Missile Defense Agency (MDA)
24.2 Small Business Innovation Research (SBIR)
Direct to Phase II (DP2) Proposal Instructions

Introduction

The Missile Defense Agency's (MDA) mission is to develop and deploy a layered Missile Defense System (MDS) to defend the United States, its deployed forces, allies, and friends from missile attacks in all phases of flight.

The MDA SBIR Program is implemented, administered, and managed by the MDA SBIR/Small Business Technology Transfer (STTR) Program Management Office (PMO), located within the Innovation, Science, & Technology directorate.

Offerors responding to a topic in this Broad Agency Announcement (BAA) must follow all general instructions provided in the Department of Defense (DoD) SBIR Program BAA. MDA requirements in addition to or deviating from the DoD Program BAA are provided in the instructions below.

Specific questions pertaining to the administration of the MDA SBIR Program and these proposal preparation instructions should be directed to:

Missile Defense Agency
SBIR/STTR Program Management Office
MDA/DVR
Bldg. 5224, Martin Road
Redstone Arsenal, AL 35898
Email: sbirsttr@mda.mil

PLEASE NOTE: Please read the following MDA Direct to Phase II (DP2) proposal instructions carefully prior to submitting your proposal. Proposals not conforming to the terms of this announcement will not be considered for negotiation and/or award. 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 contract award. The Government may withdraw from negotiations at any time for any reason to include, but not limited to, matters of national security (foreign persons, foreign influence or ownership, inability to clear the firm or personnel for security clearances, or other related issues).

Please read the entire DoD Announcement and MDA instructions carefully prior to submitting your proposal. Please go to https://www.sbir.gov/about#policy-directive to read the SBIR/STTR Policy Directive issued by the Small Business Administration.

Federally Funded Research and Development Centers (FFRDCs) and Support Contractors

Only Government personnel with active non-disclosure agreements will evaluate proposals. Non-Government technical support contractors and FFRDCs (consultants) to the Government may review and provide support in proposal evaluations during source selection. Consultants may have access to the offeror's proposals, may be utilized to review proposals, and may provide comments and recommendations to the Government's decision makers. Consultants will not establish final assessments of risk and will not rate or rank offerors' proposals. They are also expressly prohibited from competing for MDA SBIR/STTR awards in the SBIR/STTR topics they review and/or on which they provide comments to the Government.

All consultants are required to comply with procurement integrity laws. Consultants will not have access to proposals that are labeled by the offerors as "Government Only." Pursuant to FAR 9.505-4, the MDA contracts with these organizations 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 the employees of those support contractors that provide technical analysis to the SBIR/STTR Program to execute non-disclosure agreements. These agreements will remain on file with the MDA SBIR/STTR PMO.

Non-Government consultants will be authorized access to only those portions of the proposal data and discussions that are necessary to enable them to perform their respective duties. In accomplishing their duties related to the source selection process, employees of the aforementioned organizations may require access to proprietary information contained in the offerors' proposals.

Offeror Small Business Eligibility Requirements

Each offeror must qualify as a small business at time of award per the Small Business Administration's (SBA) regulations at 13 CFR 121.701-121.705 and certify to this in the Cover Sheet section of the proposal. Small businesses that are selected for award will also be required to submit a Funding Agreement Certification document and be registered with Supplier Performance Risk System https://www.sprs.csd.disa.mil/ prior to award.

Ownership Eligibility

Prior to award, MDA may request business/corporate documentation to assess ownership eligibility as related to the requirements of SBIR/STTR Program Eligibility. These documents include, but may not be limited to, the Business License; Articles of Incorporation or Organization; By-Laws/Operating Agreement; Stock Certificates (Voting Stock); Board Meeting Minutes for the previous year; and a list of all board members and officers. If requested by MDA, the offeror shall provide all necessary documentation for evaluation prior to SBIR award. Failure to submit the requested documentation in a timely manner as indicated by MDA may result in the offeror's ineligibility for further consideration for award.

SBA Company Registry

Per the SBIR/STTR Policy Directive, all applicants are required to register their firm at SBA's Company Registry prior to submitting a proposal. Upon registering, each firm will receive a unique control Identification number to be used for submissions at any of the participating agencies in the SBIR or STTR program. For more information, please visit the SBA's Firm Registration Page: http://www.sbir.gov/registration.

Organization Conflicts of Interest (OCI)

The basic OCI rules for Contractors that support development and oversight of SBIR topics are covered in 9.505-1 through FAR 9.505-4 as the means of avoiding, neutralizing, or mitigating organizational conflicts of interest.

All applicable rules under the FAR 9.5 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 BAA 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 and understand that if any 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 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 OCI's 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.

Use of Foreign Nationals (also known as Foreign Persons), Green Card Holders, and Dual Citizens

See the "Foreign Nationals" section of the DoD SBIR Program announcement for the definition of a Foreign National (also known as Foreign Persons).

ALL offerors proposing to use foreign nationals, green-card holders, or dual citizens, MUST disclose this information regardless of whether the topic is subject to export control restrictions. Identify any foreign nationals or individuals holding dual citizenship expected to be involved on this project as a direct employee, **subcontractor, or consultant.** For these individuals, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a SBIR contract. Supplemental information provided in response to this paragraph will be protected in accordance with the Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).

Proposals submitted to export control-restricted topics and/or those with foreign nationals, dual citizens, or green card holders listed will be subject to security review during the contract negotiation process (if selected for award). MDA reserves the right to vet all un-cleared individuals involved in the project, regardless of citizenship, who will have access to Controlled Unclassified Information (CUI) such as export controlled information. If the security review disqualifies a person from participating in the proposed work, the contractor may propose a suitable replacement. In the event a proposed person and/or firm is found ineligible by the Government to perform proposed work, the Contracting Officer will advise the offeror of any disqualifications but is not required to disclose the underlying rationale.

Export Control Restrictions

The technology within most MDA topics is 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 offeror must ensure that their firm complies with all applicable export control regulations. Please 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.

All MDA SBIR topics are subject to ITAR and/or EAR. If selected for award negotiations, your company will be required to submit a Technology Control Plan (TCP) during the contracting negotiation process.

Flow-Down of Clauses to Subcontractors

The clauses to which the prime contractor and subcontractors are required to comply include, but are not limited to the following clauses: MDA clause H-08 (Public Release of Information) (see Attachment), DFARS 252.204-7000 (Disclosure of Information), DFARS clause 252.204-7012 (Safeguarding Covered Defense Information and Cyber Incident Reporting), DFARS clause 252.204-7020 (NIST SP 800-171 DoD Assessment Requirements), MDA clause H-09 (Organizational Conflict of Interest) (see Attachment), MDA clause H-27 (Foreign Persons) (see Attachment), and MDA clause H-28 (Distribution of Control Technical Data) (see Attachment). Your proposal submission confirms that any proposed subcontract is in accordance to the clauses cited above and any other clauses identified by MDA in any resulting contract. All proposed universities will need to provide written acceptance of the Flow-Down Clauses in both SBIR and STTR proposals.

