

DEFENSE LOGISTICS AGENCY (DLA)
15.2 Small Business Innovation Research (SBIR) Program
Proposal Submission Instructions

Use the following address for information concerning DLA: <http://www.dla.mil/>. DLA HQ J34 Research and Development implements, administers, and manages the DLA SBIR and STTR Programs. Direct all related general questions to:

Natalie Seiling, DLA SBIR/STTR Program Manager
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Use of e-mail is encouraged.

TECHNICAL QUESTIONS

During the pre-release period (April 24 - May 25, 2015), contact the topic authors listed for each topic in the solicitation.

To obtain answers to technical questions during the formal solicitation period (May 26 - June 24, 2015) visit sbirhelp@bytecubed.com.

For general inquiries or problems with the electronic submission, contact the DoD Help Desk at 1-800-348-0787 (9:00 am to 6:00 pm ET).

DLA's projected funding levels support between one (1) and four (4) Phase I awards and between one (1) or two (2) Phase II awards from each topic. DLA reserves the right to limit awards under any topic.

DLA SBIR/STTR PROGRAM PRINCIPLES

DLA is very committed to each research topic area, although projected funding levels are extremely limited. Therefore, in order to ensure eligibility of selection, a project must offer exceptional benefits to one or more military services, a partnership with DLA, or another military service, or an OEM, or provide exceptional benefits or partnership with a private entity.

DLA seeks to solicit innovative, high-risk research and development proposals from the small business community. All selections shall demonstrate and involve a degree of technical risk where the technical feasibility of the proposed work has yet to demonstrate a fully established maturity.

DLA prefers market-driven companies, which can move technology into the commercial high volume market. Phase I proposals should demonstrate the feasibility of the proposed technology and the merit of a Phase II for a prototype or at least a proof-of- concept demonstration. Future market possibilities and demonstrated commercialization potential strongly influence Phase II selections. Funding commitments, public, or private, submitted as part of the Phase II proposal, are the best demonstration of commercialization potential.

PHASE I KEY DATES

15.2/15.B Solicitation (Pre-release)	April 24 - May 25, 2015
15.2/15.B Solicitation (Open)	May 26 - June 24, 2015
Phase I evaluations	July 2015
Phase I awards	September 2015

SUBMISSION OF DLA SBIR PROPOSALS

The DLA SBIR Program, in its decision process for Phase I award selections, uses the 15.2 BAA Evaluation Criteria – Phase I from Section 6, however with a differing prioritization and additional emphasis on innovation and commercialization potential. Appropriate consideration of these factors within your Phase I proposal will increase your competitiveness for selection. DLA reserves the right to limit awards under any topic. The DLA lists evaluation criteria in descending order of importance:

- **Technical Sufficiency**
- **Innovation:** DLA evaluates innovation independently from technical sufficiency. The DLA SBIR Program employs the following concepts and definitions of innovation when making project selection decisions. An invention improves some product, process, or service. Further, an invention transforms into innovation through introduction to the public. Another transition path would involve the invention moving into some sort of commercialization phase, e.g. commercial development, outside investment, or sales. DLA seeks technologies and processes that offer the potential for a breakthrough increases the quality, decreases cost, or lead-time for items related to the relevant topic. The items should fall under DLA procurement for one or more of the military services
- **Commercialization Potential:** In addition to the requirements of BAA Section 6, DLA recommends offeror's provide a plan to seek private and/or public funding commitments along with possible commercialization partnerships that have the relevant potential to invest in the technology. The offeror would accomplish this plan during the Phase I research and optimally result in potential co-investors at the time of Phase II proposal submission
- **Qualifications:** DLA evaluates qualifications of the proposed principal/key investigators, supporting staff and consultants

The offeror must submit the entire proposal (which includes Cover Sheet, Technical Proposal, Cost Proposal, and Company Commercialization Report) electronically via the DoD SBIR/STTR Proposal Submission Site (<https://sbir.defensebusiness.org/>); DLA will not accept any proposals submitted via any other medium. Do not send a hardcopy of the proposal. Hand or electronic signature on the proposal is not a requirement. If you experience problems uploading a proposal, call the DoD Help Desk at **1-800-348-0787** (9:00 am to 6:00 pm ET).

