Missile Defense Agency (MDA)
21.B Small Business Technology Transfer (STTR)
Proposal Submission Instructions

I. 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 Small Business Technology Transfer (STTR) Program is implemented, administered, and managed by the MDA SBIR/STTR Program Management Office (PMO), located within the Innovation, Science, & Technology (DV) directorate. Specific questions pertaining to the administration of the MDA STTR Program and these proposal preparation instructions should be submitted to:

Missile Defense Agency
SBIR/STTR Program Office
MDA/DVR
Bldg. 5222, Martin Road
Redstone Arsenal, AL 35898

Email: sbirsttr@mda.mil
Phone: 256-955-2020

Proposals not conforming to the terms of this Announcement will not be considered. 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 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/about-sbir#sbir-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 consultants (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 STTR awards in the 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 or pages of proposals that are properly 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 advisors 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.

II. 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 register with Supplier Performance Risk System https://www.sprs.csd.disa.mil/ prior to 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 ID to be used for submissions at any of the eleven (11) participating agencies in the SBIR or STTR programs. For more information, please visit the SBA’s Firm Registration Page: http://www.sbir.gov/registration.

Performance Benchmark Requirements for Phase I Eligibility

MDA does not accept proposals from firms that are currently ineligible for Phase I awards as a result of failing to meet the benchmark rates at the last assessment. Additional information on Benchmark Requirements can be found in the DoD Instructions of this Announcement.

III. ORGANIZATIONAL CONFLICTS OF INTEREST (OCI)

The basic OCI rules for Contractors which support development and oversight of STTR topics are covered in FAR 9.5 as follows (the Offeror is responsible for compliance):

(1) the Contractor’s objectivity and judgment are not biased because of its present or planned interests which relate to work under this contract;

(2) the Contractor does not obtain unfair competitive advantage by virtue of its access to non-public information regarding the Government's program plans and actual or anticipated resources; and

(3) the Contractor does not obtain unfair competitive advantage by virtue of its access to proprietary information belonging to others.

All applicable rules under the FAR Section 9.5 apply.

If you, or another employee in your company, developed or assisted in the development of any STTR 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.

IV. USE OF FOREIGN NATIONALS (also known as Foreign Persons), GREEN CARD HOLDERS AND DUAL CITIZENS

See the “Foreign Nationals” section of the DoD STTR 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 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 uncleared 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.

V. 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 http://www.bis.doc.gov/index.php/regulations/export-administration-regulations-ear.

Most MDA STTR topics are subject to ITAR and/or EAR. If the topic write-up indicates that the topic is subject to International Traffic in Arms Regulation (ITAR) and/or Export Administration Regulation (EAR), your company may be required to submit a Technology Control Plan (TCP) during the contracting negotiation process.
VI. CLAUSE H-08 PUBLIC RELEASE OF INFORMATION (Publication Approval)

Clause H-08 pertaining to the public release of information is incorporated into all MDA STTR contracts and subcontracts without exception. Any information relative to the work performed by the contractor under MDA STTR contracts must be submitted to MDA for review and approval prior to its release to the public. This mandatory clause also includes the subcontractor who shall provide their submission through the prime contractor for MDA’s review for approval.

VII. 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), DFARS 252.204-7000 (Disclosure of Information), DFARS clause 252.204-7012 (Safeguarding Covered Defense Information and Cyber Incident Reporting), and DFARS clause 252.204-7020 (NIST SP 800-171 DoD Assessment Requirements). 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.

VIII. OWNERSHIP ELIGIBILITY

Prior to award, MDA may request business/corporate documentation to assess ownership eligibility as related to the requirements of 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 contractor shall provide all necessary documentation for evaluation prior to STTR 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.

