

**SBIR 20.1 DEFENSE LOGISTICS AGENCY (DLA)
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM**

Proposal Submission Instructions

GENERAL

The Defense Logistics Agency (DLA) implements, administers, and manages the SBIR/STTR Program as part of the Small Business Innovation Programs through DLA J62LB Information Operations / Research, and Development (R&D) Division. Consult the program website at the following location: <http://www.dla.mil/SmallBusiness/SmallBusinessInnovationPrograms> for general information about the DLA SBIP Program and its mission. If you have any questions regarding the administration of the Program, please contact the DLA SBIR Program Manager (PM):

Denise Price email: DLASBIR2@dlamail.mil

TECHNICAL QUESTIONS

For questions regarding the SBIR/STTR topics during the pre-release period, contact the Topic Technical Point of Contact (TPOC) listed for each topic on the SBIR/STTR website at <https://sbir.defensebusiness.org/> prior to the close of the pre-release. To obtain answers to technical questions during the open period a firm must submit questions through the online SBIR/STTR Q&A System at <https://sbir.defensebusiness.org/>.

For general inquiries or problems with electronic submission, contact Department of Defense (DoD) SBIR Help Desk at dodsbirsupport@reisystems.com or 703-214-1333 between 9:00 am and 5:00 pm ET.

PHASE I KEY DATES

20.1 BAA (Pre-release)	10 Dec, 2019
20.1 BAA (Open period)	14 Jan, 2020
20.1 BAA Closes	12 Feb 2020 (@ 8PM ET)

PROGRAM BROAD AGENCY ANNOUNCEMENT (BAA) 20.1

PHASE I GUIDELINES

A list of the topics currently eligible for proposal submission is included in the Topic Index, followed by full topic descriptions. Additional guidance is as follows:

- Proposal period of performance should not to exceed 9 months.
- Proposal Cost Estimate should not to exceed \$100,000 however, the DLA Program Manager has the discretion to waive this limit up to \$252,131. (This must be part of the discussion in the Pre Release period)
- Phase I proposals not to exceed the 20-page limit.
- Proposal attachments, appendices, or references are included in Volume 5.
- Notification of selection and non-selection occurs electronically via e-mail.

For detailed proposal submission guidance, refer to U.S. Department of Defense (DoD) Instructions 20.1 SBIR at: <https://www.dodsbirsttr.mil/submissions>.

PHASE II GUIDELINES

Phase II eligibility:

- Phase I awardees may submit a Phase II proposal without invitation.
- Proposal period of performance not to exceed 24 months
- Proposal Cost Estimate should not to exceed \$1,000,000, however, the DLA Program Manager has the discretion to waive this limit up to \$1,680,879
- Phase II proposals not to exceed the 40-page limit
- Proposal attachments, appendices, or references are included in Volume 5.
- Cost Estimate is not included in the 40-page limit.
- Commercialization Strategy Requirements:
 - Business Case highlighting benefits to the DoD/DLA
 - Transition Strategy and Key Tasks
 - Time-Phased Transition Plan
 - Projected Transition Cost Analysis

DLA Phase II proposals must follow the detailed proposal submission guidance in the original Phase I BAA. Refer to DoD Instructions at <https://www.dodsbirsttr.mil/submissions>.

EVALUATION CRITERIA

Phase I see Section 6 in the OSD BAA Phase II see Section 8 in the OSD BAA

TECHNICAL ASSISTANCE

The DLA SBIR Program does not participate in the Technical and Business Assistance (formally the Discretionary Technical Assistance Program). Contractors should not submit proposals that include Technical and Business Assistance.

DELIVERABLES / REPORTS

All DLA SBIR and STTR awardees are required to submit reports in accordance with the deliverable schedule. The recipient must provide all reports to the individuals identified in Exhibit A of the contract. Milestones: Each phase of the project will be milestone driven. The Principal Investigator will propose milestones prior to starting any phase of the project.

