

PROJECT CALL ANNOUNCEMENT

Phase 3 of the Maturation of Advanced Manufacturing for Low-cost Sustainment (MAMLS) program


TECHNICAL TOPICS

The three (3) technical topics for this Project Call are as follows.

TOPIC AREA 1
Feature-based Qualification using Directed Energy Deposition (DED)

With current casting and welding processes, once solidification occurs, there are few opportunities for elimination of compositional, physical, or microstructural discontinuities. Subsequently, the resulting product forms possess higher inherent variability that require changes to the design and manufacturing process to accommodate this variability.

Feature-based qualification (FBQ) approaches seek to identify and create a catalog of all relevant unique combinations of process parameters with simplified specimen geometries. This catalog of qualified features is subjected to extensive material and process qualification testing. Parts are qualified by decomposing the parts into the relevant constituent features and producing each feature in a manner compliant with the catalog specification. FBQ is seen as a potentially viable strategy for avoiding non-statistical based approaches and inefficient point design practices.

The goal of this topic area is to apply FBQ approaches to the production of large scale, additively manufactured aerospace components utilizing DED techniques to first, demonstrate the extent of utility of the FBQ approach and second, identify associated implementation challenges and risk reduction or alternative qualification strategies.

Proposals must not exceed \$2.5M in federal funding*

TOPIC AREA 2
Understanding Manufacturing Realities of Additive Manufacturing (AM)

There are many factors that lead to scrapped material from the AM process. Possible root causes include powder contamination, process interruptions, unremoved powder, rough finish on downward facing surfaces, and unintended volumetric flaws, such as lack of fusion voids or distributed porosity. Characterization of these flaws, their influence on mechanical performance, and the ability to conduct post-processing to repair such flaws are desired. Furthermore, as engineers gain more experience with materials and the effect of defects, it is reasonable that thresholds of allowable flaw size will change, likely increasing allowable flaw sizes due to the conservative approaches employed in the absence of knowledge.

The goal of this topic area is to quantify the effect of defects on the mechanical performance of additively manufactured material. Evaluation of material properties that are sensitive to statistical extremes is of particular interest, as well as the evaluation of real flaws rather than having to make assumptions about the relevance of intentionally induced flaws, such as CAD-embedded voids. Characterizing the extent to which specific post-processing approaches, such as Hot Isostatic Pressing, improve mechanical performance is also relevant to this topic area.

Proposals must not exceed \$1.0M in federal funding*

TOPIC AREA 3
Emerging Process Technology for Low Criticality Part Families

AM is being implemented across the Department of Defense (DoD) and industrial base for a wide variety of applications. While direct part replacement of flight or mission-critical components may eventually result in significant cost and lead time reductions and improved mission capability, there are many other insertion points for AM of lower criticality that may impact the operation of legacy systems. There remain significant opportunities to address current sustainment needs for non-structural and in some cases, non-critical parts replacement, such as, but not limited to, unique electrical connectors, ducting, manifolds, instrumentation knobs, wiring harnesses, small brackets, etc., using low-cost AM alternatives compared to the relatively high-quality powder-bed fusion and DED processes.

The goal of this topic is to evaluate the ability of emerging AM processing and AM technologies to supply low criticality components that satisfactorily fulfill the required part function. Additionally, Air Force Research Laboratory (AFRL) seeks to assess the degree to which the demonstrated solutions extend to part families of similar size, shape, criticality, and function.

Proposals must not exceed \$600K in federal funding*

**NCDMM anticipates multiple awards, up to the available funding. Proposing teams are required to provide minimum cost share of 50% of the federal funding request. AFRL reserves the right to select multiple awards or no awards in each topic area.*



WEBINAR

America Makes will convene a Project Call Kick-off Webinar on **Friday, December 1, 2017**, to review all of the criteria. Immediately following the conclusion of the Webinar, there will be a brief Q&A session.

PROJECT CALL PROPOSAL PROCESS

Once again America Makes will utilize a Two-Step Project Call Process:



STEP 1 (PROJECT CONCEPT)

Proposers are required to first fill out a Project Concept form, summarizing their team's high-level technical approach and technology transition requirements. Proposal teams have four (4) weeks to prepare the Project Concept form, which is due on **Wednesday, January 3, 2018**.



Proposers do not have to be an America Makes member to submit a Project Concept form. Selections will be made by January 17, 2018.



STEP 2 (PROJECT PROPOSAL)

America Makes will review all submitted Project Concept forms and proceed with a down-select process.

America Makes will be in communication with all submission teams to notify them whether or not they will be proceeding to the full Proposal step. No detailed feedback will be provided at that time.



In the Proposal step, project teams will develop a full proposal as in previous project calls. Proposal teams will have approximately five weeks to submit their full proposals to America Makes, which are due on **Friday, February 23, 2018**. Selections will be made by March 21, 2018.

ELIGIBILITY

To be eligible for the America Makes Project Call, a lead proposer must be an America Makes member **TWO WEEKS** prior to the full Proposal submission deadline.

Information on how to join America Makes is available at americamakes.us/membership

Participants of the lead proposer's team may be made up of America Makes members and non-members.

SCHEDULE & DEADLINES

Questions from Proposers	December 15, 2017
Responses to questions <i>(All questions and responses will be shared on www.americamakes.us)</i>	December 19, 2017
Fully Executed NDA with NCDMM <i>(if proposal contains proprietary information)</i>	December 22, 2017
Project Concept Submission	January 3, 2018
Anticipated Notification (Step 1)	January 17, 2018
Full Project Proposal Submission	February 23, 2018
Anticipated Notification (Step 2)	March 21, 2018
ALL funded projects under contract	June 1, 2018



ABOUT MAMLS

The goal of the MAMLS program is to enhance and improve U.S. Air Force sustainment operations through the development, demonstration, and transition of Advanced Manufacturing.

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