IX. 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

Additional information on Fraud, Waste and Abuse may be found in the DoD Instructions of this Announcement.
**X. INTELLECTUAL PROPERTY RIGHTS**

Per section 8, paragraph (d), part 1 of the [SBIR/STTR Policy Directive](https://www.dodsbirsttr.mil), (1) A small business concern (SBC), before receiving an STTR award, must negotiate a written agreement between the SBC and the partnering Research Institution, allocating Intellectual Property rights and rights, if any, to carry out follow-on research, development, or Commercialization. The SBC must submit this agreement to the awarding agency with the proposal as part of Volume 5 (using the “Funding Agreement Certification” option). The SBC must certify in all proposals that the agreement is satisfactory to the SBC. DoD has made a model agreement for the Allocation of Rights available here: [https://rt.cto.mil/wp-content/uploads/STTR-Model-Agreement-for-the-Allocation-of-Rights.pdf](https://rt.cto.mil/wp-content/uploads/STTR-Model-Agreement-for-the-Allocation-of-Rights.pdf)

**XI. PROPOSAL FUNDAMENTALS**

**Proposal Submission**
All proposals MUST be submitted online using DSIP ([https://www.dodsbirsttr.mil](https://www.dodsbirsttr.mil)). Any questions pertaining to the DoD SBIR/STTR submission system should be directed to the DoD SBIR/STTR Help Desk at DoDSBIRSupport@reisystems.com.

It is recommended that potential offerors email topic authors to schedule a time for topic discussion during the pre-release period listed in the DoD STTR Program BAA.

**Classified Proposals**
Classified proposals ARE NOT accepted under the MDA 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 STTR contract must use the security classification guidance provided under that contract to verify new STTR proposals are unclassified prior to submission. Phase I contracts are not typically awarded for classified work. However, 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](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, and the anticipated benefits/potential commercial applications of the research or development sections. 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.

**Proposal Status**
The MDA Contracting Office will distribute selection or non-selection email notices to all firms who submit a MDA STTR 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. MDA anticipates that selection and non-selection notifications will be distributed to all offerors in the September 2021 timeframe.
**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 instructions for requesting proposal feedback. Only firms that receive a non-selection notification are eligible for written feedback.

**Technical and Business Assistance (TABA)**
The [SBIR/STTR Policy Directive](https://www.mda.mil/global/documents/pdf/SBIR_STTR_Policy_Directive.pdf) allows agencies to enter into agreements with suppliers to provide technical assistance to 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 online data bases.

All requests for TABA must be completed using the MDA SBIR/STTR Phase I TABA Form ([https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHI_TABA_Form.pdf](https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHI_TABA_Form.pdf)) and included as a part of Volume 5 of the proposal package. MDA will not accept requests for TABA that do not utilize the MDA SBIR/STTR Phase I TABA Form or are not provided as part of Volume 5 of the Phase I proposal package.

An STTR firm may acquire the technical assistance services described above on its own. Firms must request this authority from MDA and demonstrate in its 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 $5,000 per year. This will be an allowable cost on the STTR award. The per year amount will be in addition to the award and is not subject to any burden, profit or fee by the offeror. The per-year amount is based on the original contract period of performance and does not apply to period of performance extensions. Requests for TABA funding outside of the base period of performance (6 months) for Phase I proposal submission will not be considered.

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

The MDA Phase I TABA form can be accessed here ([https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHI_TABA_Form.pdf](https://www.mda.mil/global/documents/pdf/SBIR_STTR_PHI_TABA_Form.pdf)) and must be included as part of Volume 5 using the “Other” category.

**STTR Proposal Funding**
All MDA 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 FAR 33.106(b), FAR 52.233-3, Protests after Award should be submitted to:
Tina Barnhill | 256-450-2817 | sbrisstr@mda.mil

XII. PHASE I PROPOSAL GUIDELINES

DSIP (available at https://www.dodsbirsttr.mil) will lead you through the preparation and submission of your proposal. Read the front section of the DoD Announcement for detailed instructions on proposal format and program requirements. Proposals not conforming to the terms of this Announcement will not be considered. To be considered for evaluation the proposal package must be formally submitted on DSIP.

MAXIMUM PHASE I PAGE LIMIT FOR MDA IS 15 PAGES FOR VOLUME 2, TECHNICAL VOLUME

Any pages submitted beyond the 15-page limit within the Technical Volume (Volume 2) will not be evaluated. If including a letter(s) of support and/or TABA request, it must be included as part of Volume 5 and will not count towards the 15-page Technical Volume (Volume 2) limit. Any technical data/information that should be in the Technical Volume (Volume 2) but is contained in other Volumes will not be considered.