Notification of Selection and non-selection letters will occur electronically via e-mail.

Proposals not conforming to the terms of this solicitation will not receive further consideration.

FOREIGN NATIONALS

If the offeror proposes to use a foreign national(s) [any person who is NOT a citizen or national of the United States, a lawful permanent resident, or a protected individual as defined by 8 U.S.C. 1324b(a)(3) – refer to section 3.4 of the DoD SBIR Program Solicitation 14.2 for definitions of “lawful permanent resident” and “protected individual”] as key personnel, the following information should be provided: 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. DLA may require additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a contract issued as part of this solicitation.

PHASE I PROPOSAL PAGE LIMIT

DLA Phase I proposals have a 20-page limit (excluding the Cost Proposal and the Company

Commercialization Report). Pages in excess of the 20-page limitation will not receive any consideration for proposal (including attachments, appendices, and references).

OPTION MUST BE INCLUDED AS PART OF PHASE I PROPOSAL

Phase I contracts are expected to have a period of performance (POP) of roughly nine to twelve months and a maximum cost of \$100,000. The Phase I Option, which **must** be included as part of the Phase I proposal, covers activities over a period of up to six months and should describe appropriate initial Phase II activities that may lead to the successful demonstration of a product or technology. The Phase I Option proposal must be included within the 20-page limit for the Phase I proposal. DLA may or may not exercise the Phase I Option; however, DLA will make the determination to exercise the option prior to the end of the POP stated in the Phase I contract.

The offeror will submit a firm-fixed-price-level-of-effort-term Phase I cost proposal (\$150,000 maximum) in detail online. Proposers that participate in this solicitation must complete the Phase I Cost Proposal not to exceed the maximum dollar amount of \$100,000 and a Phase I Option Cost Proposal not to exceed the maximum dollar amount of \$50,000. Phase I and Phase I Option costs must be shown separately but may be presented side by side on a single Cost Proposal. DLA recommends that the Phase I Cost Proposal include a cost estimate for travel for a final program review. Travel locations for planning purposes are as follows:

<u>Topic:</u>	<u>Location:</u>
DLA152-001	Defense Supply Center Richmond (DSCR), Richmond, VA
DLA152-002	Defense Supply Center Philadelphia (DSCP), Philadelphia, PA
DLA152-003	Defense Supply Center Richmond (DSCR), Richmond, VA

PHASE II PROPOSAL SUBMISSION

Offeror may submit Phase II proposals during any open solicitation period any time after the effective date of the Phase I award. DLA may invite Phase I performers to submit a Phase II proposal, not to exceed \$1,000,000, based upon the success of the Phase I contract to meet the technical goals of the topic. This Phase II proposal invitation process shall not limit a company from submitting a Phase II proposal. The evaluation of Phase II proposals adhere to the evaluation criteria provided below.

Due to limited funding, DLA reserves the right to limit awards under any topic and only proposals considered to be of superior quality will receive funding consideration. The preferred contract types for DLA Phase II are firm-fixed-price-level-of-effort-term (FFP) or cost plus fixed fee (CPFF).

The DLA SBIR program, in its decision process for Phase II award selections, uses the three 15.2 BAA Evaluation Criteria – Phase II from Section 8, however with a differing prioritization and additional emphasis on commercialization potential. DLA lists the evaluation criteria in descending order of importance:

- **Technical Sufficiency**
- **Commercialization Potential:** In addition to the requirements of BAA section 8, DLA recommends that companies demonstrate the commercialization potential of their technology by attracting private-sector co-investment and support during the performance of the Phase II. The value that DLA assesses for this factor depends on the type of co-investment or support (cash or support-in-kind), the amount of matching support, and the timing of the matching support.
- **Qualifications:** DLA evaluates qualifications of the proposed principal/key investigators, supporting staff and consultants

OPTIONS MUST BE INCLUDED AS PART OF PHASE II PROPOSAL

Phase II contracts are expected to have a period of performance (POP) of roughly twenty-four months and a maximum cost of \$1,000,000. Two Phase II Options, which **must** be included as part of the Phase II proposal, covers activities over the initial (base) period of up to twelve months and between \$200,000 to \$400,000 each and should describe appropriate initial Phase II activities that may lead to the successful demonstration of a product or technology. The Phase II Options technical proposal must be included within the 40-page limit for the Phase II proposal. DLA may or may not exercise the Phase II Options; however, DLA will make the determination to exercise the option prior to the end of the POP stated in the Phase II contract.

