

DMEA

STTR 15.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 presolicitation period (24 April 2015 through 25 May 2015), contact the Topic Authors listed under each topic on the SBIR/STTR website at <https://sbir.defensebusiness.org/> prior to the open phase of the solicitation. Information regarding the DMEA mission and programs can be found at <http://www.dmea.osd.mil>.

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 assure 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 15.B preface. 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. Cost proposals that exceed \$150,000 will not be considered for award.

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 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. ET deadline on 24 June 2015.

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 at <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 15.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.

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 24 June 2015.**

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

DMEA STTR 15.B Topic Index

DMEA15B-001 Optimized Scintillator for High Resolution X-ray Imaging at 9keV **DMEA STTR 15.B Topic Descriptions**

DMEA15B-001 TITLE: Optimized Scintillator for High Resolution X-ray Imaging at 9keV

TECHNOLOGY AREAS: Sensors, Electronics and Electronic Warfare, Materials/Processes

OBJECTIVE: Develop a scintillator with high resolution, high damage threshold, no browning or afterglow.

DESCRIPTION: Rapid Integrated Circuit (IC) inspection using x-ray microscopy requires novel x-ray scintillating materials with high efficiency and high spatial resolution. Current scintillator materials, such as Cesium Iodide (CsI), suffer from a trade-off between efficiency and spatial resolution. Novel materials with higher stopping power and light yields are necessary to address the stringent requirements of fast, high resolution x-ray microscopy.

PHASE I: Perform a study to compare the novel scintillator materials to existing commercially available scintillators. Develop a plan to produce an x-ray scintillator that meets the following characteristics:

- Transparent to visible light (particularly at the scintillating frequency)
- At least 5% efficient for 9keV photons
- 0.5 micrometer spatial resolution
- Afterglow decays to less than 0.0001% of the signal, 0.5s after exposure is removed
- Defect free (no dark spots or imperfections larger than 0.25um)
- Homogeneous across a 5mm diameter active area
- No browning (the transparency of the scintillator should not vary over time)

The required manufacturing apparatus must be identified and detailed in the production plan.

Deliver a report of research that presents tradeoffs between the new scintillator and existing, commercially available scintillators (in all the above mentioned characteristics). If any of the constraints cannot be adhered to, the report must include relevant research and rationale. Offerors may provide alternative parameters that are both attainable and consistent with the goals summarized above. The report must also include all generated files (e.g., CAD drawings), an explanation of feasibility, a program plan for manufacture, a demonstration of the capability and test results for the chosen material.

PHASE II: Based on the aforementioned research make a full size, high quality prototype of the scintillator detailed in Phase I. Test and deliver the sample, characterization results, and all generated files (e.g., final CAD drawings, test results, etc.).

PHASE III: There may be opportunities for further development of this scintillator for use in a specific military or commercial application. During a Phase III program, offerors may refine the performance of the design and produce pre-production quantities for evaluation by the Government.

POTENTIAL DUAL USE APPLICATIONS: The scintillator would be applicable to fast, high-resolution microscopy for both commercial and government use. It is a critical component of x-ray microscopes routinely used in the fields of semiconductors, failure analysis, energy generation and storage. High duty cycle scintillators can help optimize processes like fuel injection, cells charging and discharging, graphite nuclear radiation damage analysis, crack formation, and many other novel material research projects. Government applications include failure analysis and characterization of advanced semiconductor fabrication processes.

REFERENCES:

1. Glenn F. Knoll, "Radiation Detection and Measurement", Fourth Edition, John Wiley and Sons, New York, NY, 2010
2. G. Gundiah, G. Bizarri, S. Hanrahan, M. Webera, E. Bourret-Courchesne and S. Derenzo, "Structure and scintillation of Eu²⁺-activated solid solutions in the BaBr₂-BaI₂ system", Nucl Instr Meth, 2011
3. Seeley, Zachary M., Nerine J. Cherepy, and Stephen A. Payne. "Expanded phase stability of Gd-based garnet transparent ceramic scintillators." *Journal of Materials Research* 29.19 (2014): 2332-2337.
4. Yanagida, Takayuki, et al. "Optical and scintillation properties of transparent ceramic Yb: Lu₂O₃ with different Yb concentrations." *Optical Materials* 36.6 (2014): 1044-1048.

KEYWORDS: X-ray, Imaging, Microscopy, Scintillator