MDA’s objective for the Phase I effort is to determine the merit and technical feasibility of the concept. The contract period of performance for Phase I shall be six (6) months and the award shall not exceed $150,000. A list of topics currently eligible for proposal submission is included in these instructions, followed by full topic descriptions. These are the only topics for which proposals will be accepted at this time.

Phase I Proposal

A complete Phase I proposal consists of six volumes:
- Volume 1 (required): Proposal Cover Sheet (does not count towards 15-page limit)
- Volume 2 (required): Technical Volume (maximum of 15 pages)
- Volume 3 (required): Cost Volume (does not count towards 15-page limit)
- Volume 5: Supporting Documents-
  - Contractor Certification Regarding Provision of Prohibited Video Surveillance and Telecommunications Services and Equipment (required),
  - Foreign Ownership or Control Disclosure (Proposers must review Attachment 2 in the DoD STTR 21.B BAA: Foreign Ownership or Control Disclosure to determine applicability). A proposal that has an answer of “Yes” to any question regarding foreign investment disclosure
in the Firm Certifications section of Volume 1 (Proposal Cover Sheet) must include as part of their submission a Foreign Disclosure Addendum,
  
  - Written Agreement of Allocation of Rights in Intellectual Property and Rights to Carry Out Follow-on Research, Development, or Commercialization (using the “Funding Agreement Certification” option) (required).
  - Letters of Supports (optional),
  - TABA (optional).

- Volume 6 (required): Fraud, Waste, and Abuse Training Certification

**Volume 5 – Supporting Documents**

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

4. Letters of support (optional).
5. Request for TABA using the MDA Phase I TABA form (optional).

If including a request for TABA, the MDA **Phase I 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, Allocation of Rights agreement, letter(s) of support, or requests for TABA included as part of Volume 5 WILL NOT be considered.

**References to Hardware, Computer Software, or Technical Data**

In accordance with the SBIR/STTR Policy Directive, SBIR/STTR contracts are to conduct feasibility-related experimental or theoretical R/R&D related to described agency requirements. The purpose for Phase I is to determine the scientific and technical merit and feasibility of the proposed effort.

It is not intended for any formal end-item contract delivery and ownership by the Government of your hardware, computer software, or technical data. As a result, your technical proposal should not contain any reference to the term "Deliverables" when referring to your hardware, computer software, or technical data. Instead use the term: “Products for Government Testing, Evaluation, Demonstration, and/or possible destructive testing.”

The standard formal deliverables for a Phase I are the:

- A001: Report of Invention(s), Contractor, and/or Subcontractor(s) // Patent Application for Invention
- A002: Status Report // Phase I Bi-monthly Status Report
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 Broad Agency Announcement (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.

XIII. PHASE I PROPOSAL SUBMISSION CHECKLIST

1. The following have been submitted electronically through DSIP by the date and time listed on the first page of the DoD Program BAA.

   ✓ Volume 1: DoD Proposal Cover Sheet


     If proposing to use foreign nationals (also known as foreign persons), green card holders, and/or dual citizens; identify the personnel you expect to be involved on this project, the type of visa or work permit under which they are performing, country of origin and level of involvement.

   ✓ Volume 3: Cost Volume. (Online Cost Volume form is REQUIRED by MDA)
✓ Volume 4: Company Commercialization Report. (required even if your firm has no prior SBIR/STTR awards).

✓ Volume 5: Contractor Certification Regarding Provision of Prohibited Video Surveillance and Telecommunications Services and Equipment (required), Foreign Ownership or Control Disclosure, Written Agreement of Allocation of Rights in Intellectual Property and Rights to Carry Out Follow-on Research, Development, or Commercialization (required), Letters of Supports (optional), and/or TABA (optional).

✓ Volume 6 (required): Fraud, Waste, and Abuse Training Certification.

___2. Phase I proposal is not to exceed $150,000. (or not to exceed $155,000 if TABA is included)

___3. The proposal must be formally submitted on DSIP. Proposals that are not submitted will not be evaluated.

XIV. MDA SECURITY REVIEW OF ABSTRACTS, BENEFITS, AND KEYWORDS

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

XV. MDA PROPOSAL EVALUATIONS

MDA will evaluate and select Phase I and Phase II proposals using scientific review criteria based upon technical merit and other criteria as discussed in this announcement 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. Due to limited funding, MDA reserves the right to limit awards under any topic and only proposals considered to be of superior quality as determined by MDA will be funded.