Ownership Eligibility

If selected for award, MDA may request business/corporate documentation to assess ownership eligibility as related to the requirements of the Guide to SBIR Program Eligibility. These documents include, but may not be limited to, the Business License; Articles of Incorporation or Organization; By-Laws/Operating Agreement; Stock Certificates (Voting Stock); Board Meeting Minutes for the previous year; and a list of all board members and officers. If requested by MDA, the contractor shall provide all necessary documentation for evaluation prior to award. Failure to submit the requested documentation in a timely manner as indicated by MDA may result in the offeror's ineligibility for further consideration for award.

Rights in Noncommercial Technical Data and Computer Software – SBIR Program (DFARs 252.227-7018 Class Deviation 2020-O0007 Revision 1)

Use this link for full description of Data Rights:
https://www.acq.osd.mil/dpap/policy/policyvault/USA001352-23-DPC.pdf

Fraud, Waste, and Abuse

All offerors must complete the fraud, waste, and abuse training (Volume 6) that is located on the Defense SBIR/STTR Innovation Portal (DSIP) (https://www.dodsbirsttr.mil). Please follow guidance provided on DSIP to complete the required training.

To report fraud, waste, or abuse, please contact:

MDA Fraud, Waste & Abuse
Hotline: (256) 313-9699
MDAHotline@mda.mil

DoD Inspector General (IG) Fraud, Waste & Abuse
Hotline: (800) 424-9098
hotline@dodig.mil

DP2 Proposal Submission Guidelines and Requirements

Proposal Submission

The MDA SBIR 24.2 DP2 proposal submission instructions are intended to clarify the Department of Defense (DoD) instructions (https://www.dodsbirsttr.mil) as they apply to MDA requirements. This announcement is for MDA SBIR 24.2 DP2 topics only. The offeror is responsible for ensuring that DP2 proposals comply with all requirements. Prior to submitting your proposal, please review the latest version of these instructions as they are subject to change before the submission deadline. Any proposal received after the 12:00pm EDT deadline on June 12, 2024 will not be evaluated or considered for award.

All proposals MUST be submitted online using DSIP (https://www.dodsbirsttr.mil). Any questions or technical issues pertaining to DSIP should be directed to the DoD SBIR/STTR Help Desk: DoDSBIRSupport@reisystems.com. It is recommended that potential offerors email the topic author(s) to schedule a time for topic discussion during the pre-release period.

Classified Proposals

Classified proposals ARE NOT accepted under the MDA SBIR/STTR Program. The inclusion of classified data in an unclassified proposal MAY BE grounds for the Agency to determine the proposal as non-responsive and the proposal not to be evaluated. Contractors currently working under a classified MDA SBIR/STTR contract must use the security classification guidance provided under that contract to verify new SBIR/STTR proposals are unclassified prior to submission. In some instances work being performed on Phase II contracts will require security clearances. If a Phase II contract will require classified work, the offeror must have a facility clearance and appropriate personnel clearances in order to perform the classified work. For more information on facility and personnel clearance procedures and requirements, please visit the Defense Counterintelligence and Security Agency Web site at: https://www.dcsa.mil.

Use of Acronyms

Acronyms should be spelled out the first time they are used within the technical volume (Volume 2), the technical abstract, the anticipated benefits/potential commercial applications, and the keywords section of the proposal. This will help avoid confusion when proposals are evaluated by technical reviewers.

Communication

All communication from the MDA SBIR/STTR PMO will originate from the "sbirsttr@mda.mil" email address. Please white-list this address in your company's spam filters to ensure timely receipt of communications from our office. In some instances, the MDA SBIR/STTR PMO may utilize the DoD Secure Access File Exchange (SAFE) website (https://safe.apps.mil) to provide information and/or documentation to offerors.

Proposal Status

The MDA SBIR/STTR PMO will distribute selection or non-selection email notices to all firms who submit a proposal. The email will be distributed to the "Corporate Official" and "Principal Investigator" listed on the proposal coversheet. MDA cannot be responsible for notification to a company that provides incorrect information or changes such information after proposal submission.

Proposal Layout

For MDA DP2 proposals, MDA has provided a template that may be used to create the technical volume, Volume 2, of the DP2 proposal. The Volume 2 template can be found here: https://www.mda.mil/global/documents/pdf/MDA%20SBIR%20phase%20II.pdf

All pages within the technical volume (Volume 2) must be numbered consecutively. Proposals may not exceed 25 pages, may not have a font size smaller than 10-point, must use a font type of Times New Roman, and must be submitted on standard 8-1/2" x 11" paper with one-inch margins. The header on

each page of the Technical Volume should contain your company name, topic number, and proposal number assigned by DSIP. The header must be included in the one-inch margin.

Proposal Feedback

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 guidance for requesting proposal feedback.

Technical and Business Assistance (TABA)

The SBIR/STTR Policy Directive allows agencies to enter into agreements with suppliers to provide technical assistance to SBIR/STTR awardees, which may include access to a network of scientists and engineers engaged in a wide range of technologies or access to technical and business literature available through on-line databases.

All requests for TABA must be completed using the MDA SBIR/STTR Phase II TABA Form (https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHII_TABA_Form.pdf) and must be included as a part of Volume 5 of the proposal package 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 uploaded using the DSIP "Other" category as part of Volume 5 of the Phase II proposal package.

An SBIR/STTR firm may acquire the technical assistance services described above on its own. Firms must request this authority from MDA and demonstrate in its SBIR/STTR proposal that the individual or entity selected can provide the specific technical services needed. In addition, costs must be included in the cost volume of the offeror's proposal. The TABA provider may not be the requesting firm, an affiliate of the requesting firm, an investor of the requesting firm, or a subcontractor or consultant of the requesting firm otherwise required as part of the paid portion of the research effort (e.g. research partner or research institution).

If the awardee supports the need for this requirement sufficiently as determined by the Government, MDA will permit the awardee to acquire such technical assistance, in an amount up to $10,000. This will be an allowable cost on the SBIR/STTR award. The amount will be in addition to the award and is not subject to any burden, profit or fee by the offeror. The amount is based on the original contract period of performance and does not apply to period of performance extensions and/or enhancements. Requests for TABA funding outside of the base Phase II period of performance (24 months) will not be considered.

