additionally, proposers should identify the threat type(s) (ballistic, hypersonic, cruise missile, etc.) that are relevant to the proposed technology, and any assumptions made concerning the technology or its integration into the missile defense system should be explicitly referenced.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer’s development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like "Phase I" component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Develop a prototype low-cost IR seeker or integrated seeker component(s). Provide design specifications including size, power, weight, field of view, etc. during development. Validate concept performance in laboratory environment. Demonstrate prototype seeker performance in a ground test facility at relevant environments using an IR target source. Planning for a flight demonstration is desired, but not a requirement.

PHASE III DUAL USE APPLICATIONS: These low-cost IR seeker technologies could be utilized in the commercial infrared camera industry.

REFERENCES:

1. https://aerospacedefenserd.com/modular-low-cost-cruise-missiles/
2. Adrienne D. Stiff-Roberts, IEEE, "Quantum dot infrared photodetectors: Advantages, challenges, and future research directions"
3. S. Abdollahi Pour; E. K. Huang; "High operating temperature midwave infrared photodiodes and focal plane arrays based on type-II InAs/GaSb superlattices" Appl. Phys. Lett. 98, 143501 (2011)

KEYWORDS: Infrared; seeker; low cost; interceptor

MDA27BZ02-DV002 TITLE: Rapidly Deployable Aerial Interdiction Cluster

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Super Intelligence (ASI)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Trusted AI and Autonomy; Integrated sensing and cyber

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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OBJECTIVE: Demonstrate a rapidly deployable aerial interdiction cluster to be part of the layered missile defense.

DESCRIPTION: The Missile Defense Agency seeks novel solutions for a rapidly deployable aerial interdiction cluster for close-in defense against evolving threats to national security assets, including counter-air; counter-drone; electronic warfare; and force protection. The proposed cluster should be capable of transitioning from a standby state to a deployed state and be capable of autonomous, sustained operations. Cluster should contain a number of continuously cycling elements capable of multiple modes of operation (i.e., surveillance, discrimination, electronic warfare, attack). The cluster should contain a high volume of elements that are low size, weight, power, and cost (SWaP-C). The assets should be capable of maneuvering and loitering. Assets should be able to host various sensors and/or effectors capable of interdicting various threats (i.e., hypersonic vehicles, glide vehicles, drones, low-flying aerial objects). Modular cargo bays capable of carrying payloads are desired. System should employ a resilient mesh-node architecture and utilize multiple communication pathways.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

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Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like “Phase I” component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Proposals would be evaluated to the degree that they deliver a solution that demonstrates the ability to become a high-volume, low cost-per-unit cluster. Evaluation would also consider to what degree cluster units could be rapidly re-deployed and what percentage of total cluster assets could remain on continuous deployment. Cluster should be capable of detection and tracking of rapidly maneuvering objects. Cluster communication capabilities should have sufficient bandwidth to process and securely relay observation data. Significant technology advancements in core capability areas (swarm autonomy and coordination, advanced sensing and fusion, resilient communications and networking, countermeasures and survivability) would be considered for evaluation. The vendor solution should culminate in a demonstration subjected to conditions to verify function and performance.

PHASE III DUAL USE APPLICATIONS: Conduct engineering and manufacturing development, test, evaluation in a realistic environment with a system level test-bed. Cluster sensitivity, performance, and communication capabilities should be verified.

REFERENCES:

1. https://www.anduril.com/hardware/anvil/
2. https://www.defensenews.com/pentagon/2024/11/20/pentagon-picks-programmers-to-connect-its-replicator-drone-swarms/

KEYWORDS: Aerial Platform; Rapidly Deployable; Multi-Mission; Sensors; Non-Kinetic Missile Defeat; Fully Autonomous; Resilient; Scalable; Sustainable; Forward Deployed; Aerial Sensing Array

MDA27BZ02-DV003 TITLE: High Speed Low Size, Weight, and Power (SWaP) Radio Frequency (RF) Communications Systems for Space-to-Space and Space-to-Terrestrial Applications

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Quantum and Battlefield Information Dominance (Q-BID)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Future G; Integrated Network Systems-of-Systems; Space Technology

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

OBJECTIVE: Provide novel and innovative space communications technologies enabling improved defensive communication capabilities.

