

DMEA

STTR 16.B PROPOSAL SUBMISSION INSTRUCTIONS

INTRODUCTION

The Defense Microelectronics Activity (DMEA) SBIR/STTR Program is implemented, administrated, and managed by the DMEA Program Control Division. If you have any questions regarding the administration of the DMEA SBIR/STTR Program, please contact the DMEA SBIR/STTR Program Manager (PM), Mr. Gene Graham, gene.graham@dmea.osd.mil.

For general inquiries or problems with electronic submission, contact the DoD SBIRSTTR Help Desk at 1-800-348-0787 between 9:00 am to 6:00 pm ET. For questions about the topic during the pre-solicitation period (22 April 2016 through 22 May 2016), contact the Topic Authors listed under each topic on the <https://sbir.defensebusiness.org/> website prior to the Open phase of the solicitation. Information regarding the DMEA mission and programs can be found at <http://www.dmea.osd.mil>.

DISCRETIONARY TECHNICAL ASSISTANCE

DMEA may provide up to \$5,000 of STTR funds for the Discretionary Technical Assistance (DTA) described per year for each Phase I award and each Phase II award as outlined in Section 4.22 of the program solicitation. Due to limited funding, DMEA reserves the right to approve or disapprove any DTA requests. DTA requests must be included in the Explanatory Material section of the firm's cost proposal specifically identified as "Discretionary Technical Assistance."

PHASE I GUIDELINES

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 \$150,000.

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.

PHASE I PROPOSAL SUBMISSION

Read the DoD front section of this solicitation 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 entertained.

The technical period of performance for the Phase I should be no more than six (6) months. DMEA will evaluate and select Phase I proposals using the evaluation criteria contained in Section 6.0 of the DoD Solicitation 16.B Preface Instructions. 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.

DMEA accepts Phase I proposals not exceeding \$150,000. 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.

If you plan to employ NON-U.S. citizens in the performance of a DMEA STTR contract, please identify these individuals in your proposal as specified in Section 5.4.c (8) of the program solicitation.

It is mandatory that the ENTIRE Technical Volume, DoD Proposal Cover Sheet, Cost Volume and the Company Commercialization Report are submitted electronically through the DoD SBIR/STTR website at <https://sbir.defensebusiness.org/>. The DoD proposal submission site submission will lead you through the process for submitting your technical proposal and all of the sections electronically. Each of these documents is submitted separately through the website. If you have any questions or problems with the electronic proposal submission, contact the DoD SBIR/STTR Helpdesk at 1-800-348-0787.

Your proposal submission must be submitted via the submission site on or before the 6:00 a.m. deadline on 22 June 2016.

Proposal submissions that are not complete or that are received after the closing date and time will not be considered for award.

PHASE II GUIDELINES

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.

Phase II proposals may be submitted for an amount not to exceed \$1,000,000.

PHASE II PROPOSAL SUBMISSION

The Reauthorization of the SBIR/STTR Program has resulted in significant changes to the Phase II proposal submission process. On December 31, 2011, the President of the United States signed into law the National Defense Authorization Act for Fiscal Year 2012 (Defense Reauthorization Act), Public Law 112–81. Section 5001, Division E, of the Defense Reauthorization Act contains the SBIR/STTR Reauthorization Act of 2011 (SBIR/STTR Reauthorization Act), which extends both the SBIR and STTR Programs through September 30, 2017.

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, “H-959 STTR Phase II Proposal Submission Instructions.”

All Phase II proposals must have a complete electronic submission. Complete electronic submission includes the submission of Cover Sheet, Cost Volume, Company Commercialization Report, the entire Technical Volume, and any appendices via the DoD submission site (<https://sbir.defensebusiness.org/>). The DoD proposal submission site will lead you through the process for submitting your technical volume and all of the sections electronically. Each of these documents is submitted separately through the website. Your proposal must be submitted via the submission site on or before the DMEA-specified deadline or it will not be considered for award.

DMEA will evaluate Phase II proposals based on the Phase II evaluation criteria listed in Section 8.0 of DoD Solicitation 16.B Preface. DMEA does not have an established page limit for Phase II submissions. Please reference the DoD SBIR/STTR Submission site FAQs for more information on generating Phase II proposals. 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.

Any follow-on Phase II proposal (i.e., a second Phase II subsequent to the initial Phase II effort) 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 PM in advance.