The purpose of this technical assistance is to assist SBIR/STTR awardees in:
1. Making better technical decisions on SBIR/STTR projects;
2. Solving technical problems that arise during SBIR/STTR projects;
3. Minimizing technical risks associated with SBIR/STTR projects; and
4. Developing and commercializing new commercial products and processes resulting from such projects including intellectual property protections.

SBIR/STTR Proposal Funding

All MDA SBIR/STTR contracts are funded with 6.2/6.3 funding which is defined as:

1. Applied Research (6.2), Systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

2. Advanced Technology Development (6.3), Includes all efforts that have moved into the development and integration of hardware for field experiments and tests.

As stated in Section VI "CLAUSE H-08 PUBLIC RELEASE OF INFORMATION", MDA requires prior review and approval before public release of any information arising from STTR-sponsored research. As such, MDA does not consider STTR-sponsored research as fundamental research.

Protests Procedures

Refer to the DoD Program Announcement for procedures to protest the Announcement.

As further prescribed in Federal Acquisition Regulation (FAR) 33.106(b), and in accordance with FAR clause 52.233-3 Protest after Award, any protests after award should be submitted to Candace Wright via email: sbirsttr@mda.mil.

Proposal Submission Requirements and Proposal Format

Proposals submitted to an MDA SBIR DP2 topic must provide documentation to substantiate that the scientific and technical merit and feasibility described in the Phase I section of the topic has been met and describes 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 submitted within the proposal must have been substantially performed by the offeror and/or the principal investigator (PI).

A complete DP2 proposal consists of five volumes (six if including letters of support and/or Technical and Business Assistance (TABA) funding):

- Volume 1: Proposal Cover Sheet
- Volume 2: Technical Volume **(25 page maximum)**
- Volume 3: Cost Volume
- Volume 4: Company Commercialization Report
- Volume 5:
  - Contractor Certification Regarding Provision of Prohibited Video Surveillance and Telecommunications Services and Equipment (**required**),
  - Disclosures of Foreign Affiliations or Relationships to Foreign Countries (required),
  - Quality Management Questionnaire (**required – use "other" upload category**),
  - Letters of Support (**optional**),
  - MDA SBIR/STTR TABA Form (**optional – use "other" upload category**).
- Volume 6: Fraud, Waste, and Abuse Certification

Volume 1 – Proposal Coversheet (Required)

- A coversheet will be automatically generated by DSIP and placed at the beginning of your PDF proposal package document.

Volume 2 – Technical Volume (Required – 25 page maximum)

- Use of the MDA provided DP2 template is recommended. The template can be obtained at the following URL: https://www.mda.mil/global/documents/pdf/MDA%20SBIR%20phase%20II.pdf . The technical volume should include the following 11 sections:

  (1) **Executive Summary.**
  Provide a summary of the key objectives that will be accomplished in the DP2 effort.

(2) **Phase I Proof of Feasibility.**
The offeror must describe work performed that substantiates Phase I feasibility as described in the topic.

Proposers interested in participating in DP2 must include Phase I feasibility documentation that substantiates the scientific and technical merit and ensure that the Phase I feasibility described in the topic has been met and describe the potential commercialization applications. The documentation provided must validate that the proposer has completed development of technology as stated in Phase I above in previous work or research completed. Documentation should include all relevant information including, but not limited to: technical reports, test data, prototype designs/models, and performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

Provide documentation to substantiate that the scientific and technical merit and feasibility described in the Phase I section of the topic has been met and describes 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 submitted within the feasibility documentation must have been substantially performed by the proposer and/or the principal investigator (PI).

(3) **Description of Proposed DP2 Technical Effort and Objectives.**
Define the specific technical problem or opportunity addressed and its importance.

(4) **Phase II Technical Objective and Statement of Work**.
Enumerate the specific objectives of the Phase II work, and describe the technical approach and methods to be used in meeting these objectives. The statement of work should provide an explicit, detailed description of the Phase II approach, indicate what is planned, how and where the work will be carried out, a schedule of major events and the final product to be delivered. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should be a substantial portion of the total proposal.

(5) **Related Work.**
Describe significant activities directly related or similar to the proposed effort, including any conducted by the principal investigator, the proposing firm, consultants, or stakeholders. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The proposal must accentuate its state-of-the-art technology and how it relates to the topic to capture the Government's interest for further development. In addition, please indicate whether your firm has performed on a classified government contract in the past as either a prime or subcontractor.

(6) **Relationship with Future Research or Research and Development.**
State the anticipated results if the project is successful. Discuss the significance of the Phase II effort in providing a foundation for Phase III research and development or commercialization.

(7) **Key Personnel.**

Identify at least two key personnel who will be involved in the Phase II effort including information on directly related education and experience. A concise resume of the Principal Investigator (PI) that includes a list of relevant publications (if any) authored by the PI, must be submitted. All resumes count toward the page limitation in the technical volume.

a) **Foreign Persons**: ALL offerors proposing to use foreign persons, green-card holders, or dual citizens, MUST disclose this information regardless of whether the topic is subject to export control restrictions. Identify any foreign nationals or individuals holding dual citizenship expected to be involved on this project as a direct employee, subcontractor, or consultant. For these individuals, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on an SBIR/STTR contract. Supplemental information provided in response to this paragraph will be protected in accordance with the Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).

   Proposals submitted to export control-restricted topics and/or those with foreign nationals, dual citizens, or green-card holders listed will be subject to security review during the contract negotiation process (if selected for award). MDA reserves the right to vet all un-cleared individuals involved in the project, regardless of citizenship, who will have access to Controlled Unclassified Information (CUI) such as export controlled information. If the security review disqualifies a person from participating in the proposed work, the contractor may propose a suitable replacement. In the event a proposed person is found ineligible by the government to perform proposed work, the contracting officer will advise the offeror of any disqualifications but may not disclose the underlying rationale. In the event a firm is found ineligible to perform proposed work, the contracting officer will advise the offeror of any disqualifications but may not disclose the underlying rationale.

(8) **Facilities/Equipment**

Describe the equipment and physical facilities necessary to carry out the Phase II effort. Items of equipment to be purchased (as detailed in the cost proposal) shall be justified under this section. Also, certify that the facilities where the proposed work that will be performed meet environmental laws and regulations of federal, state (name), and local governments (name) for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.

(9) **Subcontractors/Consultants**.

Involvement of a university or other subcontractors or consultants in the project may be appropriate. If such involvement is intended, it should be described in detail and identified in the Cost Volume. A minimum of one-half of the research and/or analytical work in Phase II, as measured by direct and indirect costs, must be carried out by the offeror, unless otherwise approved in writing by the Contracting Officer.

(10) **Prior, Current or Pending Support of Similar Proposals or Awards.**

While it is permissible to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous federal program

solicitations or Broad Agency Announcements (BAA), it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning prior, current, or pending support of similar proposals or awards, it must be disclosed to the soliciting agency or agencies as early as possible.