Phase I 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 which are listed in descending order of importance:

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 this 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 only on information contained in the proposal. Relevant supporting data such as journal articles, literature, including Government publications, etc., should be listed in the proposal and will count toward the applicable page limit.

**Phase II Proposal Submission**

Per DoD STTR Phase II Proposal guidance, all Phase I awardees from the 21.B Phase I announcement will be permitted to submit a Phase II proposal for evaluation and potential award selection. Details on the due date, format, content, and submission requirements of the Phase II proposal will be provided by the MDA SBIR/STTR PMO on/around the fourth month of the Phase I period of performance. Only firms who receive a Phase I award resulting from the 21.B announcement may submit a Phase II proposal. MDA will evaluate and select Phase II proposals using the Phase II evaluation criteria listed in the DoD Program Announcement. While funding must be based upon the results of work performed under a Phase I award and the scientific and technical merit, feasibility and commercial potential of the Phase II proposal; Phase I final reports will not be reviewed as part of the Phase II evaluation process. The Phase II proposal should include a concise summary of the Phase I effort including the specific technical problem or opportunity addressed and its importance, the objective of the Phase I effort, the type of research conducted, findings or results of this research, and technical feasibility of the proposed technology. Due to limited funding, MDA reserves the right to limit awards under any topic and only proposals considered to be of superior quality will be funded.

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 visit [https://www.dcaa.mil/Customers/Small-Business](https://www.dcaa.mil/Customers/Small-Business) for more information on obtaining a DCAA approved accounting system.

Approved for Public Release
21-MDA-10735 (12 Mar 21)
<table>
<thead>
<tr>
<th>MDA21-T001</th>
<th>Methodologies to Develop Radiation Testing Environments for Survivable Microelectronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDA21-T002</td>
<td>Cyber Secure Collaboration</td>
</tr>
<tr>
<td>MDA21-T003</td>
<td>Validation of Data Driven Models for Simulation</td>
</tr>
<tr>
<td>MDA21-T004</td>
<td>Alternatives to Mercury Cadmium Telluride for High-Performance Long-wave Infrared Focal Plane Arrays</td>
</tr>
<tr>
<td>MDA21-T005</td>
<td>Geometry Based Thermal Management Solutions for Propulsion</td>
</tr>
</tbody>
</table>
MDA21-T001 TITLE: Methodologies to Develop Radiation Testing Environments for Survivable Microelectronics

RT&L FOCUS AREA(S): Microelectronics

TECHNOLOGY AREA(S): Sensors; Electronics; Space Platform

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 section 3.5 of 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 methodologies to evaluate and distinguish between radiation effects from a persistent beta and gamma environment, and determine the circumstances where testing for one environment is sufficient to show survivability in the other, or in a combined environment.

DESCRIPTION: This topic seeks innovative, cost effective, solutions for radiation testing of microelectronics. The need for testing of microelectronics in a persistent beta environment vs. a persistent gamma environment is a subject of discussion and debate within the radiation survivability community. Aspects of the discussion include the best way to generate a persistent beta environment in a ground test, the best way to generate a persistent gamma environment in a ground test, whether successful testing in one environment is sufficient to show survivability in the other, and whether combined testing in both persistent beta and gamma environments is required or whether broader combined testing involving the full environment is necessary.

PHASE I: In Phase I, show feasibility of a methodology to develop test environments that will demonstrate survivability using partial vs. combined environments. Select representative electronic parts and show survivability results, either using an analytical approach or leveraging existing test data. Consider whether existing methods of generating gamma and beta environments can be used, or whether innovative approaches are needed.

PHASE II: In Phase II, implement the Phase I results in a prototype test design. Demonstrate the methodology by conducting an experimental study where electronic parts are tested in partial and combined environments. Consider whether existing methods of generating gamma and beta environments can be used, or whether innovative approaches are needed.

PHASE III DUAL USE APPLICATIONS: The offeror should evaluate whether these approaches can be used for commercial space applications where radiation survivability is required, in addition to military system requirements.