DESCRIPTION: Specific to this topic, to support the Missile Defense Agency (MDA) mission of developing and deploying a layered Missile Defense System to defend the United States, its deployed forces, and friends from missile attacks in all phases of flight, the MDA seeks improved defensive communication capabilities by increasing bandwidth of new low size, weight, and power, radios and antennas to gigabyte speeds. Small form-factor (.1L) or less volume and low power (<10 W) RF radio utilizing Ku bands or higher (due to National Telecommunication and Information Administration (NTIA) restrictions) capable of transmitting data at speeds of 1.5Gbps or greater in a natural space environment is desired. Technology should also be capable of burst transmission of data through the atmosphere to flight vehicles at speeds of 1 Gbps or greater. Communications system capable of meshed (self-forming, self-healing network, high probability of delivery network) High Assurance Internet Protocol Encryptors (HAIPE) interactions for inclusion into "Zero Trust" platforms and networks. Solutions should consider frequency diversity, antenna diversification, and advanced modulation and coding schemas for security and jamming prevention. At the end of the Phase II, two flight radio payloads would be the deliverables.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer’s development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like “Phase I” component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Complete radio payload(s) incorporating government performance and physical requirements. Coordinate with the Government during payload design, development, and testing to ensure that the delivered products would be relevant to an ongoing missile defense architecture and data types and structures.

PHASE III DUAL USE APPLICATIONS: Facilitate insertion into proliferated warfighter space architecture programs. Collaborate with satellite integrators and unmanned aerier vehicle operators for demo platforms. Participate in DoW field exercises and satellite demonstrations to validate operational effectiveness and build end-user confidence. Utilize partner labs for environmental testing (thermal, vacuum, vibration).

REFERENCES:

1. P. Dražić, "The propagation of Ka-band signals through the atmosphere," 2017 International Symposium ELMAR, Zadar, Croatia, 2017, pp. 55-58, doi: 10.23919/ELMAR.2017.8124434.
2. Udo, E. U., Nwaorgu, O. A., Odo, K. O., & Kanu, N. D. (2023). The Effects of Atmospheric Attenuations on C, Ku and Ka Frequency Bands on Satellite Communication System. ARID ZONE JOURNAL OF ENGINEERING, TECHNOLOGY AND ENVIRONMENT, 19(3), 447-460. Retrieved from https://azojete.com.ng/index.php/azojete/article/view/765
3. J. F. Zhang and Y. J. Cheng, "K-/Ka-Band Planar Shared-Aperture Beam-Scanning Array Antenna for Simultaneous Transmitting and Receiving Low Earth Orbit Satellite Communication Terminal," in IEEE Transactions on Antennas and Propagation, vol. 71, no. 8, pp. 6617-6627, Aug. 2023, doi: 10.1109/TAP.2023.3284163:URL: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10151799&isnumber=10207863

KEYWORDS: Miniaturized RF systems; SWaP optimized; compact communication payload; low power RF transceiver; software defined radio (SDR); multi-band operation; link budget

MDA27BZ02-DV004 TITLE: Modeling UV/VIS/near-IR Observables of Dim Hypersonic Configurations

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Super Intelligence (ASI); Quantum and Battlefield Information Dominance (Q-BID); Scaled Hypersonics (SHY)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Directed Energy; Hypersonics

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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OBJECTIVE: Develop an innovative model of the ultraviolet (UV), visible (Vis), and near-infrared (near-IR) observables of hypersonic configurations at low- and high-altitudes to facilitate detection of dim, hypersonic vehicles by fast-moving observers.

DESCRIPTION: To address dim hypersonic threats in missile defense scenarios, the government desires to enhance current physical modeling tools with the ability to simultaneously predict at-source observable properties in the ultraviolet (UV), visible (VIS), and near-infrared (near-IR) spectral regimes that are founded and built upon Navier-Stokes Computational Fluid Dynamics (CFD) and Direct Simulation Monte Carlo (DSMC) techniques and which accounts for, but is not limited to, vehicle surface heating and ablation, Arrhenius and collisional chemically reacting flows, non-local thermodynamic equilibrium (NLTE) effects, boost and divert jet exhaust interactions with the hypersonic body flowfield, and electro-optical radiative transfer physics-based models. The modeling suite provided by the Joint Army-Navy-NASA Air Force (JANNAF) Exhaust Plume and Signatures Subcommittee (EPSS) [1-4] computes RF and certain IR observables. It is founded on CFD and DSMC flowfield codes, hardbody heating models, and radiative transfer / radar propagation techniques. However, the suite does not model all the underlying chemical and physical mechanisms needed to account for radiative emissions in the identified parts of the electromagnetic spectrum. Phenomenologies that must be enhanced within or added to the suite include, but are not limited to: characterization of thermal protection system response, development of material degradation models, detailed Arrhenius and collisional chemical kinetics models that consistently apply across the continuum and rarefied regimes, and generation of molecular band models for UV, Visible, and near-IR radiative emission. The developed models should be compatible with the JANNAF suite infrastructure. And the resulting assemblage should be able to model realistic hypersonic configurations (such as boost-glide, divert jet, and cruise missiles) under steady, unsteady, and maneuvering flight conditions lasting tens of minutes with high Mach within the atmosphere over a wide range of continuum and rarefied altitudes. The resulting capability is expected to facilitate the acquisition and tracking of