(11) **Commercialization Strategy.**

The Commercialization Strategy must address the following questions:

a) What is the first product that this technology will go into (identify the components of the Missile defense System (MDS) and areas within the commercial marketplace where you can transition this technology)?
b) Who will be your customers, and what is your estimate of the market size?
c) How much funding will you need to bring the technology to market, how will you acquire the necessary funds, and how do you expect to integrate this technology into the MDS?
d) Does your company have marketing expertise? If yes, please elaborate. If not, how do you intend to bring that expertise into the company?
e) Who are your competitors, and what makes you more competitive with your technology?

The commercialization strategy must also include a schedule showing the quantitative commercialization results from the Phase II project at one year after the start of Phase II, at the completion of Phase II, and after the completion of Phase II (i.e., amount of additional investment, sales revenue, etc.). After Phase II award, the company is required to report actual sales and investment data in its Company Commercialization Report at least annually.

Volume 3 – Cost Volume (Required)

Complete the on-line cost proposal in DSIP. Your cost volume may not exceed $2,000,000 (or $2,010,000 if TABA is included – use of the MDA Phase II TABA form is required if applying for TABA). Proposals whose cost volumes exceed $2,000,000 (or $2,010,000 if TABA is included) will not be evaluated or considered for award. Phase II Period of Performance is generally 24 months. MDA will not accept any deviation to the percentage of work requirements.

Volume 4 – Company Commercialization Report (CCR) (Required)

The Company Commercialization Report (CCR) allows companies to report funding outcomes resulting from prior SBIR and STTR awards. The Company Commercialization Report (CCR) is required for DP2 proposals. The information contained in the CCR will not be considered by MDA during proposal evaluations.

Small businesses must complete the CCR by logging into their account at https://www.sbir.gov. To view or print the information currently contained in the Company Registry Commercialization Report, navigate to My Dashboard > My Documents. To create or update the commercialization record, from the company dashboard, scroll to the "My Commercialization" section, and click the create/update Commercialization tab under "Current Report Version". Please refer to the "Instructions" and "Guide" documents contained in the DSIP Dashboard for more detail on completing and updating the CCR.

Once the report is certified and submitted on SBIR.gov, click the "Company Commercialization Report" PDF under the My Documents section of the dashboard to download a PDF of the CCR. This PDF of the CCR must be uploaded to Volume 4: Company Commercialization Report in the Firm Information section of DSIP by the Firm Admin. All other firm users will have read-only access to the CCR from the

proposal submission page, in order to confirm that the CCR has been uploaded by the Firm Admin to complete the Volume 4 requirement.

Volume 5 – Supporting Documents

MDA will only accept the following documents as part of Volume 5:

- Volume 5:
  - Contractor Certification Regarding Provision of Prohibited Video Surveillance and Telecommunications Services and Equipment (**required**),
  - Disclosures of Foreign Affiliations or Relationships to Foreign Countries (required),
  - Quality Management Questionnaire (**required – use "other" upload category**),
  - Letters of Support (**optional**),
  - MDA SBIR/STTR TABA Form (**optional – use "other" upload category**).

If including a request for TABA, the Phase II TABA Form MUST be completed and uploaded using the "Other" category within Volume 5 of DSIP.

If including letters of support, they MUST be uploaded using the "Letters of Support" category within Volume 5 of DSIP. A qualified letter of support is from a relevant commercial or Government Agency procuring organization(s) working with MDA, articulating their pull for the technology (i.e., what MDS 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. Letters of support shall not be contingent upon award of a subcontract.

Any documentation other than the prohibited Video Surveillance and Telecommunications Services and Equipment form, Foreign Ownership or Control Disclosure, letter(s) of support, or requests for TABA included as part of Volume 5 WILL NOT be considered.

Volume 6 – Fraud, Waste, and Abuse Certification (Required)

All offerors must complete the fraud, waste, and abuse training that is located on DSIP.

References to Hardware, Computer Software, or Technical Data

In accordance with the SBIR/STTR Policy Directive, SBIR contracts are to conduct feasibility-related experimental or theoretical Research/Research & Development (R/R&D). Phase II is not for formal end-item contract delivery or ownership by the Government of the contractor's hardware, computer software, or technical data.

The SBIR/STTR Policy Directive states that Agencies may issue Phase II awards for testing and evaluation of products, services, or technologies for use in technical or weapons systems.

As a result, the technical proposal should not use the term "Deliverables" when referring to your hardware, computer software, or technical data. Instead use the term: "Products for Testing, Evaluation, and/or Demonstration (possibly destruction)."

The standard formal deliverables for a Phase II are the:

(a) Report of Invention and Disclosure
(b) Contract Summary Report: Final Report
(c) Certificate of Compliance: SBIR_STTR Life-Cycle Certification
(d) Status Report: Quarterly Status Reports
(e) Computer Software Product: Product Description (if applicable, for Government Testing, Evaluation, and/or Demonstration ONLY)
(f) Technical Report - Study Services: Prototype Design and Operation Document

(g) Contract Summary Report: Phase III Plan
(h) Final Summary Chart: SBIR/STTR Transition Summary Chart
(i) Government Property Inventory Report: Government Furnished Property (GFP) and Contractor Acquired Property (CAP) Listing

FAR 52.203-5 Covenant Against Contingent Fees

As prescribed in FAR 3.404, the following FAR 52.203-5 clause shall be included in all contracts awarded under this BAA:

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) Bona fide agency, as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

MDA Proposal Evaluations and Selection

MDA will evaluate DP2 proposals using scientific review criteria based upon technical merit and other criteria as discussed in this document. MDA reserves the right to award none, one, or more than one contract under any topic. MDA is not responsible for any money expended by the offeror before award of any contract.

DP2 proposals will be evaluated based on the criteria outlined below, including potential benefit to the MDS. Selections will be based on best value to the Government considering the following factors:

a) The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.
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.
c) The potential for commercial (Government or private sector) application and the benefits expected to accrue from its commercialization.

Please note that potential benefit to the MDS will be considered throughout all the evaluation criteria and in the best value trade-off analysis. When combined, the stated evaluation criteria are significantly more important than cost or price.

It cannot be assumed that reviewers are acquainted with the firm or key individuals or any referenced experiments. Technical reviewers will base their conclusions on information contained in the proposal. Relevant supporting data such as journal articles, literature, including Government publications, etc., should be contained in Volume 2 and will count toward the applicable page limit. Qualified letters of support and/or requests for TABA, if included, MUST be uploaded as part of Volume 5 and will not count towards the Volume 2-page limit. Letters of support shall not be contingent upon award of a subcontract.