REFERENCES:


KEYWORDS: Electronics Testing, Radiation Survivability, Rad-Hard, gamma and beta environments
MDA21-T002   TITLE: Cyber Secure Collaboration

RT&L FOCUS AREA(S): Artificial Intelligence/ Machine Learning; Cybersecurity

TECHNOLOGY AREA(S): Information Systems

OBJECTIVE: Create a secure environment for collaboration between small businesses and government personnel and provide a central location for SBIR/STTR knowledge management.

DESCRIPTION: Industry and the government require access to collaborative data repositories that are tightly controlled with cyber secure protocols, Risk Management Framework (RMF) compliance, and role-based access controls, resulting in the warrant and implementation of DFARS Clause 252.204-7012, Safeguarding Covered Defense Information and Cyber Incident Reporting. This regulation can be costly to small businesses with limited resources, hindering their ability to exchange innovative ideas and research with government entities. Another challenge that faces most small business employees is not being able to send encrypted emails due to the lack of a Common Access Card (CAC) or the required certificates, making secure collaboration difficult. Current processes for collaboration are not only an issue for small businesses lacking the necessary tools for security, but also encourages the unnecessary duplication of data. The Contract Data Requirements List (CDRL) list several directorates to submit SBIR/STTR related deliverables, resulting in the accumulation of costs for storage. The CDRLs also contain a number of deadlines that companies involved in the SBIR/STTR effort must keep track of. This topic seeks solutions for a collaborative repository that:

(1) Leverages Artificial Intelligence/Machine Learning (AI/ML) techniques to ensure security.
(2) Provides enough flexibility to seamlessly integrate plug-ins and supplemental tools.
(3) Employs two-factor authentication methods that do not restrict small businesses to the use of a CAC and username/complex password combination.
(4) Encrypts communication while also preserving the integrity and non-repudiation of the message.
(5) Implements the Least Privilege principle.
(6) Monitors and audits user activity and data movement.
(7) Provides authorized users with reminders of upcoming deadlines as established in the CDRLs.

PHASE I: Provide proof of concept for the technology.

PHASE II: Further develop proof of concept and begin adding technical requirements (1) – (7) (refer to Description).

PHASE III DUAL USE APPLICATIONS: Implement collaborative environment within relevant missile defense elements.

REFERENCES:

KEYWORDS: Cybersecurity, Collaboration, Information Management, Task Management, Machine Learning
TITLE: Validation of Data Driven Models for Simulation

RT&L FOCUS AREA(S): Artificial Intelligence/ Machine Learning; Cybersecurity

TECHNOLOGY AREA(S): Information Systems

OBJECTIVE: Develop methodologies for validating models of phenomenon and processes generated by advanced data fitting methods, such as machine learning techniques.

DESCRIPTION: This topic seeks innovative methods for validating data fitted models. Use of collected input and output data from phenomenon/process to generate a data-fitted model has increased with the advent of new techniques in Artificial Intelligence/Machine Learning (AI/ML). AI/ML techniques have made it much easier to create data-fitted models of very complex systems with unknown complex relationships. The standard method for validating data generated models is to withhold a portion (e.g. 20%) of the collected data from the fitting process in order to have an independent validation sample. When data is expensive and/or hard to collect, the bifurcation of the data both limits the available data to fit and to validate the models, therefore limiting the quality of both. The government is in search of methods to mitigate this conundrum. Possibilities include, but are not limited to, use of partial knowledge of the modeled systems (e.g. first order physics models, process flows, etc.), guided sampling/data collection for initial and validation data, cross comparisons of models generated from data-subsets, etc.

PHASE I: Provide the following:
1. Method concept descriptions (one or more).
2. Application architecture description, including data management concepts.
4. Phase II plan, including cyber security approval steps.

PHASE II: Complete a detailed prototype design incorporating government performance requirements.

PHASE III DUAL USE APPLICATIONS: Develop solution from Phase II into a mature, field-able capability. Work with missile defense integrators to integrate the technology for a missile defense system level test-bed and test in a relevant environment.

