

**Defense Microelectronics Activity (DMEA)
23.C Small Business Technology Transfer (STTR) Open Topic
Proposal Submission Instructions**

INTRODUCTION

The Defense Microelectronics Activity (DMEA) SBIR/STTR Program is implemented, administrated, and managed by the DMEA Office of Small Business Programs (OSBP). Proposers responding to a topic in this BAA must follow all general instructions provided in the Department of Defense (DoD) STTR Program BAA. DMEA 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.defensesbirstr.mil/SBIR-STTR/Opportunities/#announcements>. Be sure to select the tab for the appropriate BAA cycle.
- Register for the DSIP Listserv at: <https://www.dodsbirstr.mil/submissions/login>.

Specific questions pertaining to the administration of the DMEA SBIR/STTR Program and these proposal preparation instructions should be directed to the DMEA Acting SBIR/STTR Program Manager (PM), Mr. Tien Dang, at osd.mcclellan-park.dmea.list.smbus@mail.mil.

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.

PHASE I PROPOSAL GUIDELINES

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

DMEA intends for Phase I to be only an examination of the merit of the concept or technology that still involves technical risk, with a cost not exceeding \$ 98,642.00. The technical period of performance for the Phase I effort shall be no more than three (3) months.

A list of the topics currently eligible for proposal submission is included in this section followed by full topic descriptions. These are the only topics for which proposals will be accepted at this time. The topics are directly linked to DMEA's core research and development requirements.

Please ensure that your e-mail address listed in your proposal is current and accurate. DMEA cannot be responsible for notification to companies that change their mailing address, e-mail address, or company official after proposal submission.

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. Technical volumes exceeding 10 pages will be deemed non-compliant and will not be evaluated.

Content of the Technical Volume

Read the DoD STTR Program BAA for detailed instructions on proposal format and program requirements. When you prepare your proposal submission, keep in mind that Phase I should address the feasibility of a solution to the topic. Only UNCLASSIFIED proposals will be accepted.

DMEA will evaluate and select Phase I proposals using the evaluation criteria contained in Section 6.0 of the DoD STTR Program BAA. Due to limited funding, DMEA reserves the right to limit awards under any topic, and only proposals considered to be of superior quality will be funded.

Cost Volume (Volume 3)

The Phase I Base amount must not exceed \$98,642.00. DMEA will conduct a price analysis to determine whether cost proposals, including quantities and prices, are fair and reasonable. Contractors should expect that cost proposals will be negotiated. Costs must be separated and clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3.

The on-line cost volume for Phase I proposal submissions must be at a level of detail that would enable DMEA personnel to determine the purpose, necessity, and reasonability of each cost element. Provide sufficient information (a. through h. below) on how funds will be used if the contract is awarded. Include the itemized cost volume information (a. through h. below) as an appendix in your technical proposal. The itemized cost volume information (a. through h. below) will not count against the 10-page limit on Phase I proposal submissions.

a. Special Tooling and Test Equipment and Material: The inclusion of equipment and materials will be carefully reviewed relative to need and appropriateness of the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and relate directly to the specific effort. They may include such items as innovative instrumentation and/or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with the DoD Component; unless it is determined that transfer of the title to the contractor would be more cost effective than recovery of the equipment by the DoD Component.

b. Direct Cost Materials: Justify costs for materials, parts, and supplies with an itemized list containing types, quantities, price, and where appropriate, purposes.

c. Other Direct Costs: This category of costs includes specialized services such as machining or milling, special testing or analysis, costs incurred in obtaining temporary use of specialized equipment. Proposals, which include leased hardware, must provide an adequate lease versus purchase justification or rationale.

d. Direct Labor: Identify key personnel by name if possible or by labor category if specific names are not available. The number of hours, labor overhead and/or fringe benefits and actual hourly rates for each individual are also necessary.