All Phase II awardees must have a Defense Contract Audit Agency (DCAA) approved accounting system. It is strongly urged that an approved accounting system be in place prior to the MDA Phase II award timeframe. If you do not have a DCAA approved accounting system, this will delay/prevent Phase II contract award. Please reference www.dcaa.mil/small_business/Accounting_System.pdf for more information on obtaining a DCAA approved accounting system.

Proposing firms will be notified of selection or non-selection status for a Direct to Phase II award within 90 days of the closing date of the BAA. The email will be distributed to the "Corporate Official" and "Principal Investigator" listed on the proposal coversheet and will originate from the sbirsttr@mda.mil email address. MDA cannot be responsible for notification to a company that provides incorrect information or changes 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 DoD STTR Program BAA for procedures to protest the Announcement.

Attachment – Standard MDA Mandatory Flowdown Local Clauses

H-08 PUBLIC RELEASE OF INFORMATION (MAR 2020)

a. In addition to the requirements of National Industrial Security Program Operations Manual (DoD 5220.22-M), all foreign and domestic contractor(s) and its subcontractors are required to comply with the following:

1) Any official MDA information/materials that a contractor/subcontractor intends to release to the public that pertains to any work under performance of this contract, the Missile Defense Agency (MDA) will perform a pre-publication review prior to authorizing any release of information/materials.

2) 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 MDAPressOperations@mda.mil, and simultaneously provide courtesy copy to the appropriate PCO. (Additional distribution emails can be added by the Program Office to ensure proper internal coordination and tracking of PR 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 are 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 publically 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.

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.

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.

H-27 FOREIGN PERSONS (Jun 2010)

1. "Foreign National" (also known as Foreign Persons) as used in this clause means any person who is NOT:

a. a citizen or national of the United States; or

b. a lawful permanent resident; or

c. a protected individual as defined by 8 U.S.C.1324b(a)(3).

"Lawful permanent resident" is a person having the status of having been lawfully accorded the privilege of residing permanently in the United States as an immigrant in accordance with the immigration laws and such status not having changed.

"Protected individual" is an alien who is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under 8 U.S.C.1160(a) or 8 U.S.C.1255a(a)(1), is admitted as a refugee under 8 U.S.C.1157, or is granted asylum under section 8 U.S.C.1158; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and (ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within 2 years after the date of the application, unless the alien can establish that the alien is actively pursuing naturalization, except that time consumed in the Service's processing the application shall not be counted toward the 2-year period."

2. Prior to contract award, the contractor shall identify any lawful U.S. permanent residents and foreign nationals expected to be involved on this project as a direct employee, subcontractor or consultant. For these individuals, in addition to resumes, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a contract. Supplemental information provided in response to this clause will be protected in accordance with Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)). After award of the contract, the Contractor shall promptly notify the Contracting Officer and Contracting Officer's Representative with the information above prior to making any personnel changes involving foreign persons. No changes involving foreign persons will be allowed without prior approval from the Contracting Officer. This clause does not remove any liability from the contractor to comply with applicable ITAR and EAR export control obligations and restrictions. This clause shall be included in any subcontract."

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

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

1. DoD Official. Serves in DoD 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 DOD 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 DoD 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 DoD Directive 5230.25

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

follow the procedures in DoDM 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.

MDA SBIR 24.2 Direct to Phase II Topic Index

MDA242-D001 TITLE: Continuous Adaptive Digital Operations Planning

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Computing and Software; Mission Readiness &Disaster Preparedness; Sustainment & Logistics

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: Use new and evolving digital technologies to revolutionize the operations planning process, resulting in always up to date and ready to execute plans that maintain commander's intent and utilize available resources most effectively and efficiently.

DESCRIPTION: Joint doctrine describes an Operation Plan (OPLAN) as a complete and detailed plan that identifies the force requirements, functional support, and resources to execute the plan. An OPLAN contains a full description of the concept of operations (CONOPS), all applicable annexes, a time-phased force and deployment list (TPFDL) and a transportation-feasible notional time-phased force and deployment data (TPFDD), as well as analysis of the impact of a potentially contested environment on the joint deployment and distribution enterprise (JDDE).

The initial development of an OPLAN is a detailed and time-consuming process involving subject matter experts (SMEs), modeling and simulation, and detailed analysis. Once fully developed, plans are on the shelf for future use and are reviewed and updated periodically to maintain their relevance. In the event of a conflict, the current plan will be used to inform and guide tactical operations and strategy. The problem is that even though plans go through periodic review and update processes, this is not done frequently enough to maintain currency with a rapidly changing real world. The less current an OPLAN is, the less valuable it will be in the event of a conflict.

The baseline assumptions underlying any OPLAN are constantly changing. Details such as red intelligence estimates, blue inventories, asset maintenance and availability, force levels, and available transportation and logistics support are always changing and impact current plans. Global political events and conflicts can rapidly alter strategic considerations and lead to changes in commander's guidance and intent. A responsive, automated, near real-time system to update OPLANs as underlying data changes and the ability to alter plans based on updated guidance is needed to ensure our deployed forces and commanders at all levels always have the best plans available to deter the enemy and ensure our forces can engage most effectively and efficiently if conflict ensues.

This topic seeks innovations in digital operations planning. The desire is to research and develop tools and processes that enable the continual review and update of OPLANs such that they maintain currency and maximum relevancy. This is a multifaceted problem that involves model maintenance and both automated and analyst driven data updates, continuous assessment of the current plan as inputs change, automated optimization and analysis informing whether updates are recommended, and the ability to trade off and measure best choices across multiple metrics while considering levels of change to the currently accepted plan. New metrics and new constraints may be introduced and ways to incorporate these while maintaining and updating the plan are needed.

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 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, previous Phase I/Phase II 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 digital OPLAN maintenance, review, and updates. Work with project sponsors to perform an example study using this new technology with representative data and models.

Key Technical Objectives:
- Automation of Routine Tasks: Implement automation for routine planning tasks such as data entry, report generation, and scheduling, reducing the time and effort required for these activities.
- Integration of Data Sources: Integrate diverse data sources, both internal and external, to provide a comprehensive and real-time view of relevant information. This can include integrating databases, Internet of Things devices, or other systems to ensure data accuracy and timeliness.
- Predictive Analytics: Utilize predictive analytics to forecast trends, demands, and potential operational challenges. This can enable proactive decision-making and allow for adjustments to plans before issues arise.
- Geospatial Analysis: Implement geospatial analysis tools to visualize data on maps.
- User Experience (UX) Optimization: Prioritize the user experience of digital planning tools. A user-friendly interface improves efficiency and reduces the learning curve for team members, leading to faster adoption and more effective use.
- Scalability: Ensure that the digital planning infrastructure is scalable to accommodate growing data volumes and user loads. Scalability is crucial for handling increased operational demands without a significant decrease in performance.
- Machine Learning Integration: Explore the integration of machine learning algorithms to analyze historical data and patterns. This can assist in decision-making processes, providing insights that might not be immediately apparent from manual analysis.
- Feedback Loops and Iterative Improvement: Implement mechanisms for collecting feedback from users and operational outcomes. Use this feedback to make iterative improvements to the digital planning processes and tools continuously.

