

**NCDMM Request for Proposal 22-156
AMNOW Polymer Challenge Project Call
Phase 1**

April 13, 2022

National Center for Defense Manufacturing and Machining (NCDMM) is accepting proposals to demonstrate the applicability of artificial intelligence and data analytics to Material Extrusion. The purpose of this project is to leverage analytics to correlate material and process input data to material property data.

The National Center for Defense Manufacturing and Machining (NCDMM) through their AMNOW Program seeks to apply artificial intelligence and data analytics to a data set of Additive Manufacturing (AM) Material Extrusion digital thread data to discover anomalies and trends in Material Extruded parts. These data sets encompass at least 30 parts made from PETG with the Material Extrusion process, and associated pressure analysis, collected across two (2) Prusa i3 MK3 machines.

NCDMM is utilizing a two-phase approach to this analytical effort.

- Phase 1: Utilize manufacturing data from two sets of builds, the first of which will contain known good parts or “control builds” and the second will contain a mixture of good parts and parts with intentional anomalies introduced. The objective is to identify the “anomalous parts” by analyzing the provided manufacturing data sets.
- Phase 2: The second phase contains additional post-build test data relating to the introduced anomaly. The objective of Phase 2 is to determine the severity of the anomalies on a scale of 0-100 (slight to catastrophic failure).

Up to five (5) project agreements will be available in Phase 1. Upon completion of the Phase 1 effort, some or all will be selected to proceed to Phase 2. An evaluation panel of AM and polymer experts will review the proposals, hear the presentations, and make selection recommendations to NCDMM. Note: Phase 2 does not require a formal proposal submission; the Phase 1 final report briefing will serve the same purpose.

Important Dates

April 22, 2022	Questions related to project scope or approach are due to AMNOW@NCDMM.ORG
April 25, 2022	All questions and responses will be published on AMERICAMAKES.US
April 29, 2022	Full proposal submission due (NO concept papers)
May 4, 2022	Oral team presentations to Evaluation Team
May 6, 2022	Phase 1 Awardees notified
May 11, 2022	Project Agreements issued

Under this Challenge, the Project Agreement Holder (PAH) is to:

- a) Download data files from the AMNOW Polymer Challenge SharePoint, interview AM Builder (CSU), then, using analytics, link and correlate data associated with build and post processing data files.
- b) Compare and contrast data to identify trends, anomalies and/or insights. Develop an algorithm(s) to predict key results (such as pressure for a failure).
- c) Produce report of findings.

Project Definition and Scope

The project description and scope are contained within the applicable AMNOW Statement of Work (ASOW) and associated documents. Detailed part definition and data files will be provided via a SharePoint made available after award.

Proposal Format

Technical – Contained in 15-minute Presentation for the Evaluation Board

- Addressing ASOW-156
- Draft execution plan and schedule
- Overview of approach and proposed software or tools, including description of off-the-shelf or proprietary tools
- What they plan to demonstrate
- Computing approach and projected computing needs

Programmatic

- Participating organizations
- Identification of single person from team to access SharePoint and download data
- Willingness to present results at an America Makes or NCDMM sponsored event in 2022

Cost – Not Required

- **Phase 1 award will be for \$10k**
- **Phase 2 award will be for \$10k**

Proposed Delivery Schedule

Line Item	SOW Reference	Title of Deliverable	Data Rights	Due Date
1	4.1.2	Kickoff Meeting	Limited	5/13/2022
2	4.6.1	Submit Preliminary Summary Report of Phase 1 Findings	Unlimited	6/24/2022
3	4.6.2	Presentation of Phase 1 Findings to Evaluation Board	Unlimited	6/24/2022
4	4.8.1	Submit Final Summary Report Including Phase 2 Findings	Unlimited	7/25/2022
5	4.8.2	Presentation of Phase 2 Findings to Evaluation Board	Unlimited	7/25/2022
6	4.8.3	Presentation of Final Findings at America Makes Event	Unlimited	Week of 8/15/22

Proposal Evaluation Criteria

- Approach for Addressing ASOW-156 Including: – 40%
 - Correlation of Machine and Sensor Data
 - Identification of Process Anomalies
 - Correlation of Phase 1 and Phase 2 Data
 - Identification of Anomaly Location
- Draft Execution Plan and Schedule - 5%
- Proposed software or tools, including description of off-the-shelf or proprietary tools
 - Uniqueness – 15%
 - Description Details – 15%
 - Computing Efficiency – 15%
- Experience they have working with material extrusion, artificial intelligence, and data analytics – 10%

Proposal Submission Deadlines

All proposals in response to this RFP are due no later than NOON EST, April 29, 2022. NO EXTENSIONS IN PROPOSAL DUE DATE WILL BE APPROVED.

Proposals received after the required due date and time will not be evaluated or considered for award.

Each bidder must submit their proposal to AMNOW@ncdmm.org.

We look forward to working with you to accomplish our goal of supporting the Warfighter.

Gene D. Berkebile
Vice President and CFO