Phase I Proposals should anticipate a combination of any or all of the following deliverables:

- Plan of Action and Milestones (POAM) with sufficient detail for monthly project tracking
- Initial Project Summary: one-page, unclassified, non-sensitive, and non-proprietary summation of the project problem statement and intended benefits (must be suitable for public viewing).
- Monthly Status Report - DLA SBIP Team will provide a format at the project launch meeting.
- The TPOC and PM will determine a meeting schedule at project launch meeting. Phase I awardees can expect:
 - Mid Term Project Review (format provided at launch meeting); and possibly
 - Monthly (or more frequent) Project Reviews (format provided at launch meeting)
- Draft Final Report including major accomplishments, business case analysis, commercialization strategy, transition plan with timeline, and proposed path forward for Phase II.
- Final Report including major accomplishments, business case analysis, commercialization strategy and transition plan with timeline, and proposed path forward for Phase II
- Final Project Summary (one-page, unclassified, non-sensitive and non-proprietary summation of project results, non-proprietary high resolution photos or graphics intended for public viewing)
- Phase II Proposal is optional at the Phase I Awardee's discretion (as Applicable)
- Applicable Patent documentation
- Other Deliverables as defined in the Phase I Proposal

Phase II Proposals should anticipate a combination of any or all of the following deliverables:

- Plan of Action and Milestones (POAM) with sufficient detail for monthly project tracking Initial Project Summary: one-page, unclassified, non-sensitive, and non-proprietary summation of the project problem statement and intended benefits (must be suitable for public viewing)
- Monthly Status Reports, The format will be provided at project launch meeting
- The Technical Point of Contact (TPOC) and PM will determine the meeting schedule at project launch meeting. Phase II awardees can expect:
 - Triannual Project Review (format provided at launch meeting)
 - Monthly (or more frequent) Project Reviews (format provided at launch meeting)
- Draft Final Report including major accomplishments, commercialization strategy and transition plan and timeline.
- A Final Report including major accomplishments, commercialization strategy and a transition plan and timeline

- Final Project Summary (one-page, unclassified, non-sensitive and non-proprietary summation of project results, non-proprietary high resolution photos or graphics intended for public viewing)
- Applicable Patent documentation
- Other Deliverables as defined in the Phase II Proposal.

DLA SBIR 20.1 Topic Index

DLA201-001	Engaging the Manufacturing Industrial Base in Support of DLA's Critical Supply Chains
DLA201-002	Grain Boundary Engineering in Additive Manufacturing (AM)
DLA201-D003	Production of Industrial Rubber Gloves for the Nuclear Enterprise Support Office through Manufacturing Techniques that Support Multiple DoD Applications for the DLA
DLA201-D004	Deployable Additive Manufacturing Capability

DLA SBIR 20.1 Topic Descriptions

DLA201-001 TITLE: Engaging the Manufacturing Industrial Base in Support of DLA's Critical Supply Chains

TECHNOLOGY AREA(S): Air Platform, Materials/Processes, Nuclear Technology, Weapons

ITAR: 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 Announcement.

OBJECTIVE: Improve product availability and increase competition through the development of Source Approval Requests (SAR) by small business manufacturers for National Stock Numbers (NSNs) with government provided technical data or through the Reverse Engineering (RE) of a technical data package. If DLA has adequate technical data available, the small business manufacturer will utilize the technical data to develop a SAR package.

If the technical data is not available or inadequate, the small business will conduct relevant research and reverse engineering resulting in the development of the technical data package (TDP) as well as a SAR. The intent is that the participating small business manufacturer will be responsive to future solicitations as well as participate in the development of additional SARs for technically related NSNs.

DESCRIPTION: DLA established the Nuclear Enterprise Support Office (NESO) so the Agency is in a position to be responsive to the needs of the United States Air Force and U.S. Navy nuclear communities. The sole mission of the office is to synchronize DLA's enterprise wide support to the nuclear enterprise and engage strategically with DLA customers. Through partnerships with the small business industrial base, DLA will augment existing sources of supply to enhance life-cycle performance, product availability, competitive pricing as well as ensure effective logistics support to the nuclear enterprise. This program is restricted to DLA managed NESO items where sources of supply are scarce and is in use to incentivize small business participation to address specific weapon system requirements as well as provide small manufacturers the opportunity to build a mutually beneficial relationship with DLA.