The offeror must submit the entire proposal (which includes Cover Sheet, Technical Proposal, Cost Proposal, and Company Commercialization Report) electronically via the DoD SBIR/STTR Proposal Submission Site (<https://sbir.defensebusiness.org/>); DLA will not accept any proposals not submitted via this site. Do not send a hardcopy of the proposal. Hand or electronic signature on the proposal is also not a requirement. If you experience problems uploading a proposal, call the DoD Help Desk **1-800-348-0787** (9:00 am to 6:00 pm EST).

DLA recommends that the Phase II Cost Proposal include a cost estimate for travel for quarterly program reviews. Travel locations for planning purposes are as follows:

<u>Topic:</u>	<u>Location:</u>
DLA152-001	Defense Supply Center Richmond (DSCR), Richmond, VA
DLA152-002	Defense Supply Center Philadelphia (DSCP), Philadelphia, PA
DLA152-003	Defense Supply Center Richmond (DSCR), Richmond, VA

Notification of Selection and non-selection letters occurs electronically via e-mail. Proposals not conforming to the terms of this solicitation will not receive further consideration.

PHASE II PROPOSAL PAGE LIMIT

DLA Phase II proposals have a 40-page limit (excluding the Cost Proposal and the Company Commercialization Report). Pages in excess of the 40-page limitation will not receive consideration during the evaluation of the proposal (including attachments, appendices, or references)

FAST TRACK or PHASE II ENHANCEMENT POLICY

DLA does not utilize Fast Track or a Phase II enhancement process.

PHASE I DELIVERABLES / REPORTS

All DLA SBIR and STTR awardees are required to submit reports in accordance with the Contract Data Requirements List – CDRL and any applicable Contract Line Item Number (CLIN) of the Phase I contract. The Awardee 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 the following deliverables.

Deliverables:

- Major milestone schedule and decision tree for project

- Initial SBIR Project Summary (one-page, unclassified, non-sensitive, and non-proprietary summation of Phase I results that is intended for public viewing)
- Monthly reports, may be in the format of a slide deck and teleconference
- Phase I Special Technical Summary (may be in the form of a slide deck, after a significant achievement, event, or meeting)
- Final Report including major accomplishments and proposed path forward
- Final SBIR Project Summary (one-page, unclassified, non-sensitive, and non-proprietary summation of Phase I results that is intended for public viewing)

PHASE II DELIVERABLES / REPORTS

Phase II proposals should anticipate the deliverables listed above with the addition of the following:

- Quarterly In-Progress reviews in the format of a slide deck and teleconference

EXTERNAL CERTIFICATION AUTHORITY (ECA)

Effective for the 12.3 SBIR and 12.A STTR solicitations and thereafter, DoD mission partners under contract with DLA who are not eligible to receive a Common Access Card (CAC) are required to obtain a digital certificate from an approved External Certification Authority (ECA) vendor within 90 days of contract award. DoD Instruction 8520.02 (Public Key Infrastructure (PKI) and Public Key (PK) Enabling, May 24, 2011)) requires DoD mission partners to use certificates issued by the DoD ECA program or a DoD-approved Public Key Infrastructure (PKI) when interacting with the DoD in unclassified domains.

NOTE: Offerors must include, in the ODC line, the proposed purchase cost of each ECA in order to receive reimbursement for the cost of ECAs. Reimbursement is limited to a maximum of three ECAs per company. Offerors should consider purchasing the ECA subscription to cover the entire Phase II period of performance, to include the option year. Offerors will only receive reimbursement for ECA costs once per subscription. Offerors that previously obtained a DoD-approved ECA may not receive reimbursement under any potential SBIR/STTR Phase II contract. Likewise, offerors having received reimbursement for ECAs obtained, as a requirement under an active SBIR/STTR Phase II contract, may not receive reimbursement again for the same ECA purchase under any subsequent government contract.