dim hypersonic threats in modeling and simulation venues, such as MDA's existing agency framework, and operational scenarios.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like "Phase I" component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Develop and deliver UV/Visible/near-IR at-source, observable prediction models that are compatible and integrate with the JANNAF Plume/Wake/Hypersonic Flowfield and Hardbody Signature Prediction Suite to provide simultaneous, high-fidelity, expanded spectral characterization of threats based on the proof of concept demonstrated by the Phase I evidence. Focus should be on, but is not limited to, adding the capabilities specified in the Description section above. As part of the Phase II effort, the small business should identify measured data which could be used to establish evidence of validation of the Phase II models under Department of War-relevant conditions. In addition, the integration of the Phase II prototype software within the stakeholders' current simulation process (such as the existing agency framework) should be demonstrated for relevant missile defense scenarios of interest to the Missile Defense Agency. The prototype software should also demonstrate the capability to integrate with relevant scene generators such as FLITES [5]. All software developed under this effort, including executable and source code, as well as associated databases, makefiles, and example case input/output files should be delivered during the course of contract performance to enable the Government to test the resulting prototype. The corresponding final software products and technical/user manuals should also be delivered to the Government.

PHASE III DUAL USE APPLICATIONS: Example dual use applications include but are not limited to: collaboration with simulation model developers to integrate the Phase II product into a missile defense application, optimization of the resulting Phase II toolset to accommodate new advances in technology for tracking and predicting trajectories of emerging threats, transition of the resulting technology via JANNAF to appropriate government organizations and/or defense contractors for integration and testing, and integration of the resulting functional tools into a real-world missile defense applications.

REFERENCES:

1. Vaughn, M. E., Jr, "The JANNAF Initiative: Plume/Wake/Hypersonic Flowfield and Hardbody Signature Prediction Capabilities for the Near Term," 39th JANNAF Exhaust Plume and Signatures Subcommittee Meeting, (2022).
2. Vaughn, M. E., Jr, "The JANNAF Initiative: Next Steps─An Integrated Approach to Providing a National Plume/Wake/Hypersonic Signatures Prediction Capability." 40th JANNAF Exhaust Plume and Signatures Subcommittee Meeting, (2023).
3. Taylor, R. S.; Stelter, D.; Woldman, A.; Deschenes, T. R.; Johnson, H. B. and G. V. Candler, "An Overview of the US3D Plume, Wake Hypersonic (US3D-PWH) Software Suite," 39th JANNAF Exhaust Plume and Signatures Subcommittee Meeting, (2022).
4. Deschenes, T.R. and V. Gidzak, "Considerations for the Simulation of Non-Equilibrium Gas Dynamics and Signatures Around Hypersonic Vehicles," 37th EPSS JANNAF Subcommittee Meeting, (2019).
5. https://dsiac.dtic.mil/models/flites/

KEYWORDS: Hypersonic; Cruise Missile; Boost-Glide Vehicle; Signatures; Ultraviolet (UV); Visible (VIS); Electro-Optical/Infrared (EO/IR); Computational Fluid Dynamics (CFD); Aerothermal Effects; Modeling and Simulation; Flight; Tracking

MDA27BZ02-DV005 TITLE: Mobile Sea-Based Launch Platform

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Scaled Hypersonics (SHY)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Hypersonics

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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OBJECTIVE: Develop and test a mobile, sea-based launch platform.

DESCRIPTION: The Missile Defense Agency (MDA) Directorate for Test and Targets (DT) Directorate designs, develops and provides missile targets to test US missile defenses. The Department of War is pushing towards the deployment of sea-based launch capabilities for a variety of applications to enhance range and survivability of hypersonic technologies [1]. A commercially-owned and operated mobile sea-based platform capable of launching a variety of commercially-procured target vehicles from any point on the ocean will enable MDA to more accurately and cost-effectively replicate adversary threats while increasing equatorial launch access and enabling more responsive launch coordination [2].

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like "Phase I" component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and

describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Under this Direct to Phase II effort, successful proposals should design, develop, fabricate, and field-test a sea-based target launch platform capable of leveraging a wide variety of commercially-procured launch vehicles.

Proposers must demonstrate how their solutions are novel technology (not 'commercial off-the-shelf' procurement) and how they can support multiple, existing, proven target launch vehicles via physical hardware. MDA highly desires a field-test demonstration of the solution at sea. Proposers must be a small business with a demonstrated track record of conducting commercial launch vehicle operations at sea, and must also demonstrate commercial interest in their proposed solution. Proposers should not propose a solution that is exclusive to MDA nor one that requires ongoing MDA outlays for maintenance and overhead costs. MDA prefers proposals that demonstrate their solution meets the needs of other Department of War (DoW) stakeholders. MDA prefers modularized, containerized, and easily-transportable solutions that could be used at a variety of launch sites, both on land and at sea. MDA encourages teaming arrangements that include commercial launch service providers.