A SAR package is an assembly of information required of a prospective new supplier of a Critical/Weapon System Item (NSN). A SAR package contains all technical data needed to demonstrate that the prospective contractor can competently manufacture the Critical/Weapon System Item to the same level of quality or better than the system prime contractor, major subsystem contractor, or initial Approved Source (OEM).

There are SAR Guides with templates and charts that explain the process. Find these guides, charts, checklists, and templates via the internet at the referenced link 1. The list of candidate parts is posted on the DLA Small Business Innovation Program (SBIP) site <http://www.dla.mil/SmallBusiness/SmallBusinessInnovationPrograms>. Specific parts may require minor deviations in the process dependent on the Engineering Support Activity (ESA) requirements. Those deviations will be addressed post award. Participating small businesses must have an organic manufacturing capability and a Commercial and Government Entity (CAGE) code and be Joint Certification Program (JCP) certified in order to access technical data if available.

Refer to "link 2" below for further information on JCP certification. Additionally, small businesses will need to create a DLA's Internet Bid Board System (DIBBS) account to view all data and requirements in C Folders.

Refer to "links 3 and 4" below for further information on DIBBS and C Folders. All available documents and drawings are located in the C Folder location "SBIR201A". If the data is incomplete, or not available, the effort will require reverse engineering.

PHASE I: The innovation research goals of Phase I are to provide small business manufacturers an opportunity to qualify as an Approved Source for one or more of the NSNs specifically identified in this BAA. In this phase, manufacturers will request SAR approval from the applicable Engineering Support Activity (ESA), if required, for the NSNs. During the project launch, the awardee will submit a Gantt chart (as well as other deliverables called out in the contract) detailing the steps and timing to complete any reverse engineering efforts necessary. The Chart should cover the process from the Launch meeting, through the beginning start of Low Rate Production (LRIP) of the NSN(s). In addition, it is encouraged

that manufacturers and engineers consider innovation opportunities for the identified component for the potential for cost reduction, extended life cycle, and improvement of the performance of the component. The culmination of this research will provide the basis for the business case included in the final report.

The NESO team selected the list of items and associated details to address the needs of the Nuclear Enterprise to sustain critical weapons systems as described below. Proposals may include all or a subset of the NSNs listed at <http://www.dla.mil/SmallBusiness/SmallBusinessInnovationPrograms> . Firm may submit multiple proposals for this topic providing that the proposals address unique NSNs. In order to be competitive, firms should base proposal costs on the level of effort and not the maximum dollars available. The expected cost of a "SAR only" package should not exceed \$30,000 per part, and the expected cost of a Reverse Engineering SAR package should not exceed \$45,000 per part. **There are exceptions for more complex parts and the proposal should provide the rationale.**

PHASE II: The submission of a Phase II proposal is at the option of the Phase I awardee. Based on a successful Phase I project, the requirements / priorities at that time, and the quality and feasibility of the manufacturer's business case, DLA will decide whether to award the Phase II proposal. The goal of Phase II is for the awardee to become a qualified source for multiple NSNs, usually similar to the NSNs in the Phase I project. In cases where the Phase I addressed a particularly complex NSN or NSN with extended testing requirements, that effort may be continued into the Phase II. If the part identified is already in production resulting from a successful Phase I, the Phase II may be used to create additional manufacturing capacity to meet demand and/or pursue SARs for other DLA managed items.

PHASE III DUAL USE APPLICATIONS: At this point, no specific funding is associated with Phase III. Progress made in PHASE I and PHASE II should result in the manufacturer's qualification as an approved source of supply enabling participation in DLA procurement actions.

COMMERCIALIZATION: The manufacturer will pursue commercialization of the various technologies and processes developed in prior phases through participation in future DLA procurement actions on items identified with this BAA.