SMALL BUSINESS CERTIFICATIONS

15 U.S.C. §638(cc), as amended by NDAA FY12 Sec. 5143. Reducing Vulnerability of SBIR and STTR Programs to Fraud, Waste, and Abuse, requires each applicant for and small business concern that receives funding under the SBIR program or the STTR program shall certify whether the applicant or small business concern is in compliance with the laws relating to the SBIR program and the STTR program and the conduct guidelines established under the SBIR Policy Directive and the STTR Policy Directive.

SECURITY REQUIREMENTS

If a proposed effort is classified or classified information is involved, the offeror must have, or obtain, a security clearance in accordance with the Industry Security Manual for Safeguarding Classified Information (DOD 5220.22M).

PAYMENT SCHEDULE

Payment will be made in accordance with General Provisions FAR 523.216-7, Allowable Cost and Payments.

PUBLICATION APPROVAL (PUBLIC RELEASE)

National Security Decision Directive (NSDD) 189 established the national policy for controlling the flow of scientific, technical, and engineering information produced in federally funded fundamental research at colleges, universities, and laboratories. The directive defines fundamental research as follows:

"Fundamental research' means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons."

It is DLA's goal to eliminate pre-publication review and other restrictions on fundamental research except in those exceptional cases when it is in the best interest of national security.

COPYRIGHTS

To the extent permitted by statute, the awardee may copyright (consistent with appropriate national security considerations, if any) material developed with DoD support. DoD receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgement and disclaimer statement.

PATENTS

Small business concerns normally may retain the principal worldwide patent rights to any invention developed with government support. The Government receives a royalty-free license for its use, reserves the right to require the patent holder to license others in certain limited circumstances and requires that anyone exclusively licensed to sell the invention in the U.S. must normally manufacture it domestically. To the extent authorized by 35 USC 205, the Government will not make public any information disclosing a government-supported invention for a period of five years to allow the awardee to pursue a patent.

Technical Data Rights in technical data, including software, developed under the terms of any contract resulting from proposals submitted in response to a DoD SBIR/STTR Solicitation generally remain with the contractor, except that the Government obtains a royalty-free license to use such technical data only for government purposes during the period commencing with contract award and ending five years after completion of the project under which the data were generated. Upon expiration of the five-year restrictive license, the Government has unlimited rights in the SBIR/STTR data. During the license period, the Government may not release or disclose SBIR/STTR data to any person other than its support services contractors, except:

1. For evolutionary purposes
2. As expressly permitted by the contractor
3. A use, release, or disclosure that is necessary for emergency repair or overhaul of items operated by the Government. See
4. FAR clause 52.227-20, "Rights in Data - SBIR Program" and DFARS 252.227-7018, "Rights in Noncommercial Technical Data and Computer Software - SBIR Program."

DLA SBIR 15.2 Topic Index

DLA152-001 Advanced Manufacturing Technologies
DLA152-002 Medical 3D Printing
DLA152-003 Ceramic Additive Manufacturing for Investment Casting

DLA SBIR 15.2 Topic Descriptions

DLA152-001 TITLE: Advanced Manufacturing Technologies

TECHNOLOGY AREAS: Air Platform, Ground/Sea Vehicles, Materials/Processes, Weapons

OBJECTIVE: The Defense Logistics Agency (DLA) seeks to provide responsive, best value supplies consistently to our customers. DLA continually investigates diverse technologies for manufacturing which would lead to the highest level of innovation in the discrete-parts support of fielded weapon systems (many of which were designed in the 1960's, 1970's and 1980's) with a future impact on both commercial technology and government applications. As such, advanced technology demonstrations for affordability and advanced industrial practices to demonstrate the combination of improved discrete-parts manufacturing and improved business methods are of interest. All these areas of manufacturing technologies provide potential avenues toward achieving breakthrough advances. Proposed efforts funded under this topic may encompass any specific discrete-parts manufacturing technology at any level resulting in a unit cost reduction. Research and Development efforts selected under this topic shall demonstrate and involve a degree of risk where the technical feasibility of the proposed work has not been fully established. Further, proposed efforts must be judged to be at a Technology Readiness Level of less than 6 -- system/subsystem model or prototype demonstration in a relevant environment -- but greater than 3 -- analytical and experimental critical function and/or characteristic proof of concept -- to receive funding consideration.

