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DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Metal Additive Manufacturing Powder Consortium

AGENCY: National Institute of Standards and Technology, Department of Commerce.

ACTION: Notice of Research Consortium.

SUMMARY: The National Institute of Standards and Technology (NIST), an agency of the United States Department of Commerce, in support of efforts to develop standards for metal powders used in additive manufacturing (AM), is establishing the Metal Additive Manufacturing Powder Consortium ("Consortium"). The Consortium will bring together stakeholders to identify and address pre-competitive measurement science and standards needs related to metal powders used in various AM technologies. The Consortium efforts are intended to develop measurement solutions and standards to improve measurement confidence, establish measurement traceability, and enable comparability in the measurements to quantify the performance of metal powders in AM applications. Participants will be required to sign a Cooperative Research and Development Agreement (CRADA). At NIST's discretion, entities which are not permitted to enter into CRADAs pursuant to law or other governmental constraint may be allowed to participate in the Consortium pursuant to a separate non-CRADA agreement.

DATES: The Consortium's activities will commence on July 1, 2023 (“Commencement Date”). NIST will accept letters of interest to participate in this Consortium on an ongoing basis.

ADDRESSES: Completed letters of interest or requests for additional information about the Consortium can be directed via mail to the Consortium Manager, Dr. Shawn Moylan, Intelligent Systems Division of NIST's Engineering Laboratory, 100 Bureau Drive, Mail Stop 8220, Gaithersburg, Maryland 20899, or via electronic mail to AMPowderConsortium@nist.gov, or by telephone at (301) 975-4352.

FOR FURTHER INFORMATION CONTACT: J’aime Maynard, TPO Agreements Officer, National Institute of Standards and Technology's Technology Partnerships Office, by mail to 100 Bureau Drive, Mail Stop 2200, Gaithersburg, Maryland 20899, by electronic mail to Jaime.maynard@nist.gov.

SUPPLEMENTARY INFORMATION: The Metal Additive Manufacturing Powder (MAMP) Consortium is focused on pre-competitive measurement science and standards research for metal powder feedstocks used in additive manufacturing (AM). Laser powder bed fusion and powder-blown directed energy deposition are of particular interest, and other AM methods utilizing metal powder may also be considered. MAMP research findings will broadly benefit the AM community, with more direct benefit to metal powder manufacturers, manufacturers of powder measurement tools, original AM equipment manufacturers, academic researchers focused on metal powders, standards development organizations addressing AM, as well as Federal and state agencies seeking to advance AM for their missions and applications. All MAMP research findings will be considered for development of new standards and modifications to existing standards under development at NIST and in other accredited standards development organizations.

The Consortium will address industrial needs over a broad range of topics, as guided by the Consortium Steering Committee, including:

(1) characterization of powder (e.g., size, shape, chemistry, surface roughness, rheology, flow, packing density)

(2) defining effective powder use in the AM applications being considered and scientifically correlating it with powder characterization results

(3) quantitative experimental and theoretical comparisons between various size/shape measurement techniques

(4) quantitative experimental and theoretical comparisons between various powder mixing/flow/spreading/packing measurements

(5) correlation of bulk powder properties to spreading and blowing processes

(6) correlation of spreading processes to powder packing and laser absorption

(7) optimization of powder attributes, based on quantitative and relevant powder characterization techniques, for improved AM processes

(8) optimized powder reuse and re-conditioning practices through deeper, more fundamental understanding of powder feedstock changes during AM processes.

(9) rapid qualification of new and re-conditioned powder sources through identification and characterization of critical powder attributes

Measurements may include: 2D and 3D powder shape and size measurement, powder rheology, helium pycnometry, surface area, thermal flash, high-speed imaging of powder processes, X-ray photoelectron spectroscopy, scanning electron microscopy, X-ray diffraction, laser absorption.

The NIST AM Metrology Testbed (AMMT), Powder Spreading Testbed (PST) and other AM platforms at NIST as well as various simulation tools, including discrete element method, will be used to support the Consortium's research efforts.

No proprietary information will be shared as part of the Consortium.

Participation Process:

NIST is soliciting responses from all sources, including other Federal Government agencies, State or local governments, foreign government agencies, industrial organizations (including corporations, partnerships, and limited partnerships, and industrial development organizations), public and private foundations, and nonprofit organizations (including universities). Eligibility will be determined by NIST based on the information provided by prospective participants in response to this notice. NIST will evaluate the submitted responses from prospective participants to determine eligibility to participate in this Consortium. Prospective participants should provide letters of interest with the following information to NIST's Consortium Manager:

(1) A description of their experience in metals-based additive manufacturing and related expertise to contribute to the Consortium.

(2) List of interested party's anticipated participants.

Letters of interest must not include business proprietary information. NIST will not treat any information provided in response to this notice as proprietary information. NIST will notify each organization of its eligibility. In order to participate in this Consortium, each eligible organization must sign a CRADA for this Consortium. Entities which are not permitted to enter into CRADAs pursuant to law or other governmental constraint may be allowed to participate in the Consortium, at NIST's discretion, pursuant to separate non-CRADA agreements with terms that may differ, as necessary, from the Consortium CRADA terms.

Participants will contribute US $25,000 in funds or equivalent in-kind contributions to be members of the Consortium. NIST does not guarantee participation in the Consortium to any organization submitting a letter of interest. This phase of the Consortium will be for up to five years.

Authority: 15 U.S.C. 3710a.

Alicia Chambers,
NIST Executive Secretariat.
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