PHASE III DUAL USE APPLICATIONS: Scale-up the capability from the Phase II platform design utilizing the new technologies developed in Phase II into a full-scale test platform. The solution could be utilized in future MDA target launch campaigns leveraging commercial sea-based launch platforms. The solution may be used to meet the intent of the FY 2024 NDAA directive instructing DoW to begin planning for a sea-based launch capability.

REFERENCES:

1. “Strategic systems programs proves sea based hypersonic launch approach,” Strategic Systems Programs, https://www.ssp.navy.mil/News-Media/News/Article/4172910/strategic-systems-programs-proves-sea-based-hypersonic-launch-approach/ (accessed Jul. 18, 2025)
2. https://www.diu.mil/latest/defense-innovation-units-issues-first-awards-under-its-novel-responsive

KEYWORDS: Sea-based; launch; target; vehicle; mobile; barge

MDA27BZ02-DV006 TITLE: Performance Enhancement of Solid Rocket Motors Applied to Existing Systems

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Scaled Hypersonics (SHY)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Hypersonics

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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OBJECTIVE: Develop and demonstrate enhanced capability/performance of a Solid Rocket Motor (SRM) on an existing missile system without changing system form factor.

DESCRIPTION: The Missile Defense Agency designs, develops, and delivers advanced missile defense capabilities to protect the United States, its allies, and deployed forces from missile attacks in all phases of flight. Traditional SRM propellant formulations and motor designs are mostly optimized, creating some limitations in regards to capability when form factor is constrained [1]. Methods to enhance and optimize the performance of SRM technology at reasonable cost have been researched for decades, incorporating a variety of potential solution paths such as burn-rate enhancement, particle size modifications, propellant composition optimization, and more [2]. Performance enhancements of SRMs in existing missile systems are desired to provide increased capability to both defensive systems and target systems used to validate defensive capabilities.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer’s development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

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IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Under this Direct to Phase II effort, successful proposals should develop and demonstrate enhanced capability/performance of a Solid Rocket Motor (SRM) on an existing missile system without changing system form factor (Form Factor: relates to MINIMAL/NO changes in physical size, mechanical or electrical interfaces, or logistics/operations/maintenance support) . Awardees may be provided with Government Furnished Information (GFI) to ensure form factor preservation when developing their SRM technology enhancement solution.

Proposers must demonstrate how their solutions minimize cost and Non-Recurring Engineering (NRE) required to integrate their SRM enhancement technology into an existing missile system. MDA highly desires a ground test demonstration of the solution to validate capability enhancement compared to an existing system. Proposers must be a small business with demonstrated expertise in the development of SRM technology. Proposers may propose a solution that is exclusive to one existing missile system or a solution that could be applied to multiple existing missile systems.

PHASE III DUAL USE APPLICATIONS: Integrate the solution developed and tested during the Phase II into an existing system to support flight testing.

REFERENCES:

1. Atwood, Alice I, et al. “High-Pressure Burning Rate Studies of Solid Rocket Propellants.” Progress in Propulsion Physics, 1 Jan. 2013, https://doi.org/10.1051/eucass/201304003. Accessed 24 Jun 2025.
2. Mahjub, Ahmed, et al. “Design Optimization of Solid Rocket Propulsion: A Survey of Recent Advancements | Journal of Spacecraft and Rockets.” Journal of Spacecraft and Rockets, vol. 57, no. 1, 2019, arc.aiaa.org/doi/full/10.2514/1.A34594, https://doi.org/10.2514/jsr.2020.57.issue-1;pageGroup:string:Publication. Accessed 24 Jun 2025.

KEYWORDS: Solid rocket motor; SRM; test

Approved for Public Release
26-MDA-12424 (18 Sep 26)

MDA27BZ02-DV007 TITLE: Low Cost / Rapidly Producible Booster Insulation Methods

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Scaled Hypersonics (SHY)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Advanced Infrastructure & Advanced Manufacturing; Advanced Materials

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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

OBJECTIVE: This topic will develop affordable, scalable, high production rate insulation technologies for solid rocket motors.

DESCRIPTION: Solid propellant rockets use insulation to protect motor cases from the high temperature combustion gases and, in the case of composite cases, prevent egress of gases. Heritage methods for insulating motor cases utilize filled polymers with low thermal conductivities which absorb heat as they decompose. The insulation layer is typically applied through time consuming processes on custom mandrels which require significant manual labor. The Government seeks novel insulation material/processing technologies which reduce insulation processing time and/or cost compared to legacy processes for a variety of motor case geometries and sizes. The primary motor case materials of interest for this solicitation are polymer matrix composites, though applicability to metallic cases is also desirable. Proposals developing reusable or low-cost consumable mandrels which can be easily and quickly removed after insulation lay-up and winding are also of interest. The proposed insulation solution must consider stress limitations in the propellant with variations in temperature during storage and operation. The proposed insulation technology should also meet or exceed the insulating ability of the current state of the art with equal or lower inert mass with an increased production rate and/or lower per unit price.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer’s development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like “Phase I” component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Produce subscale insulated cases with novel, scalable insulation technology, and characterize the erosion rate compared to the current state of the art in sub-scale motor tests with relevant motor propellants. Show that the proposed insulation should meet a 20-year storage life as well as storage conditions as low as -40 °C. The proposed insulation technology must demonstrate adequate adhesion to the propellant to survive storage and operating conditions. The proposal for novel insulation technology must include thermal conductivity and other relevant material characterization. Proposals incorporating novel mandrel technologies must show that motors incorporating the technology can achieve thrust misalignment of less than 1°.