COST VOLUME GUIDELINES

The on-line cost volume for Phase I and Phase II 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 i below) on how funds will be used if the contract is awarded. Include the itemized cost volume information (a through i below) as an appendix in your technical proposal. The itemized cost volume information (a through i below) will not count against the 20-page limit.

- 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 teased 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.

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 \$500,000 matching STTR 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.

PHASE I PROPOSAL SUBMISSION CHECKLIST:

All of the following criteria must be met or your proposal will be REJECTED.

_____ 1. Your Technical Volume, the DoD Cover Sheet, the DoD Company Commercialization Report (required even if your firm has no prior STTRs), and the Cost Volume have been submitted electronically through the DoD submission site by 6:00 am ET on 22 June 2016.

_____ 2. The Phase I proposal does not exceed \$150,000.

DMEA STTR 16.B Topic Index

DMEA16B-001 Thickness Measurement Technology for Thin Films on Sapphire Substrate

DMEA STTR 16.B Topic Descriptions

DMEA16B-001 TITLE: Thickness Measurement Technology for Thin Films on Sapphire Substrate

TECHNOLOGY AREA(S): Electronics, Sensors

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 5.4.c.(8) of the solicitation.

OBJECTIVE: Develop an innovative metrology system for measuring thickness of various thin films on a sapphire substrate.

DESCRIPTION: Currently there is no metrology tool to measure thickness of thin films on sapphire substrate wafer, which is also called silicon on sapphire (SOS) wafer, since sapphire is transparent to light. When fabricating integrated circuits with SOS wafer, a typical thickness of a thin film can't be measured with the current tool set to verify the wafer process conditions. As a result, the SOS process is not well controlled, and it could lead to lower yield. Therefore, it is desirable to have an innovative and non-destructive system to perform thickness measurements on a processed SOS wafer. The measurements are for thin films and thin film stacks of epitaxial silicon (epi Si), silicon dioxide (oxide), silicon nitride (nitride), polycrystalline silicon (p-Si), and amorphous silicon (a-Si). The system should be capable of measuring thin film thickness with ± 10 percent accuracy.

PHASE I: Develop an optical method to measure thickness of the described thin films and a stack of the films on sapphire substrate wafer. The film stack should include oxide over epi Si, nitride over oxide and epi Si, p-Si or a-Si over oxide, and nitride over oxide and epi Si. The method also includes any possible hardware and software to be developed. The end result of Phase I is a feasibility study report.

PHASE II: From the result study of Phase I, develop a prototype system of film thickness measurement, which is integrated with DMEA (Defense Microelectronic Activity) foundry to provide and demonstrate the system capability. The system should be capable to measure thickness of the mentioned thin films and their stacks on a 150mm processed SOS wafer with the following metrics:

- 1) 0\AA = epi Si $<3000\text{\AA}$
- 2) 0\AA = thin oxide/epi Si $<500\text{\AA}$ (measured oxide above epi Si)
- 3) 400\AA = oxide $<14000\text{\AA}$
- 4) 0\AA = p-Si or a-Si/oxide $<3000\text{\AA}$ (measured p-Si or a-Si over oxide)
- 5) 0\AA = nitride/thin oxide/epi Si $<2000\text{\AA}$ (measured nitride above oxide and epi Si)
- 6) 0\AA = nitride/oxide $<10000\text{\AA}$ (measured nitride above oxide)

Oxide and nitride can be made by either thermal oxidation or chemical vapor deposition (CVD) process.

PHASE III DUAL USE APPLICATIONS: Develop and expand the successful prototype system in Phase II into a production scale through government and commercialization. During this phase, the system should be refined and produce production quantities for both military and commercial applications.

REFERENCES:

1. Md Abull Hossion, Brij Mohan Arora, "Optical characterization of Intrinsic Poly Silicon Film for Photovoltaic Application on Sapphire and TiO₂ Substrate by HWCVD," International Conference on Electrical Engineering and Information & Communication Technology (ICEEICT) doi: 10.1109/ICEEICT.2014.69

2. Peregrine Semiconductor, www.psemi.com, “UltraCMOS Process Technology – The Ultimate SOI”, July 2012
3. Dieter K. Schroder, “Semiconductor Material and Device Characterization” 3rd Edition, John Wiley & Son, 2006.

KEYWORDS: Thin Film/Sensors/Measurement/Sapphire