DESCRIPTION: DLA seeks drastically lower unit costs of discrete-parts support through manufacturing revolutions that also have applicability to low and high volume production from commercial sales. This will result in an improvement in the affordability of these innovations to DLA and its customers and the development of cost effective methods to sustain existing defense systems while potentially impacting the next generation of defense systems. The proposals must include and will be judged, in part, on an economic analysis of the expected market impact of the technology proposed. This topic seeks a revolution in the reduction of unit cost metrics. Incremental advancements will receive very little consideration. DLA seeks herein only projects that are too risky for ordinary capital investment by the private sector.

PHASE I: Determine, insofar as possible, the scientific, technical and commercial feasibility of the idea. Include a plan to demonstrate the innovative discrete-parts manufacturing process and address implementation approaches for near term insertion into the manufacture of Department of Defense (DoD) systems, subsystems, components or parts.

PHASE II: Develop applicable and feasible prototype demonstrations for the approach described, and demonstrate a degree of commercial viability. Validate the feasibility of the innovative discrete-parts manufacturing process by demonstrating its use in the production, testing and integration of items for DLA. Validation would include, but not be limited to, system simulations, operation in test-beds, or operation in a demonstration system. A partnership with a current or potential supplier to DLA is highly desirable. Identify any commercial benefit or application opportunities of the innovation. Innovative processes should be developed with the intent to readily transition to production in support of DLA and its supply chains.

PHASE III: Technology transition via successful demonstration of a new process technology. This demonstration should show near-term application to one or more Department of Defense systems, subsystems or components. This demonstration should also verify the potential for enhancement of quality, reliability, performance and/or reduction of unit cost or total ownership cost of the proposed subject.

Private Sector Commercial Potential: Discrete-parts manufacturing improvements have a direct

applicability to all defense system technologies. Discrete-parts manufacturing technologies, processes, and systems have wide applicability to the defense industry including air, ground, sea, and weapons technologies. Competitive discrete-parts manufacturing improvements should have leverage into private sector industries as well as civilian sector relevance. Many of the technologies under this topic would be directly applicable to other DoD agencies, NASA, and any commercial manufacturing venue. Advanced technologies for discrete-parts manufacturing would directly improve production in the commercial sector resulting in reduced cost and improved productivity.

REFERENCES:

1. <https://www.dodmantech.com/>
2. DoDD Directive 4200.15 with emphasis on Enclosure 2

KEYWORDS: Manufacturing, machine tools, machining, material cutting, material forming, material additive processes, process/machine intelligence, manufacturing modeling, manufacturing simulation, manufacturing monitoring, manufacturing control systems, manufacturing technology, manufacturing process improvements, adaptive control, agile manufacturing, artificial intelligence, benign manufacturing, computer aided design, computer aided engineering, computer aided manufacturing, computer aided process planning, computer integrated manufacturing, integrated product and process design, intelligent manufacturing, inventory systems, just in time, lean manufacturing, lean production, logistics systems, machine controls, machine optimization, machine preventive maintenance, machinery manufacturing accuracy, manufacturing capacity, manufacturing cost, manufacturing efficiency, manufacturing equipment, manufacturing quality, manufacturing skills, manufacturing software, manufacturing systems, manufacturing workforce, model based manufacturing, non-destructive testing, predictive modeling, process control, process design, process diagnostics, process planning, product design, product specifications, production control, purchasing, quality assurance, quality systems, real time inspection, reliability assessment, remanufacturing, statistical process control, supply chain, sustainable manufacturing, system simulation.

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DLA152-002 TITLE: Medical 3D Printing

TECHNOLOGY AREAS: Materials/Processes

OBJECTIVE: The Defense Logistics Agency (DLA) seeks to provide responsive, best value supplies consistently to our customers. DLA continually investigates diverse technologies for manufacturing which would lead to the highest level of innovation in the discrete-parts support of fielded weapon systems (many of which were designed in the 1960's, 1970's and 1980's) with a future impact on both commercial technology and government applications. As such, advanced technology demonstrations for affordability and advanced industrial practices to demonstrate the combination of 3D printing in the medical supply chain and improved business methods are always of interest. All these areas of manufacturing technologies provide potential avenues toward achieving breakthrough advances. Proposed efforts funded under this topic may encompass any specific 3D printing technology at any level resulting in a unit cost reduction or material availability. Research and Development efforts selected under this topic shall demonstrate and involve a degree of risk where the technical feasibility of the proposed work is not fully established. Further, proposed efforts must be judged to be at a Technology Readiness Level of less than 6 -- system/subsystem model or prototype demonstration in a relevant environment -- but greater than 3 --

analytical and experimental critical function and/or characteristic proof of concept -- to receive funding consideration.

