

Missile Defense Agency (MDA)
23.C Small Business Technology Transfer (STTR)
Proposal Submission Instructions for Program on Innovation Open Topic

INTRODUCTION

The Missile Defense Agency's (MDA) mission 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.

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

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

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

- The DoD Program BAA is located at: <https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/#announcements>. Be sure to select the tab for the appropriate BAA cycle.
- Register for the DSIP Listserv at: <https://www.dodsirsttr.mil/submissions/login>.

The MDA STTR topic published in this BAA meets requirements of Section 7 of the SBIR and STTR Extension Act of 2022. Please read the instructions carefully as they deviate from MDA's typical SBIR/STTR Phase I proposal submission instructions.

This release contains an open topic. As outlined in section 7 of the SBIR and STTR Extension Act of 2022, innovation open topic activities—

- (A) Increase the transition of commercial technology to the Department of Defense;
- (B) Expand the small business nontraditional industrial base;
- (C) Increase commercialization derived from investments of the Department of Defense; and
- (D) Expand the ability for qualifying small business concerns to propose technology solutions to meet the needs of the Department of Defense.

Unlike conventional topics, which specify the desired technical objective and output, open topics can use generalized mission requirements or specific technology areas to adapt commercial products or solutions to close capability gaps, improve performance, or provide technological advancements in existing capabilities.

A small business concern may only submit one (1) proposal to each open topic. If more than one proposal from a small business concern is received for a single open topic, only the most recent proposal to be certified and submitted prior to the submission deadline will receive an evaluation. All prior proposals submitted by the small business concern for the same open topic will be marked as nonresponsive and will not receive an evaluation.

Specific questions pertaining to the administration of the MDA STTR 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

IMPORTANT

Please read the instructions carefully as they deviate from MDA's typical SBIR/STTR Phase I proposal submission instructions.

Your proposal must conform to the terms of this announcement. MDA reserves the right not to consider any or all non-conforming proposals. MDA reserves the right to limit awards under the 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). Only United States small businesses and certain individuals are eligible to participate in the SBIR/STTR programs. A small business must meet the eligibility requirements set forth in 13 CFR 121.702. Please see the Small Business Administration (SBA) SBIR/STTR website: <https://www.sbir.gov/about#eligibility>

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 SBA.

PHASE I PROPOSAL GUIDELINES

The Defense SBIR/STTR Innovation Portal (DSIP) is the official portal for DoD SBIR/STTR proposal submission. Offerors are required to submit proposals via DSIP; proposals submitted by any other means will be disregarded. Detailed instructions regarding registration and proposal submission via DSIP are provided in the DoD STTR Program BAA.

A small business concern may only submit one proposal. If more than one proposal from a small business concern is received for the topic, only the most recent proposal to be certified and submitted prior to the submission deadline will receive an evaluation. All prior proposals submitted by the small business concern will be marked as nonresponsive and will not receive an evaluation.

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 may not be considered.

MDA's objective for Phase I is to determine the merit and technical feasibility of the concept. The contract period of performance for Phase I is six months.

Proposal Cover Sheet (Volume 1)

On DSIP at <https://www.dodsbirsttr.mil/submissions>, prepare the Proposal Cover Sheet.

Technical Volume (Volume 2)

The technical volume is not to exceed 10 pages and must follow the formatting requirements provided in the DoD STTR Program BAA. Any pages submitted beyond the 10 page limit will not be evaluated.

Content of the Technical Volume

For technical volume format guidance, please refer to the “Format of Technical Volume” section within the DoD STTR 23.C BAA.

Cost Volume (Volume 3)

The Phase I Base amount must not exceed \$150,000. MDA does not utilize the Phase I Option.

Company Commercialization Report (CCR) (Volume 4)

Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoD STTR Program BAA for full details on this requirement. Information contained in the CCR will not be considered by MDA during proposal evaluations.

Supporting Documents (Volume 5)

All proposing small business concerns are REQUIRED to submit the following documents to Volume 5:

1. Contractor Certification Regarding Provision of Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment
2. Disclosures of Foreign Affiliations or Relationships to Foreign Countries
3. Disclosure of Funding Sources

Please refer to the DoD Program BAA for more information.