REFERENCES:

KEYWORDS: Validation, Verification, Training, Machine Learning, Models, Processes, Phenomenon, Analysis, Confidence
TITLE: Alternatives to Mercury Cadmium Telluride for High-Performance Long-wave Infrared Focal Plane Arrays

RT&L FOCUS AREA(S): Microelectronics

TECHNOLOGY AREA(S): Materials; Sensors; Electronics

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 section 3.5 of 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: Conduct applied research and development of innovative long-wave infrared (LWIR) focal plane arrays (FPAs) in order to approach the state-of-the-art performance of mercury cadmium telluride (MCT).

DESCRIPTION: The government seeks to identify and further develop alternatives to MCT for high-performance LWIR FPAs. MCT provides an excellent solution for missile defense applications but it can also be a difficult material to produce, integrate, and maintain (which increases system cost and complexity). For decades, researchers have been working on alternatives to MCT and have made great progress, particularly with superlattice detectors based on III-V material system. Superlattice detectors are easier to use than MCT and, in theory, should also have lower dark current and similar quantum efficiency (QE) when operated at the same cryogenic temperature. However, more work is needed in order to routinely realize all of these benefits for LWIR. In addition to superlattice detectors, there are potentially other detector architectures and other material systems that could, in the future, be viable alternatives to both MCT and superlattice detectors for missile defense applications. Proposed solutions do not need to outperform MCT but should at least have a combination of beneficial properties that would allow it to outcompete MCT in the marketplace for high-performance LWIR FPAs.

This topic seeks to invest primarily in LWIR FPA materials, detector design, and growth techniques in order to help close the gap between the performance of MCT and its alternatives. Examples of responsive solutions include innovative superlattice detector designs that enhance QE, suppress dark current, and/or tolerate defects or impurities. Other examples include growth techniques to minimize defects and impurities, or produce features that contribute towards improved performance. Examples also include applied research into new material systems and detector architectures that might outcompete both MCT and superlattice technology. Proposals related to the substrate (e.g. surface preparation), reagents (e.g. purification), growth equipment (e.g. improvements to the MBE (molecular-beam epitaxy) or MOCVD (metal organic chemical vapor deposition) equipment), finishing (e.g. pixel delineation, passivation, coatings), and integration (e.g. with a readout integrated circuit (ROIC)) are allowed but must account for less than half of the total funding and must directly support topic goals. Proposals related to other components of the sensor (e.g. ROIC, optics, image processor, image stabilization) will be considered non-responsive even if the intent is to relax the performance requirements for the LWIR detector (thereby making lower-performing alternatives more acceptable). Currently, we believe that thermal (instead of photon) detectors, as defined in chapter 3 of reference 1, are not sensitive or responsive enough for the intended applications. Therefore, proposals related to thermal detectors would likely be considered non-responsive.
The LWIR detector should be sufficiently sensitive and responsive to detect dim fast-moving missile threats at ranges of 100s-1000s of kilometers using narrow field-of-view optics hosted on a dynamic platform. Solutions should be able to approach a QE of 80% anywhere within the 8-12 micrometer waveband and should approach Rule 07 dark current at 77K, or have some other combination of parameters that provides equivalent sensitivity for short (e.g. milliseconds) integration times. The objective FPAs should be 1024x1024 or larger with a 20 micrometer pixel pitch. Integrated FPAs must withstand both a bake-out and a rapid cool-down from room-temperature to cryogenic operating temperatures (e.g. 77K). FPAs might be exposed to natural and manmade radiation during operation. The ability to detect multiple wavebands from a single FPA (e.g. “2-color”) is desirable but not crucial. These are notional specifications that may be negotiated during Phase I.

Proposers are highly encouraged to either have an in-house capability to produce test articles or form a major partnership with someone who does. The Research Institute (RI) partner should be a key member of the research team and a source of many of the innovative ideas, rather than a service provider. Reference 1 provides the basis for definitions used in this topic. The remaining references either describe the state-of-the-art for LWIR detectors or provide examples of innovative approaches for improving the performance of MCT alternatives. They should not be misconstrued as describing a preferred approach, organization, or technology, or describing the boundaries within which proposed solutions must fall.