e. Travel: Travel costs must relate to the needs of the project. Break out travel cost by trip, with the number of travelers, airfare, and per diem. Indicate the destination, duration, and purpose of each trip.

f. Cost Sharing: Cost sharing is permitted. However, cost sharing is not required, nor will it be an evaluation factor in the consideration of a proposal.

g. Subcontracts: Involvement of university or other consultants in the planning and /or research stages of the project may be appropriate. If the offeror intends such involvement, describe the involvement in detail and include information in the cost proposal. The proposed total of all consultant fees, facility leases, or usage fees and other subcontract or purchase agreements may not exceed one-third of the total contract price or cost, unless otherwise approved in writing by the Contracting Officer. Support subcontract costs with copies of the subcontract agreements. The supporting agreement documents must adequately describe the work to be performed (i.e., Cost Volume). At the very least, a statement of work with a corresponding detailed cost volume for each planned subcontract must be provided.

h. Consultants: Provide a separate agreement letter for each consultant. The letter should briefly state what service or assistance will be provided, the number of hours required, and the hourly rate.

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. DMEA will not accept any deviation to the POW requirements.

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 be considered by DMEA 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.

PHASE II PROPOSAL GUIDELINES

Phase II proposals may only be submitted by Phase I awardees. Phase II is the prototype/demonstration of the technology that was found feasible in Phase I. DMEA encourages, but does not require, partnership and outside investment as part of discussions with DMEA sponsors for potential Phase II efforts.

The Technical Volume is not to exceed 40 pages and consists of a single PDF file with your firm name, topic number, and proposal number in the header of each page. All documentation should use no smaller than 10 point font on standard 8.5" X 11" paper with one-inch margins and not be in two-column format. Do not include blank pages.

Phase II proposals may be submitted for an amount not to exceed \$1,315,219.00. The technical period of performance for the Phase II effort shall be no more than twenty-four (24) months.

Phase I awardees may submit a Phase II proposal without invitation not later than sixty (60) calendar days following the end of the Phase I contract. The Phase II proposal submission instructions are identified in the Phase I contract, Part I – The Schedule, Section H, Special contract requirements, “STTR Phase II Proposal Submission Instructions.”

All Phase II proposals must have a complete electronic submission per the Proposal Volumes area listed in Phase I. Your proposal must be submitted via the submission site on or before the DMEA-specified deadline or it will not be considered for award.

Due to limited funding, DMEA’s ability to award any Phase II, regardless of proposal quality or merit, is subject to availability of funds. Please ensure that your proposal is valid for 120 days after submission, and any extension to that time period will be requested by the Contracting Officer.

A Phase II contractor may receive up to one additional, sequential Phase II award for continued work on a project. The additional, sequential Phase II award has the same guideline amounts and limits as an initial Phase II award. Sequential, Phase II proposals shall be initiated by the Government Technical Point of Contact for the initial Phase II effort and must be approved by the DMEA SBIR/STTR Program Manager in advance.

DMEA STTR PHASE II ENHANCEMENT PROGRAM

To encourage transition of STTR into DoD systems, DMEA has a Phase II Enhancement policy. DMEA’s Phase II Enhancement program requirements include: up to one-year extension of existing Phase II, and up to \$657,610.00 matching SBIR funds. Applications are subject to review of the statement of work, the transition plan, and the availability of funding. DMEA will generally provide the additional Phase II Enhancement funds by modifying the Phase II contract.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TAB A)

DMEA does not provide Discretionary Technical and Business Assistance (TAB A).

EVALUATION AND SELECTION

All proposals will be evaluated in accordance with the evaluation criteria listed in the DoD STTR Program BAA

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.