In addition to the requirements listed in the DoD STTR 23.C BAA, MDA will only accept letters of support as part of Volume 5.

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 Missile Defense Systems 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 required documents listed in the DoD STTR 23.C BAA and letter(s) of support included as part of Volume 5 WILL NOT be considered.

PHASE II PROPOSAL GUIDELINES

Phase II proposals may only be submitted by Phase I awardees. Details on the due date, format, content, and submission requirements of the Phase II proposal will be provided by the MDA SBIR/STTR PMO during the fourth month of the Phase I period of performance.

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> for more information on obtaining a DCAA approved accounting system.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)

MDA is not offering TABA as part of the MDA STTR 23.C BAA.

EVALUATION AND SELECTION

All proposals will be evaluated in accordance with the evaluation criteria listed in the DoD STTR Program BAA. Selections will be based on best value to the Government considering the evaluation criteria listed in the DoD STTR Program BAA which are listed in descending order of importance.

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.

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.

AWARD AND CONTRACT INFORMATION

The MDA SBIR/STTR PMO will distribute selection and non-selection email notices to all firms who submit an MDA STTR proposal. Proposing firms will be notified of selection or non-selection status for a Phase I 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.

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 Tina Barnhill via email: sbirsttr@mda.mil.

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

Offeror Small Business Eligibility Requirements

Each offeror must qualify as a small business at time of award per the SBA’s regulations at [13 CFR 121.701-121.705](https://www.ecfr.gov/current/title-13/chapter-I/subchapter-B/part-121/subpart-121.701) 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 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.

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 SBIR/STTR Program BAA.

References to Hardware, Computer Software, or Technical Data

In accordance with the SBIR/STTR Policy Directive, the work within the SBIR/STTR contracts are to conduct feasibility-related experimental or theoretical Research/Research and Development (R/R&D) related to described agency requirements. The purpose 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 (if applicable) 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
- A003: Contract Summary Report // Phase I Final Report
- A004: Certification of Compliance // STTR Funding Agreement Certification - Life Cycle Certification
- A005: Computer Software Product // Product Description
- A006: Technical Report - Study Services // Prototype Design and Operation Document

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.

ADDITIONAL INFORMATION

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 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.

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 11 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 general OCI rules for Contractors that support development and oversight of STTR topics are covered in FAR [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 Section [FAR 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.

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 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 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 STTR topics are subject to ITAR and/or EAR. 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), [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), MDA clause H-27 (Foreign Persons), and MDA clause H-28 (Distribution of Control Technical Data). 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.

MDA Clause H-08 Public Release of Information (Publication Approval)

MDA 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 all MDA STTR contracts must be submitted to the Procuring Contracting Officer (PCO) for review and approval prior to its release to the public. This mandatory clause also includes subcontractors, who shall provide their submission through the prime contractor for MDA's approval for release.

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 MDA will perform a prepublication 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 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.

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

Rights in Noncommercial Technical Data and Computer Software – SBIR/STTR 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 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.

Proposal Submission

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

It is recommended that potential offerors email topic authors to schedule a time for topic discussion during the pre-release period.

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>.

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 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>).

Approved for Public Release (instructions)

23-MDA-11555 (11 Aug 23)

MDA STTR 23.C Topic Index

MDA23-P001

Open Topic for Radiation Hardened Microelectronics

MDA23-P001 TITLE: Open Topic for Radiation Hardened Microelectronics

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

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: The objective of this open topic is to solicit potentially valuable small business Radiation Hardened Microelectronics (RadHard ME) focused innovations to missile defense and create an opportunity to expand the relevance of the STTR programs to firms who do not normally compete for STTR awards.