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 DoD integrators to integrate the technology into a system level testbed for analyst use.

REFERENCES:

1. Joint Publication 5-0, Joint Planning, 01 December 2020. https://www.jcs.mil/Doctrine/Joint-Doctrine-Pubs/5-0-Planning-Series
2. On How Simulations Can Support Adaptive Thinking in Operations Planning.pdf. (https://www.sto.nato.int/publications/STO%20Meeting%20Proceedings/STO-MP-MSG-133/MP-MSG-133-18.pdf
3. Plan Maintenance for Continuous Execution Management https://apps.dtic.mil/sti/tr/pdf/ADA523659.pdf

KEYWORDS: CONOPS; Digital; OPLAN; Modelling; Simulation; Planning; Continuous; Automation; Operational; Processes

MDA242-D002 TITLE: Nanosecond Quantum Timing in Threat Vehicle Form Factor Nanosecond Timing

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Hypersonics; Emerging Threat Reduction

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 nanosecond atomic clock in .25L or less form factor with 10 ns or less loss per day.

DESCRIPTION: A source of secure and accurate timing is a crucial need for government vehicles and sensors. Exquisite timing is needed for navigation, communication, and cyber security. Insertion of a timing solution can be complex since it not only affects the platform it is installed on, but communications with all outside entities. The Government requires onboard clocks able to operate through extreme flight conditions and usable across multiple platforms. The onboard clocks must be capable of very high precision and serve as a duplicative timing source to Global Positioning Systems.

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 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, previous Phase I/Phase II 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 a detailed prototype design incorporating government performance requirements. Coordinate with the Government during prototype design and development 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: Scale-up the capability from the prototype utilizing the new technologies developed in Phase II into a mature, full scale, fieldable capability. Work with missile defense integrators to integrate the technology into a missile defense system level test-bed and test in a relevant environment.

REFERENCES:

1. Schmittberger, Bonnie L., and David R. Scherer. "A review of contemporary atomic frequency standards." arXiv preprint arXiv:2004.09987 (2020).
2. P. Guo, H. Meng, L. Dan and J. Zhao, "Wafer-Level Assembly of Physics Package for Chip-Scale Atomic Clocks," in IEEE Sensors Journal, vol. 22, no. 7, pp. 6387-6398, 1 April1, 2022, doi: 10.1109/JSEN.2022.3151407.
3. Bandi, Thejesh N. "A Comprehensive Overview of Atomic Clocks and their Applications." Biology, Engineering, Medicine and Science Reports 9.1 (2023): 1-10.

KEYWORDS: quantum; clock; timing; encryption; navigation; PNT; communication

MDA242-D003 TITLE: Novel Production Processes for High Strength Ablative Insulators

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Hypersonics; Advanced Materials

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 new processes for producing high strength, ablative insulators rapidly with low scrap rates. This effort focuses specifically on high temperature, fiber reinforced matrix composites.

DESCRIPTION: High temperature, fiber reinforced composites are frequently used as ablative insulators for various aerospace applications. Ablative insulators, like carbon-phenolic and silica-phenolic, are traditionally produced by involute lay-up with manually intensive processes with low reproducibility. Conventional methods of production require highly skilled labor with weak control of production parameters. Recent advances in automation for various additive manufacturing processes provide new opportunities to eliminate production variability for ablative insulators while increasing production rates. The primary application of this technology is propulsion, but a secondary application is for thermal protection systems for aeroshells.

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 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, previous Phase I/Phase II 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 scalable, automated processes to produce high strength, ablative insulators with scrap rates lower than 5%. Minimization of custom production equipment is also desired. The proposed

process must be capable of producing fiber reinforced composites with fiber ply angles from 0° to 90°. The mechanical and thermal properties of the ablative insulators produced by the proposed process must meet or exceed those of conventional production processes. Proposers must have demonstrated experience producing fiber reinforced polymer matrix composites and must specify any size limitations, such as length, width, or thickness, to the proposed production process.

PHASE III DUAL USE APPLICATIONS: Partner with a system manufacturer to produce fiber reinforced ablative insulators.

REFERENCES:

1. Automated fiber placement: A review of history, current technologies, and future paths forward. https://www.sciencedirect.com/science/article/pii/S2666682021000773?via%3Dihub
2. Chemical Erosion of Carbon-Phenolic Rocket Nozzles with Finite-Rate Surface Chemistry. https://arc.aiaa.org/doi/abs/10.2514/1.B34791
3. Experimental Studies on the Effect of Ply Orientation on the Thermal Performance of Silica Phenolic Ablative Material. https://arc.aiaa.org/doi/abs/10.2514/6.2007-418

KEYWORDS: Propulsion

MDA242-D004 TITLE: Pulsed Laser Lethality Effects for Missile Defense

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Directed Energy; Hypersonics

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, test and deliver a system capable of characterizing, displaying, recording and transferring data collected regarding material properties and environmental conditions present during tests of pulsed laser interactions with materials. Transferred data would be used by other external systems.

DESCRIPTION: The Government is interested in diagnostic equipment that can measure material properties such as temperature gradients, rates of ablation, vibration, plasma properties (e.g. reflectivity of plasma and material from a laser pulse) and atmospheric vapor composition during material interaction testing with high energy pulsed laser systems with pulse widths ranging from hundreds of pico to micro-seconds. Typical test configurations would be material coupon tests in small wind tunnel chambers where diagnostic equipment is typically outside the chamber and separated by a window, or static environments where diagnostic equipment could be in near proximity of the material coupons. The static environments could be in a lab or outside at a range.

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 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, previous Phase I/Phase II 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 proposer would design, build, test and deliver the prototype system able to collect data during Department of Defense tests of high energy micro-second pulsed lasers against various materials. The system must be able to collect material property data including temperature gradients, reflectivity and ablation on a per laser pulse basis. The system must also be able to capture the environmental conditions around the materials and be able to detect and characterize vaporized materials and plasmas. The system would be capable of processing the data and generating user selectable plots of the data over a single or multiple tests. Raw and processed data must be transferrable via removable media and standard high speed computer data ports. The system would capture data for at least 15 tests, each of up to one minute in duration. The pulse width and rep rates must be configurable based on the laser under test.