PHASE III DUAL USE APPLICATIONS: Partner with a propulsion manufacturer to insulate and static test full size motors with a variety of propellants.

REFERENCES:

1. G. M. Santerre, P. L. Smith and R. F. Russ, "Asbestos-Free Insulation Development," JANNAF, 1987.
2. G. Sutton, Rocket Propulsion Elements, Danvers, Maine: John Wiley & Sons, 2017.

KEYWORDS: Insulation; Solid Rocket Motor; Low-Cost; Rapid Production; Advanced Manufacturing; Scalable; Polymer Matrix Composites; Mandrel

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26-MDA-12424 (18 Sep 26)

MDA27BZ02-DV008 TITLE: Virtualization Bridge for Kubernetes: Enabling Complex Legacy Applications

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Super Intelligence (ASI)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Trusted AI and Autonomy; Integrated Network Systems-of-Systems; Advanced Computing and Software

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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

OBJECTIVE: Develop a repeatable implementation pattern for running difficult-to-containerize software inside Kubernetes, beginning with legacy simulation and analysis tools and expanding to niche planning frameworks and complex “digital twins” within air-gapped, high-security environments. The goal is to reduce reliance on isolated physical workstations or manually managed Virtual Machines (VMs), improve repeatability through Infrastructure-as-Code (IaC), and facilitate integration with Kubernetes-hosted services such as object storage, databases, logging, monitoring, artificial intelligence / machine learning (AI/ML), workflow engines, and secure access.

DESCRIPTION: This topic proposes using a virtualization bridge to host applications that are impractical to containerize, bringing orchestration capabilities (scheduling, networking, storage, security, observability, automation, platform integration) to any workload deployed in Kubernetes.

Many mission, engineering, simulation, and analysis tools are challenging to operate as conventional containers due to dependencies on full operating system environments, desktop/Graphical User Interface (GUI) components, licensing services, specialized drivers, hardware access, or tightly coupled runtime requirements. A virtualization bridge allows virtual machines to run as Kubernetes-managed workloads, enabling VM-based applications to coexist with containerized services on the same platform.

This effort proposes using a virtualization bridge to host applications that are impractical to containerize, bringing orchestration capabilities (scheduling, networking, storage, security, observability, automation, platform integration) to any workload deployed in Kubernetes. The starting point is an available Kubernetes environment (local clusters, hosted platforms, air-gapped environments). The virtualization bridge extends Kubernetes with VM-specific Application Programming Interfaces (APIs), centralizing workload placement, lifecycle

management, access control, telemetry, and integration within the Kubernetes control plane. Compared to traditional VM hosting, this model improves operational repeatability and enables cluster-native integration with data services, Continuous Integration / Continuous Deployment (CI/CD) workflows, and AI/ML services.

This approach should be distinguished from related technologies such as container runtime isolation and enterprise virtualization layers. The core technology should be adaptable for local evaluation, deployment to hosted Kubernetes, and later for enterprise distributions or air-gapped environments.
Production-grade solutions require nodes with hardware virtualization support. For Graphics Processing Unit (GPU) or specialized device access, the virtualization bridge should support host device and GPU assignment, with integration patterns for GPU-accelerated VMs.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like "Phase I" component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Under the proposed solution, the contractor shall implement the virtualization bridge within a hosted or enterprise Kubernetes environment, such as Amazon Elastic Kubernetes Service (EKS), Azure Kubernetes Service (AKS), or Red Hat OpenShift. The contractor shall convert the local prototype into a fully automated, reusable deployment using Infrastructure-as-Code tools (e.g., Terraform, Helm). The solution shall encompass configuration of the virtualization bridge, persistent storage integration, VM templates, golden images, namespace

and Role-Based Access Control (RBAC) boundaries, secure ingress or remote desktop access, Public Key Infrastructure (PKI) / Transport Layer Security (TLS), logging, metrics, backups, and image/data import workflows. The contractor shall ensure that node selection meets hardware virtualization requirements and assess application needs for GPU passthrough, high-memory nodes, and persistent storage. The contractor shall demonstrate repeatable deployment, validated execution of legacy applications, secure user access, telemetry visibility, documented scaling constraints, and provide a baseline cost/performance comparison.