DESCRIPTION: Radiation hardened electronics are critical for many missile defense platforms. Missile defense applications have a need to operate in stressing natural and man-made environments. While this RadHard ME open topic may accept proposals on any technical challenge requiring a RadHard ME application, the government is seeking submissions that address the following:

- Radiation Effects- including Heavy Ion, X-ray Proton, and Pulsed Neutron Single Event Effects on Electronic Devices
- New single event effects (SEE) test methodologies, techniques, technologies, or alternate particle sources such as using LASERS
- Modeling and simulation 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
- Modeling and simulation methodologies to predict radiation damage to microelectronics and evaluate microelectronics for survivability in radiation environments
- Develop test 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
- System component health monitoring during radiation events to determine impacts of effects and application of automatic annealing techniques to maintain system operation
- Automated test software to improve testing speeds, to include the use of Artificial Intelligence/Machine Learning (AI/ML)
- Radio frequency (RF) communications in a radiation environment
- Radhard ME optimized for size, weight, and power (SWaP)
- Radiation hardened inertial measurement units (IMUs) suitable for hypersonic flight, Focal Plane Arrays (FPAs), Readout Integrated Circuits (ROICs), processors, memory, mixed-signal analog parts, optics & coatings, and power parts that meet the following specifications: Total Ionizing Dose (≥ 1 megarad (SiO₂)), Single Event Upset Rate ($1E-10$ (errors/device-day)), Single Event Latch-Up (≥ 90 (Linear Energy Transfer)), Dose Rate Upset ($\geq 1E10$ (rad(Si)/s)), Dose Rate Survivability ($\geq 1E12$ (rad(Si)/s)), Displacement Damage (fluence of $\geq 1E14$, with 1MeV energy equivalent neutrons/cm²)).

PHASE I: Conduct a feasibility study to demonstrate the technical and commercial practicality of the concept to include an assessment of its technical readiness and potential applicability to military and commercial markets.

PHASE II: Complete a prototype incorporating Government performance requirements, and demonstrate said prototype. Coordinate with the Government during prototype design and development to ensure that the delivered products would be relevant to ongoing missile defense architecture needs.

PHASE III DUAL USE APPLICATIONS: Conduct engineering and manufacturing development, test, evaluation in a realistic system environment or in a system level test-bed. The various technologies and models should have applicability to the defense industry. Model and simulations should be verified, validated, and accredited.

REFERENCES:

1. MDA22-D001: Radiation Hardened Microelectronics Storefront: <https://www.sbir.gov/node/2120611>
2. James R. Schwank, Marty R. Shaneyfelt, and Paul E. Dodd, "Radiation Hardness Assurance Testing of Microelectronic Devices and Integrated Circuits: Radiation Environments, Physical Mechanisms, and Foundations for Hardness Assurance," IEEE Transactions on Nuclear Science, Vol. 60, No. 3, June 2013.
3. Cladis, Davidson, and Newkirk, eds, "The Trapped Radiation Handbook," NDA 2534H, Washington, DC, <https://apps.dtic.mil/sti/pdfs/ADA020047.pdf>.
4. Schultz and Hjalmarson, From first-principles defect chemistry to device damage models of radiation effects in III-V semiconductors, MMM 2018, Osaka, Japan, <https://www.osti.gov/biblio/1593578>.
5. Huang et al, Multi-Timescale Microscopic Theory for Radiation Degradation of Electronic and Optoelectronic Devices, American Journal of Space Science, 2015. <https://thescipub.com/abstract/ajssp.2015.3.27> Nordland et al, Primary radiation damage: A review of current understanding and models, Journal of Nuclear Materials, 512 (2018) 450-479, <https://www.osti.gov/pages/biblio/1482433>.
6. Broberg et al, PyCDT: A Python toolkit for modeling point defects in semiconductors and insulators, Computer Physics Communications 226 (2018) 165-179. <https://www.sciencedirect.com/science/article/pii/S0010465518300079>.
7. Nordland et al, Primary radiation damage: A review of current understanding and models, Journal of Nuclear Materials, 512 (2018) 450-479, <https://www.osti.gov/pages/biblio/1482433>.
8. Radiation Effects on Electronics 101: https://nepp.nasa.gov/DocUploads/392333B0-7A48-4A04-A3A72B0B1DD73343/Rad_Effects_101_WebEx.pdf. Approved for Public Release (topic) 23-MDA-11540 (18 Jul 23)

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