This Direct to Phase II effort would include two design reviews with the Government, and a pre-test review. The proposer would conduct a test at their preferred location with a Government or Government-approved witness and a system demonstration at a location of the governments choosing within the contiguous United States. At completion of the effort, the proposer would provide a final report, the system used during the demonstration and any software required for operation.

PHASE III DUAL USE APPLICATIONS: Potential use as a diagnostic test tool for continuous wave laser testing. Aid to understand re-entry vehicle performance. Tool to assess hypersonic material testing and performance.

REFERENCES:

1. Shin, Joonghan, and J. Mazumder. "Plasma diagnostics using optical emission spectroscopy in laser drilling process." Journal of laser Applications 28.2 (2016).
2. Eliceiri, Matthew, Anthony Mark, Darren Luke, Xun Zhu, Kaushik Iyer, and Costas P. Grigoropoulos. "Comprehensive analysis and probing of plasma emitted by the laser ablation of aluminum." Applied Physics A 128, no. 12 (2022): 1068.
3. Application of spectral-domain optical coherence tomography technique to in-process measure hole depth during femtosecond laser drilling in different alloys. https://pubs.aip.org/aip/adv/article/13/3/035006/2879532/Application-of-spectral-domain-optical-coherence

KEYWORDS: High Energy Laser; High Energy Pulsed Laser; Pulsed Laser; HEL test equipment; pulsed laser diagnostics

MDA242-D005 TITLE: Over-the-Horizon Radar (OTHR) Operational Fusion

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

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

OBJECTIVE: Develop and implement algorithms for fusing OTHR tracks with Overhead Persistent Infrared (OPIR) data to generate real-time attributable tracks of long-range airborne weapons over the entire mission cycle from carrier aircraft takeoff thru intercept or impact.

DESCRIPTION: The Government has developed OTHR processing and tracking algorithms. This topic seeks to develop integrated means of correlating and fusing these OTHR tracks using OPIR source data and infrastructure, significantly enhancing the continuity and quality of the composite track data.

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 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, previous Phase I/Phase II 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, demonstrate, and assess integrated means of correlating and fusing OTHR tracks using OPIR source data and infrastructure, significantly enhancing the continuity and quality of the composite track data as well as providing a developmental path for the Government's C2BMC integration and distribution. Specifically, plan and implement tasks to achieve the following objectives:
1. Develop algorithms for correlating OTHR and OPIR tracks

2. Demonstrate improved geo-registration of OTHR tracks using OPIR data
3. Demonstrate these algorithms using real-world data
4. Demonstrate track quality including correlation, continuity, and spurious generation.
5. Implement algorithms in and port to tailor coding to assure real-time processing capability.
6. Demonstrate correlation and attribution performance over span of threats types and mission scenarios
7. Assess BMDS military utility improvements to existing OTHR and OPIR stand-alone capabilities

PHASE III DUAL USE APPLICATIONS: Support integration of Government-approved capabilities from Phase II into the Government's C2BMC lab enterprise.

REFERENCES:

1. Track-to-Track fusion with cross-covariances from radar and IR/EO sensor, University of Connecticut; 22nd International Conference on Information Fusion; Ottawa, Canada - July 2-5, 2019
2. The Missile Defense System. https://www.mda.mil/global/documents/pdf/bmds.pdf

KEYWORDS: over-the-horizon radar; OTHR; overhead persistent infrared; OPIR; correlation; fusion

MDA242-D006 TITLE: Innovative Concepts in the Missile Defense Domain for Space Superiority

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

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

OBJECTIVE: Provide novel and innovative space technologies enabling 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. Specific to this topic, the MDA seeks improved defensive sensing capabilities by increasing effectiveness of new and existing sensors against current and emerging threats.

DESCRIPTION: The mission of the MDA is to develop and deploy a layered Missile Defense System to defend the United States, its deployed forces, allies, and friends from missile attacks in all phases of flight. Critical to meeting this mission is the continued development of technologies that enable space superiority for purposes of missile defense. This solicitation seeks to identify advanced space sensing technologies that enable the MDA mission.

The MDA is seeking proposals for advanced space technologies that provide increased assurance of space domain superiority through advancements in sensing techniques, multi-phenomenology data fusion, and additional processing technologies that can improve birth to death tracking, earlier indications and warnings, and threat discrimination.

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 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, previous Phase I/Phase II 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: MDA seeks sensing technologies that support the MDA mission as applicable to operating within the space domain. This Phase II solicitation has multiple themes and would consider UNCLASSIFIED proposals submitted against any of these identified theme focus areas. Please submit proposals that are based on your best skills, experience and capability to deliver innovative technology to support the MDA mission.

Specific to this topic, the MDA seeks proposals addressing the need for sensing technologies capable of
- improving multi-phenomenology data fusion,
- improving birth-to-death tracking capabilities,
- increasing effectiveness in threat indications and warnings,
- exploiting advanced neuromorphic processes in data fusion and processing
- improving intelligent discrimination of offensive targets

PHASE III DUAL USE APPLICATIONS: Phase III work could apply to providing proliferated low earth orbit communication systems and space based processing that allows the effective and efficient distribution of overhead sensor data. Improving the industrial base to provide more effective optical satellite communications, with more power for the satellite bus and high performance clocks will enhance Phase III development.

REFERENCES:

1. Missile Defense Agency SBIR and STTR Programs. https://www.mda.mil/business/SBIR_STTR_programs.html
2. OUSD(R&E) Critical Technology Areas https://www.cto.mil/usdre-strat-vision-critical-tech-areas

KEYWORDS: Space Systems; Space Sensors; Battle Management; Edge Processing; Data Fusion; Indications & Warning; Track Management; Track Hand-off; Multi-domain sensing; Neuromorphic;

MDA242-D007 TITLE: Deployable Modular Integrated Sensor System (DMISS)

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Trusted AI and Autonomy; Integrated Sensing and Cyber; Advanced Infrastructure & Advanced Manufacturing; Advanced Materials

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

OBJECTIVE: Develop an innovative sensor system that deploys from existing missile test target mechanical deployment interfaces with the primary goal of test scene data collection.

DESCRIPTION: Missile test targets house existing mechanical deployment systems, which could be repurposed to support small fly-along systems to collect data on a target scene. This topic seeks innovative designs for a DMISS that prioritizes the use of low-cost or commercial off deployment mechanism and meet all existing test target electrical and mechanical interface requirements. Once deployed from the target, the DMISS should be capable of orienting itself to collect data on multiple objects throughout the course of the mission and telemeter the data to another instrumented object or flight vehicle for transmission to ground. The proposed DMISS should incorporate a variety of sensor types (e.g., spectrometer, Infrared(IR)/Visible(VIS) camera, etc.) and support multiple sensor configurations to meet mission-specific needs. The deployed DMISS should exhibit a minimal Radar Cross Section (RCS) and IR signature and survive to collect and transmit data during re-entry.