PHASE III DUAL USE APPLICATIONS: The contractor shall scale the proposed virtualization bridge solution to support multi-user operations, defining VM profiles for various application types and utilizing Kubernetes scheduling, node pools, quotas, templates, autoscalers, and policy-driven placement. User access shall be integrated with enterprise identity management, RBAC, audit logging, session controls, and approved remote access mechanisms. The solution shall enable cluster-adjacent storage, centralized observability, AI/ML workflow integration, and advanced tooling. Compliance and security controls shall be standardized through Kubernetes-native policies, image provenance, secrets management, network policy, storage encryption, logging, and deployment pipelines. For air-gapped environments, the contractor shall deliver a deployable bundle containing all necessary artifacts and documentation, resulting in a portable, virtualization-based operating model suitable for development, integration, and secure mission deployment.

REFERENCES:

1. Department of Defense (DoD) Enterprise DevSecOps Reference Design: Provides the architecture and security mandates for Kubernetes-based software factories. (https://dodcio.defense.gov/Portals/0/Documents/Library/DevSecOpsReferenceDesign.pdf)
2. Cloud Native Computing Foundation (CNCF) – KubeVirt Project: An example of an open-source standard for building virtual machine management interfaces into Kubernetes. (https://kubevirt.io/)
3. DoD Platform One / Iron Bank: Repository for hardened containers and DevSecOps standards for secure environments. (https://p1.dso.mil/)
4. National Institute of Standards and Technology (NIST) Special Publication 800-190: Application Container Security Guide for securing container-centric enterprise architectures. (https://csrc.nist.gov/publications/detail/sp/800-190/final)

KEYWORDS: Kubernetes virtualization; legacy applications; infrastructure-as-code; secure access; multi-user deployment; air-gapped environments; container-native virtualization

MDA27BZ02-DV009 TITLE: Configurable Operator Decision Models for Constructive Test and Evaluation Simulations

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Super Intelligence (ASI)

COMPONENT TECHNOLOGY PRIORITY AREA(S): Trusted AI and Autonomy; Advanced Computing and Software; Human-Machine Interfaces

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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

OBJECTIVE: Develop and demonstrate a government-configurable software capability that improves the representation, tuning, execution, and validation of human operator decision effects in constructive test and evaluation simulations. The capability shall enable Government analysts to instantiate credible operator behavior models across selectable conditions such as experience level, workload, decision latency, engagement posture, rules of engagement, mission priority, and information availability; execute repeatable scenario ensembles; capture decision traces and outcome metrics; and integrate with Government-owned or Government-approved constructive simulation environments used for missile defense test planning, mission engineering, wargaming, and analysis.

The desired outcome is an analyst-facing prototype that makes operator-dependent effects measurable, repeatable, explainable, and suitable for verification, validation, and accreditation (VV&A) consideration without requiring extensive scenario-specific software development.

DESCRIPTION: Government problem: Missile defense test and evaluation rely on constructive simulations to examine large numbers of scenarios, explore operational concepts, evaluate system-of-systems interactions, and reduce risk before live flight events. These simulations can represent physical platforms, sensors, weapons, communications, terrain, and threat laydowns, but operator decision effects are often represented by fixed scripts, simplified timing rules, or manually coded behaviors. This can cause analysis results to overstate or understate operational performance because human choices influence detection, classification, engagement, prioritization, communication, and response timing across the kill chain.

Capability gap: The Government lacks a reusable and validated way to generate, configure, execute, and assess operator decision representations across many scenario variations and proficiency levels. Current approaches can require extensive custom programming for each model, scenario, or operator role; may not provide traceable rationale for actions taken during

simulation; and may be difficult to compare across test events, analysis teams, or simulation environments. The gap affects the Government's ability to understand sensitivity to operator behavior, evaluate alternate tactics, and support VV&A with documented evidence of intended use, assumptions, limitations, data pedigree, and risk.

Why innovative solutions are likely available: The Government believes innovative small businesses can apply advances from artificial intelligence (AI)-enabled simulation, human behavior representation, synthetic data generation, reinforcement learning, design of experiments, digital engineering, development, security, and operations, and modular simulation integration to address this problem. Related industry capabilities already demonstrate AI-assisted constructive simulation, synthetic data generation, intelligent agents, and integration of commercial simulation toolchains with Government simulation environments. This topic seeks to mature those types of innovations into a Government-purpose capability suitable for missile defense test and evaluation workflows.
Government interest: The Government is not seeking a vendor white paper, a visualization-only training game, or a single hard-coded operator model. The Government is seeking a Direct-to-Phase-II prototype capability that can be adapted to multiple missile defense analysis contexts; that can use Government-provided scenarios, models, data, and subject matter expert (SME) input; that can be evaluated against explicit measures of performance and effectiveness; and that can produce artifacts needed for future transition, reuse, and accreditation.
Desired characteristics:
•Open, modular interfaces for integration with constructive simulations and analysis workflows.
•Configurable operator roles and behavior profiles that can be reviewed and adjusted by authorized Government analysts or SMEs.
•Support for scenario ensembles, design of experiments, and repeatable Monte Carlo-style analysis.
•Decision traceability, data provenance, uncertainty characterization, and explainable outputs suitable for analyst review.
Responsible AI, cyber, data-management, and VV&A considerations incorporated from the beginning of Phase II.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.

Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like “Phase I” component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: The Phase II effort shall mature, integrate, demonstrate, and document a prototype capability suitable for Government evaluation within missile defense constructive modeling, simulation, test, and evaluation workflows. The Government seeks an innovative capability that improves the representation of operator decision effects in constructive simulations, enables repeatable analysis across scenario variations, and provides evidence needed to assess credibility, limitations, and transition potential.

Offerors shall propose their own technical approach, architecture, tools, algorithms, data strategy, and integration methods. The proposed solution shall address the following Key Technical Objectives:

Key Technical Objective 1: Establish a Government-relevant use case and evaluation baseline.
The contractor shall coordinate with Government stakeholders to define at least one representative missile defense constructive simulation use case. The baseline shall include the intended use, operator roles or decision functions to be represented, data assumptions, measures of performance, measures of effectiveness, credibility considerations, and transition constraints. The use case shall be scoped to support meaningful prototype demonstration within the Phase II period.

Key Technical Objective 2: Develop a modular prototype capability for representing operator decision effects.
The contractor shall develop a prototype capability that can receive relevant simulation state information, represent operator-relevant decisions or actions, return those decisions or actions to a simulation or analysis workflow, and record the information needed for Government review. The prototype shall include well-defined interfaces, configuration controls, and logging sufficient to support repeatable analysis, technical assessment, and future integration into Government modeling and simulation environments.

Key Technical Objective 3: Provide configurable and analyzable operator behavior representations.
The contractor shall demonstrate a method for representing operator decision behavior across Government-defined conditions, such as experience level, risk posture, workload, degraded information, rules of engagement, mission priorities, or other operationally relevant factors. The capability shall allow Government users, analysts, or subject matter experts to adjust key

assumptions without requiring major software redevelopment for each new scenario. The approach may use AI/ML, statistical learning, reinforcement learning, rules-based methods, hybrid methods, SME-informed models, or other innovative techniques proposed by the offeror.

Key Technical Objective 4: Enable repeatable scenario analysis, validation, and explainability. The contractor shall provide a workflow to execute and assess repeated simulation runs across Government-defined scenario variables and operator-behavior assumptions. The prototype shall generate outputs that allow the Government to compare decision behavior, mission outcomes, and sensitivity to operator assumptions. The contractor shall provide analyst-readable decision traces, uncertainty and limitation statements, validation evidence, and documentation that supports responsible AI use, VV&A considerations, and reduction of unreviewed automation bias.

Key Technical Objective 5: Demonstrate transition-ready prototype performance and documentation.
The contractor shall conduct a mid-period technical demonstration and a final demonstration in a representative constructive simulation or analysis workflow. The final demonstration shall show configurable operator-behavior representation, repeatable scenario execution, decision/output logging, outcome analysis, and evidence generation suitable for Government evaluation. The contractor shall deliver the prototype software or executable evaluation package, architecture/interface documentation, user guidance, test plan, test report, validation evidence, cybersecurity/deployment notes, data rights assertions, and a Phase III transition plan identifying Missile Defense Agency (MDA) and non-MDA transition opportunities.

Threshold expectation: The contractor shall demonstrate a prototype capability at a relevant-environment maturity level appropriate for Direct-to-Phase-II evaluation, with sufficient integration, documentation, and test evidence for Government users to assess technical performance, credibility, limitations, cybersecurity posture, and transition risk.
Objective expectation: The contractor shall demonstrate a modular, reusable capability that can be adapted to additional constructive simulation environments, operator decision functions, missile defense mission areas, and other Government or commercial modeling and simulation applications with limited new software development.

PHASE III DUAL USE APPLICATIONS: Scale up the capability from the Phase II prototype into a mature, fieldable capability for Government modeling, simulation, test, evaluation, mission engineering, wargaming, training, and analysis workflows. Work with MDA, other Department of War organizations, Intelligence Community users, and commercial partners to integrate the technology into system-level testbeds, constructive simulation environments, and analyst workflows.

REFERENCES:

1. DoD Instruction 5000.61, DoD Modeling and Simulation Verification, Validation, and Accreditation, September 17, 2024.
2. OUSD(R&E), Digital Engineering, Modeling and Simulation.
3. DoD Responsible Artificial Intelligence Strategy and Implementation Pathway, June 2022.
4. Defense Systems Information Analysis Center, Advanced Framework for Simulation, Integration, and Modeling (AFSIM), October 4, 2023.

5. DARPA, A New Take on Modeling & Simulation for Improved Autonomy, October 17, 2023.
6. Applied Intuition Defense, AFWERX Autonomy Prime Selects Applied Intuition Defense to Integrate Simulation Tools With AFSIM, May 6, 2024.