PHASE I: Study the scientific and technical feasibility of the proposed approach. Model the expected performance of the proposed solution and compare it to MCT and other emerging alternatives. Identify the disadvantages of the proposed solution and describe how these disadvantages would be overcome or otherwise acceptable. Show, by analysis, the ability to scale up to multi-element arrays meeting the notional specifications described above. Show, by analysis, that the solution is integratable and suitable for the intended applications. If possible, grow and characterize single-element detectors to demonstrate proof-of-concept and validate model predictions. Complete a plan for Phase II and contact suppliers to verify that the plan is executable. Seek letters of interest from LWIR sensor suppliers to include in the Phase II proposal. No travel to government facilities would be necessary during Phase I.

PHASE II: Study and optimize the growth process in order to steadily improve performance and mitigate challenges. Begin scaling up the size of the FPA to demonstrate its performance and uniformity. Grow and characterize small (e.g. 32x32) detector arrays. Upon request, provide detector samples to the government for an independent assessment. Sample sizes, quantities, and configuration for testing will be coordinated with the government. Complete a plan for Phase III and seek letters of commitment from proposed partners. Seek letters of support from LWIR sensor suppliers to include in the Phase III proposal.

PHASE III DUAL USE APPLICATIONS: Grow and characterize moderate-sized (e.g. 256x256) detector arrays. Integrate these arrays with a representative ROIC and Dewar and test performance. Begin early screening tests to verify the ability of the detector to survive and operate in the environments of the intended application. Begin optimizing the growth process to support production and commercialization. Generate plans to scale up the size of the detector to 1024x1024 or larger. Obtain letters of commitment from LWIR sensor suppliers to start transitioning the technology into a product line.

REFERENCES:


KEYWORDS: LWIR, Longwave, Long-wave, Infrared, FPA, Detector, Superlattice, Super-lattice, III-V, MCT, HgCdTe, Molecular Beam Epitaxy, MBE, Metal Organic Chemical Vapor Deposition, MOCVD
MDA21-T005 TITLE: Geometry Based Thermal Management Solutions for Propulsion

RT&L FOCUS AREA(S): Hypersonics; Space

TECHNOLOGY AREA(S): Space Platform; Weapons

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 section 3.5 of 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 novel geometry based solutions to thermal management for future interceptor propulsion systems.

DESCRIPTION: Thermal paths for heat from rocket motors are one of the greatest considerations in propulsion system design. Thermal design for components, such as the nozzles, pintles, and motor cases drives the capability of rocket motors. Considerable amounts of insulation are necessary to shield temperature sensitive components, such as electronics and lightweight structures. Newly available manufacturing techniques can enable thermal management designs, such as tortuous paths, that were previously impossible to manufacture. This could enable significant savings in mass and volume, or enable use of higher performing hotter burning propellants. Ultimately, these benefits would manifest as greater reach and containment area for future interceptors. The thermal management design must apply to systems with pressures over 3,000 psi and propellant burn temperatures over 4,000 degrees F. The proposer will be expected to identify specific thermal management techniques, geometry type, materials, and components for development. The proposer may select one of a number of different propulsion components for development, such as pintle, nozzle, motor case, etc.

PHASE I: During Phase I, the contractor can develop models and perform simulations to evaluate feasibility and/or down select designs. Coupon fabrication and/or material formulation can be done to provide evaluation of critical properties. The contractor is expected to become familiar with solid propulsion system environments.

PHASE II: During Phase II, prototype(s) should be developed in order to validate Phase I models/simulations. The prototype designs can be updated and optimized through experimentation and enhance process/manufacturing techniques. Phase II work should lead the contractor to identify potential applications and insertion into a missile system.

PHASE III DUAL USE APPLICATIONS: During Phase III, the contractor will work with a solid propulsion system manufacturer/developer to iteratively design and fabricate prototype thermal management system/techniques for high-fidelity testing in a relevant missile defense environment. The contractor would then provide the necessary technical data to transition the technology into a missile defense application.

REFERENCES:
1. Wadleya, Haydn and Douglas Queheillaltb, “Thermal Applications of Cellular Lattice Structures”. University of Virginia


KEYWORDS: Thermal Management, Solid Propulsion, Propulsion Components, Solid Component Geometries, Additive Manufacturing

Approved for Public Release
21-MDA-10699 (18 Feb 21)