DESCRIPTION: DLA seeks to integrate 3D printing into the Medical supply chain. Medical 3D printing is a disruptive, game-changing technology that will significantly alter medical supply chains in the future. Integrating medical 3D printing will transform customer experience because the supplies will be customizable and available on-demand. With medical 3D printing, the DLA Medical Supply Chain can offer new products and services such as human tissue that will meet customer needs, while at the same time reducing inventory and stock levels for items like medication. 3D printing will also be cost-effective because it is often easier and cheaper to store raw material, rather than finished products.

There are three key ways DLA Medical Supply Chain can use 3D printing to provide life-saving medical supplies:

- 1) Print medical equipment
- 2) Print human tissue
- 3) Print medicine

With medical 3D printing, DLA will shift from forecasting, storing, and supplying items to raw materials and equipment. DLA will likely need to adapt its existing supply chain to handle biomaterial such as cells. Additionally, the DLA will need to identify and assess appropriate suppliers.

PHASE I: Determine, insofar as possible, the scientific, technical and commercial feasibility of the idea. Include, where appropriate, a process technology roadmap for implementing promising approaches for near term insertion in support of Department of Defense (DoD) systems, subsystems or component production.

PHASE II: Develop applicable and feasible prototype demonstrations for the approach described, and demonstrate a degree of commercial viability. Validate the feasibility of medical 3D printing processes by demonstrating its use in the production, testing, and integration of items for DLA and its customers. Validation would include, but not be limited to, system simulations, operation in test-beds, or operation in a demonstration system. A partnership with a current or potential supplier to DLA is highly desirable. Identify any commercial benefit or application opportunities of the innovation. Firms should develop innovative processes with the intent to readily transition to production in support of DLA and its supply chains.

PHASE III: Technology transition via successful demonstration of a new process technology. This demonstration should show near-term application to one or more medical areas. This demonstration should also verify the potential for enhancement of quality, reliability, performance and/or reduction of unit cost or total ownership cost of the proposed subject.

Private Sector Commercial Potential: Medical 3D printing processes and systems have wide applicability to the defense industry including air, ground, sea, and weapons technologies. There is significant interest within the private sector industries as well as civilian sector relevance. Many of the technologies and applications under this topic would be directly applicable to other DoD agencies, NASA, and any medical venue. Medical 3D printing will directly increase the availability, reduce the cost, and improve productivity of certain medical supplies.

REFERENCES:

1. Outcomes of bacteremia in burn patients involved in combat operations overseas, J Am Coll Surg. 2008 Mar;206(3):439-44. doi: 10.1016/j.jamcollsurg.2007.09.017. Epub 2007 Dec 11
<http://www.ncbi.nlm.nih.gov/pubmed/18308213>

2. Will 3-D Printing Revolutionize Medicine, By Sonya Collins WebMD Health News, Reviewed by Brunilda Nazario, MD, ©2005-2015 WebMD, LLC. All rights reserved
<http://www.webmd.com/news/breaking-news/20140723/3d-printing>

3. 3-D Medical Applications Center (3DMAC), Walter Reed National Military Medical Center, 2015
<http://www.wrnmmc.capmed.mil/ResearchEducation/3DMAC/SitePages/home.aspx>

KEYWORDS: 3D printing, 3D technology, 3D bioprinting, biomaterial, customized prosthetic, customized implant, additive manufacturing

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DLA152-003 TITLE: Ceramic Additive Manufacturing for Metal Castings

TECHNOLOGY AREAS: Air Platform, Ground/Sea Vehicles, Materials/Processes, Weapons