The Direct to Phase II effort would involve the design and construction of a working prototype of the DMISS concept, demonstrate proper fit and operation with the mechanical deployment system interface. Demonstrate proper operation of the suite of sensors available for the prototype and navigation/control system via test or analysis. Develop a data collection plan and demonstrate its proper operation. The system should obtain TRL 6 upon Direct to Phase II completion.

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 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.)

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PHASE II: Design, construct, test, and build a working flight-ready prototype of the DMISS based on the Phase I effort. The DMISS system must have its own ejection mechanism with the ability to maneuver once ejected from the flight vehicle. Additionally, it must be able to move and point its on-board sensors to multiple objects of interest. An Interface Control Document, detailing mechanical and electrical interfaces, would be developed to enable the use of multiple low size, weight, and power sensors in the RF, IR, and Vis areas. Ground testing must show the functionality of the system and be environmentally tested to simulate the flight environments.

PHASE III DUAL USE APPLICATIONS: Integrate the finalized DMISS prototype into future government mission planning. Verify and conduct tests to demonstrate the DMISS can provide support for different mission types depending on the different sensors required and translating and pointing to different locations to meet mission requirements. Conduct flight/ground test analyses to ensure all data can be collected from the DMISS sensors and transmitted to the launch vehicle.

REFERENCES:

1. U.S. Missile Defense Agency. November 3, 2015. Ballistic Missile Defense System. Retrieved from http://www.mda.mil/index.html
2. U.S. Department of Defense. Undated. Ballistic Missile Defense Review. Retrieved from http:/www.defense.gov/bmdr

KEYWORDS: Deployable; Sensors

MDA242-D008 TITLE: Thermal Protection Material for Terminal High Altitude Area Defense (THAAD) Interceptor

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Materials

OBJECTIVE: Demonstrate performance of advanced ceramic nanofiber-based thermal protection system (TPS) materials in the simulated operating environment.

DESCRIPTION: The THAAD missile operates in extreme environments. The Government is seeking new lightweight materials that would allow the interceptor to survive and succeed in even more dynamic engagements. This topic aims to demonstrate performance of alternative form-factor variants of nanofibers to enable new improvements to interceptor thermal protection system. Specifically, this topic seeks the demonstration of the ability to produce castable, rigid structures from nanofibers.

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, previous Phase I/Phase II 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: Demonstrate performance of advanced ceramic nanofiber-based TPS materials in the simulated operating environment.
a. Guided by computational models of the thermal effects within the aeroshell of THAAD interceptors and temperature survivability thresholds of internal components, verify the enhanced performance over current state-of-the-art, identify any potential areas for integration risk, and resolve this risk.
b. Technical Objective 1 would include tests that accurately account for the mechanical loads relevant to THAAD interceptor fly-out trajectories.
c. Demonstrate performance of alternative form-factor variants of nanofibers to enable new improvements to interceptor TPS.
a. Pilot line would be constructed and operated in a typical "factory floor" environment.
b. Ensure that industrial pilot line has sufficient output capacity to promptly supply the Government contractors with TPS materials for their own testing needs.

Develop and deliver report on costs and engineering pathway to scale output to achieve any given amount of ceramic nanofiber material. The report would include every major capital expenditure consideration (cost of manufacturing space, construction costs, diminishing labor costs associated with mass production, etc.). The report would operate on user-friendly input options for convenience while also providing complete transparency on its formulas. Thus, it would enable an accurate extrapolation of actions to achieve Phase III demands, delivered in a format that stakeholder representatives would find useful.

PHASE III DUAL USE APPLICATIONS: Insulating material used for other interceptors that operate in an extreme environment. Insulating material for other mechanical structures such as space craft. Insulating material for any structure that needs to take into account the weight of an insulating material relative to the thermal protection provided.

REFERENCES:

1. Jing Zhang, Xi Zhang, Lifeng Wang, Junxiong Zhang, Rong Liu, Qilong Sun, Xinli Ye and Xiaomin Ma - "Fabrication and Applications of Ceramic-Based Nanofiber Materials Service in High-Temperature Harsh Conditions—A Review" 1 February 2023
2. Andrei Stanishevsky, Joshua Wetuski, Michael Walock, Inessa Stanishevskaya, Helene Yockell-Lelievre, Eva Kostakova and David Lukas - "Ribbon-like and spontaneously folded structures of tungsten oxide nanofibers fabricated via electrospinning" 10 Aug 2015

KEYWORDS: ceramic insulator; lightweight insulation

MDA242-D009 TITLE: DACS COPV Helium Pressurant Measurement

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Mission Readiness &Disaster Preparedness;

OBJECTIVE: Develop and demonstrate an accurate and effective means of measuring the pressure in the Terminal High Altitude Area Defense (THAAD) Divert and Attitude Control System (DACS) Composite Overwrapped Pressure Vessel (COPV).

DESCRIPTION: The THAAD DACS COPV is pressurized with helium during assembly. The THAAD Missile Product Office (THR) is seeking a precise, non-invasive, non-destructive means of verifying the integrity of the COPV by measuring the pressure within the COPV upon DACS installation and whenever MRs are returned for Stockpile Reliability Testing (SRT).

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 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, previous Phase I/Phase II 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 demonstrate an accurate and effective means of measuring the pressure in the THAAD DACS COPV. The means of measuring pressure must be non-destructive and non-invasive to the DACS system and capable of being used without removal of the COPV from the DACS, or removal of the DACS from the MR. The method of measurement should be capable of measuring the pressure initially put into the COPV when filled with helium (pre-MR assembly) and capable of measuring the pressure within the COPV during MR SRT, or other post-production activity. The means of measurement should not result in the loss of helium from the COPV and should be precise enough to determine the capability of the COPV to provide pressurant to support a worst-case THAAD Missile engagement. The method of measurement should be demonstrated within the THAAD DACS assembly facility and the THAAD test area used for SRT.

PHASE III DUAL USE APPLICATIONS: This concept has the potential for applicability to other types (i.e. other than helium) of pressurant systems. The concept could also be developed for application to other Government programs.

REFERENCES:
1. Hongliang Zhou, Weibin Lin, Xiaocheng Ge, and Jian Zhou, "A Non-Intrusive Pressure Sensor by Detecting Multiple Longitudinal Waves" 5 August 2016
2. Prof. Ahmet Can Sabuncu, Mr. Mengqiao Yang, Prof. John M Sullivan Jr, "BYOE: Determining Pressure inside Thin Walled Vessels using Strain Measurements" June 2020

KEYWORDS: COPV; DACS; pressurant; pressure; helium