Refer to the DoD STTR Program BAA 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:

DMEA Acting SBIR/STTR Program Manager (PM):

- Name: Mr. Tien Dang
- Email: osd.mcclellan-park.dmea.list.smbus@mail.mil

END

DMEA STTR 23.C Topic Index

DMEA23C-P001 Applications to Assist in Analysis and Re-Engineering of Printed Circuit Board Assemblies

DMEA23C-P001 TITLE: Applications to Assist in Analysis and Re-Engineering of Printed Circuit Board Assemblies

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

OBJECTIVE: Design and implement technologies to assist in the process of extracting a printed circuit board design non-destructively from a printed circuit board assembly. These technologies may be purely software based or include a hardware component.

DESCRIPTION: The weapons systems of the Department of Defense (DoD) rely heavily on microelectronics to function. Sometimes the DoD does not have access to the technical design data for these microelectronics. In order to obtain the technical design data for these systems, the Defense Microelectronics Activity will analyze printed circuit boards (PCBs) and circuit card assemblies (CCAs) to create a technical data package that includes a schematic, Gerber file, and bill of materials (BoM). Sometimes the intent is to re-engineer the CCA, which requires the Gerber file to meet design rule checks and be manufacturable. The analysis may involve visual inspection, removing components to identify them, X-ray computed tomography (CT) of PCBs or CCAs, and use of a flying pin prober. There are a number of aspects of this process that are still challenging and DMEA seeks technologies to improve the process. Some examples of the challenging areas include:

- Passive Components:
 - o Identify passive component values in an automated way
- Visual Inspection:
 - o Identification of components from image, including extracting text, logos, and silkscreen labels
- X-ray CT of CCA:
 - o Beam hardening and scattering from components can obscure traces on the PCB
 - o Low dosage required to not damage flash components with ionizing radiation
 - o Extracting the layers of the PCB with board warping and reconstruction artifacts
- Clean design extraction:
 - o Generate a Gerber file from the layer images that conforms to design rules, minimizes polygon vertices, and matches the original design as closely as possible.

DMEA is looking for technologies that can be incorporated into existing PCB and CCA analysis workflows to help address challenges or automate tasks that are currently manual.

PHASE I: Conduct research on technology that addresses one or more challenges associated with non-destructively generating a schematic, bill of materials, and/or Gerber file of a CCA. The end product of Phase I is a feasibility study report, in which the following must be specified:

- 1) A clear description of the technology and how it is applied.
- 2) Any associated hardware required as part of the technology solution (e.g. fixturing, sensors, cameras, tools, etc.).
- 3) A clear description of any required hardware, software, training datasets or other requirements for the effective implementation of the technology.
- 4) A clear description of how to incorporate the technology into an overall workflow to generate the schematic, bill of materials, and/or Gerber file of a CCA.

PHASE II: Develop a prototype of the Phase I concept and demonstrate its operation. Validate the performance in a way that realistically demonstrates how the technology would be deployed. This demonstration will include scalability of the technology in terms of capacity, cost, and time.

PHASE III DUAL USE APPLICATIONS: There may be opportunities for further development of this innovation for use in a specific military or commercial application. During a Phase III program, the

contractor may refine the performance of the design and produce pre-production quantities for evaluation by the Government. The proposed technology will be applicable to both commercial and government fields that require an added level of security for their microelectronics parts. Government applications include anti-counterfeit applications and acquisition processes for microelectronics parts for weapon systems and other critical systems.

REFERENCES:

1. Asadizanjani N, Tehranipour M, Forte D. PCB Reverse Engineering Using Non-destructive X-ray Tomography and Advanced Image Processing. 2016. IEEE Transactions on Components, Packaging, and Manufacturing Technology. DOI: 10.1109/TCPMT.2016.2642824.
2. Park HS, Chung YE, Seo JK. Computed tomographic beam-hardening artefacts: mathematical characterization and analysis. Philos Trans A Math Phys Eng Sci. 2015 Jun 13;373(2043):20140388. doi: 10.1098/rsta.2014.0388. PMID: 25939628; PMCID: PMC4424484.

KEYWORDS: PCB, PCBA, CCA, X-ray CT, Electronics, Microelectronics