OBJECTIVE: The Defense Logistics Agency (DLA) seeks to provide responsive, best value repair parts consistently to our customers, including casted parts from pouring molten metal into a mold. DLA continually investigates diverse technologies for manufacturing castings, which may lead to the highest level of innovation in the support of fielded weapon systems with a future impact on both commercial technology and government applications. As such, advanced technology demonstrations for affordability and advanced industrial practices to demonstrate the combination of innovative ceramic additive manufacturing for investment casting manufacturing processes and business methods are of interest. All these areas of casting manufacturing provide potential avenues toward achieving breakthrough advances. Proposed efforts funded under this topic may encompass any ceramic additive manufacturing process that improves investment casting technology at any level resulting in a unit cost reduction or improved time to manufacture. Research and Development efforts selected under this topic shall demonstrate and involve a degree of risk where the technical feasibility of the proposed work is not fully established. Further, proposed efforts must be judged to be at a Technology Readiness Level (TRL) of less than 6 -- system/subsystem model or prototype demonstration in a relevant environment -- but greater than 3 -- analytical and experimental critical function and/or characteristic proof of concept -- to receive funding consideration.

DESCRIPTION: DLA seeks drastically lower unit costs and availability of cast parts support through manufacturing revolutions that also have applicability to low or high volume production from commercial sales. This will result in an improvement in the affordability of these innovations to DLA and its customers and the development of cost effective methods to sustain existing defense systems while a potential impact on the next generation of defense systems. The proposals must include and evaluations will review, in part, an economic analysis of the expected market impact of the technology proposed. This topic seeks a revolution in the reduction of unit cost metrics. Incremental advancements will receive very little consideration. DLA seeks herein only projects that are too risky for ordinary capital investment by the private sector.

Manufacturing using ceramic cores or molds for metal casting processes, like investment casting, use conventional tooling that is typically expensive with long lead times. Ceramic Additive Manufacturing has become a more efficient way to manufacture cores and molds for some metal castings, including investment cast parts. The DLA desires to make Ceramic additive manufacturing a viable drop-in replacement in the manufacture and production cores and molds used for metal cast parts.

PHASE I: Determine, insofar as possible, the scientific, technical and commercial feasibility of the idea. Include, where appropriate, a process technology roadmap for implementing promising approaches for near term insertion in support of Department of Defense (DoD) weapon systems, subsystems or component production.

PHASE II: Develop applicable and feasible prototype demonstrations for the approach described, and demonstrate a degree of commercial viability. Validate the feasibility of the innovative ceramic additive manufacturing process by demonstrating its use in the production, testing, and integration of items for the DLA. Validation would include, but not be limited to, system simulations, operation in test-beds, or operation in a demonstration system. A partnership with a current or potential supplier to the DLA is highly desirable. Identify any commercial benefit or application opportunities of the innovation. Firms should develop innovative processes with the intent to readily transition to production in support of the DLA and its supply chains.

PHASE III: Technology transition via successful demonstration of a new process technology. This demonstration should show near-term application to one or more Department of Defense weapon systems, subsystems, or components. This demonstration should also verify the potential for enhancement of quality, reliability, performance and/or reduction of unit cost or total ownership cost of the proposed subject.

Private Sector Commercial Potential: Ceramic additive manufacturing innovations for metal castings have a direct applicability to many defense weapon system technologies. New ceramic additive manufacturing technologies processes and systems for metal cast items have wide applicability to the defense industry including air, ground, sea, and weapons technologies. There is significant interest within the private sector industries as well as civilian sector relevance. Many of the technologies under this topic would be directly applicable to other DoD agencies, NASA, and many commercial manufacturing venues. Ceramic additive manufacturing innovations would directly improve production in the commercial sector resulting in reduced cost and improved productivity.

REFERENCES:

1. "Rapid Prototyping Report", The newsletter of the desktop Manufacturing industry, June 1995, September 1995; CAD/CAM Publishing Inc., USA
2. "Stereo lithography of Ceramics and Metals", WWW-Information Technology Assessment & Transfer, Inc., USA
3. "Application of Laser Stereo lithography to Forming Tool Manufacturing", M. Imamura, Y. Xu, H. Noguchi, T. Nakagawa, Sintokogio Ltd., Japan; Institute of Industrial Science, University of Tokyo, Japan

KEYWORDS: Ceramic, stereolithography, additive manufacturing, investment casting, ceramic cores and molds

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