REFERENCES:

1. DLA Aviation SAR Package instructions. DLA Small Business Resources:

<http://www.dla.mil/Aviation/Business/IndustryResources/SBO.aspx>

2. JCP Certification: <https://public.logisticsinformationservice.dla.mil/PublicHome/jcp>

3. Access the web address for DIBBS at <https://www.dibbs.bsm.dla.mil> , then select the "Tech Data" Tab and Log into c-Folders. This requires an additional password. Filter for solicitation "SBIR201A"

4. DLA Small Business Innovation Programs web site:

<http://www.dla.mil/SmallBusiness/SmallBusinessInnovationPrograms>

KEYWORDS: Nuclear Enterprise Support (NESO), Source Approval, Reverse Engineering

DLA201-002

Title: Grain Boundary Engineering in Additive Manufacturing (AM)

TECHNOLOGY AREA(S): Materials and Manufacturing Processes

National Defense Strategy (NDS): Reform Business Practices. Developing grain boundary engineering will help DLA/DoD acquire metal parts made of AM more efficiently and routinely without having to manage large inventory.

OBJECTIVE: The Defense Logistics Agency (DLA) seeks technologies and processes in Additive Manufacturing (AM) design and engineering procedures that can predetermine the microstructure of AM parts with “tailored” grain boundaries to produce predictable mechanical properties including mode of failure.

DESCRIPTION: Department of Defense (DoD) demand for out-of-production parts to maintain mission readiness of various weapons system platforms is an ongoing challenge. DLA's strategic objective is to enable a flexible supply chain that can accelerate repairs and part replacements utilizing AM. However, AM technology is relatively new to manufacturing and has many hurdles to overcome before universal adoption as a replacement to traditional manufacturing. Variability in the mechanical properties of additively manufactured metal parts is a key concern for DoD Engineers. Understanding the microstructure development and evolution during the AM process of metallic alloys is an important precondition for the optimization of the parameters to achieve desired mechanical properties of the AM builds. DLA is looking to leverage this evolving technology to enable a supply chain that is flexible, scalable, and capable of producing parts that are more reliable.

Metallic alloys consist of individual crystallites commonly referred to as grains. The individual grain connections (grain boundaries) formed through recrystallization during metal part fabrication and heat treatment. A grain boundary is the interface between two grains, or crystallites. Grain boundaries influence the mechanical properties of the metal; hence, certain grain boundaries are preferred over others. For example, grain boundaries such as coincidence site lattice (CSL) grain boundaries and low angle grain boundaries exhibit improved properties as compared to equiaxed grain boundaries. The improved properties exhibited by the CSL grain boundaries and low angle grain boundaries may include increased resistance to stress, corrosion, and cracking. The performance of grain boundary engineering may attempt to create CSL grain boundaries and/or low angle grain boundaries. It is now recognized, that improved grain boundary engineering techniques are desirable and may be a viable technology to provide DoD with more reliable parts.

In subtractive manufacturing, the grain boundaries are predetermined in the net-shaped parts. In AM, it would be possible to design the grain size and grain boundaries of the net-shaped parts by altering the process parameters or by adding nano/micro particles in a specific localized region during the AM process.

PHASE I: Demonstrate the feasibility of “engineered” grain boundary in metal AM technologies and processes.

PHASE II: Develop a TRL 6 prototype demonstrating the technologies and processes of Grain Boundary Engineering in AM in a DLA environment.

PHASE III DUAL USE APPLICATIONS: At this point, no specific funding is associated with Phase III. Progress made in PHASE I and PHASE II should result in a functional Open Source System which can transition into the Government or the commercial markets.

COMMERCIALIZATION: Expand and enable Grain Boundary Engineering in AM technologies and processes to produce parts with predictable mechanical properties including mode of failure.

KEYWORDS: Additive Manufacturing; Grain Boundary; Engineering

REFERENCES:

1. Lou, Xiaoyuan (Rexford, NY, US), Dolley, Evan Jarrett (Clifton Park, NY, US), Morra, Martin Matthew (Schenectady, NY, US), "GRAIN BOUNDARY ENGINEERING FOR ADDITIVE MANUFACTURING",

2018. <http://www.freepatentsonline.com/y2018/0085830.html> "

2. Vyatskikh, Andrey, Delalande, Stéphane, Kudo, Akira, Zhang, Xuan, Portela, Carlos M., Greer, Julia R., "Additive manufacturing of 3D Nano-Architected Metals", 2018. Nature Communications, Volume 9, Issue 1. <https://doi.org/10.1038/s41467-018-03071-9>