KEYWORDS: Modeling and Simulation; Constructive Simulation; Test and Evaluation; Missile Defense; Operator Decision Modeling; Human Behavior Representation; Artificial Intelligence; Machine Learning; Reinforcement Learning; Data Driven Decision Aids

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26-MDA-12424 (18 Sep 26)

MDA27BZ02-DV010 TITLE: Multi-Fidelity Transfer Learning for Defense Applications

OUSW (R&E) CRITICAL TECHNOLOGY AREA(S): Applied Super Intelligence (ASI):

COMPONENT TECHNOLOGY PRIORITY AREA(S): Trusted AI and Autonomy; Advanced Computing and Software; Human-Machine Interfaces

PROJECTED CMMC LEVEL REQUIREMENT: Level 2 (Self)

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OBJECTIVE: Use new and evolving Artificial Intelligence (AI) training techniques, algorithms, and protocols to rapidly reduce the resources required to integrate AI into the Missile Defense System (MDS).

DESCRIPTION: Rapid Artificial Intelligence (AI) integration into the MDS is required for the United States to properly defend itself against its adversaries. The development of robust Artificial Intelligence/Machine Learning (AI/ML) agents for complex missile defense and aerospace applications is often constrained by the computational cost, limited availability, and security restrictions of high-fidelity simulation environments. Transfer learning provides a critical pathway to overcoming these barriers. By initially training agents on low-fidelity models or unclassified representations—where data is abundant and computational demands are reduced—core behaviors, strategies, and decision-making frameworks could be efficiently developed and refined. These pretrained models could then be adapted and optimized in high-fidelity and/or environments at higher classification levels, allowing the agent to leverage its foundational knowledge while rapidly acquiring the nuanced performance required for operational deployment. This staged approach significantly reduces training time, minimizes resource expenditure, and mitigates the risk of overfitting to scarce high-fidelity/classified data. Moreover, it enables iterative development cycles where low-fidelity environments serve as agile testbeds for innovation, and high-fidelity environments refine and validate for mission-readiness. Leveraging transfer learning in this manner not only accelerates capability delivery but also ensures that AI/ML systems achieve the precision, resilience, and adaptability necessary for real-world mission success.

PHASE I: Phase I-like proposals will not be evaluated and will be rejected as nonresponsive. For this topic, the Government expects the small business would have accomplished the following in a Phase I-like effort via some other means, e.g., independent research and development (IRAD) or other source, a concept for a workable prototype or design to address, at a minimum, the basic capabilities of the stated objective above. Proposal must show, as appropriate, a demonstrated

technical feasibility or nascent capability. The documentation provided must substantiate the proposer's development of a preliminary understanding of the technology to be applied in their Phase II proposal in meeting topic objectives.

Documentation should comprise all relevant information including, but not limited to, technical reports, test data, prototype designs/models, and performance goals/results. Feasibility = maturity and what have you already done/validated.
Proposers interested in participating in Direct to Phase II must include in their responses 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 a proof of concept like "Phase I" component and/or other validation in a relevant environment, and/or at a much higher Technology Readiness Level (TRL) level (5 or higher) and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology in previous work or research completed.)

IRAD work: Documentation should include the most relevant information including, but not limited to: technical reports, test data, prototype designs/models, and/or performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

PHASE II: Create a full prototype capability implementing the tools and demonstrating the processes required to enable AI transfer learning for MDS applications. Design and conduct a case study using the prototype implementation with representative data and models.
Key Technical Objectives:
-Establish a low fidelity training environment based on limited data for AI agent learning applicable to MDS use cases.
-Develop, apply, and implement transfer learning methodologies to drive transfer learning.
-Develop and integrate high fidelity representations of MDS simulation environment across multiple levels of classification.
-Demonstrate resource savings of transfer learning methods versus traditional training methods.
-Design and implement a human-machine interface to seamlessly orchestrate the AI training workflows.
-Deliver prototype AI training workflows for mission relevant use cases that integrate with existing MDS agent training systems.

PHASE III DUAL USE APPLICATIONS: Scale up the capability from the prototype utilizing the new processes and software technologies developed in Phase II into a mature, fieldable capability. Work with additional DoD or commercial organizations to integrate the technology into a system level testbed for analyst use.

REFERENCES:

1. Suder, Piotr M., Jason Xu, and David B. Dunson. "Bayesian Transfer Learning." Statistics 2024.2312 (2023).
2. Reeve, H., Cannings, T., & Samworth, R. (2021). Adaptive transfer learning. Computing Research Repository, 2021(2106),

3. Cody, T., & Beling, P. (2021). A Systems Theory of Transfer Learning. Computing Research Repository, 2021(2107),

KEYWORDS: Transfer Learning; AI/ML; Data Science; Simulation; Modeling; Applied Statistics; Data Reduction; Battle Management

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