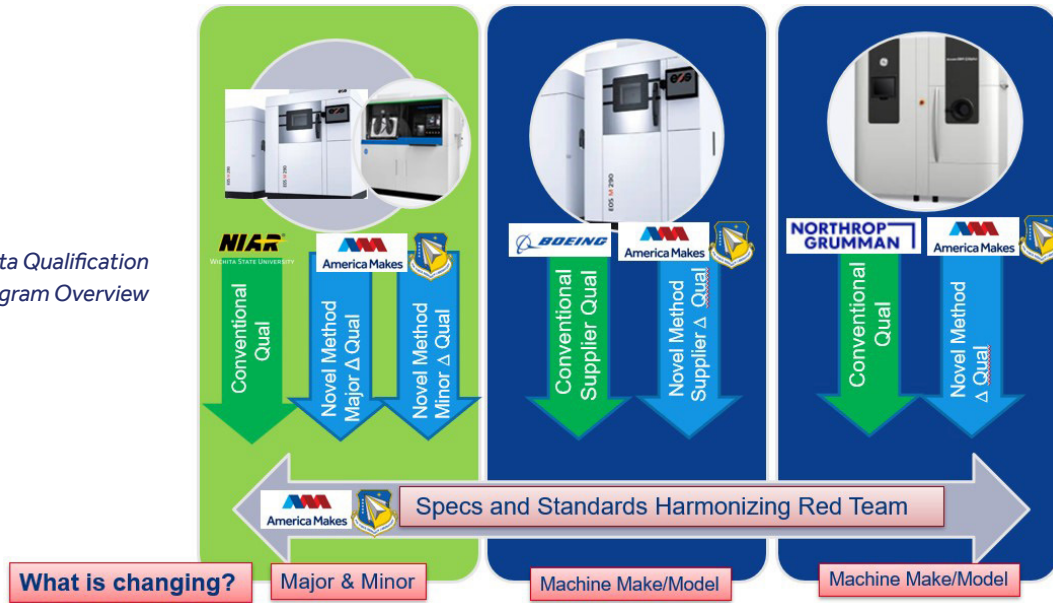


Delta Qual Innovation

Delta Qualification Program Overview



PROBLEM

Qualification of additive manufacturing (AM) machines and materials is a major barrier to the broad adoption of AM. Generating the requisite data and models requires significant resources to produce statistically significant data, which requires generating test coupons under a controlled process and performing testing and analysis of the resulting data. These processes are then “frozen” with no changes to key process variables allowed. There is no standards-based guidance for what is required when a change to the process is needed. This greatly inhibits the agility of AM processes to respond to changes in the technology or supply base and allows only one path to implement change to a qualified process — a total requalification, which may cost more than \$3M per machine/material combination and take several years.

OBJECTIVE

The objective of this project is to employ technical teams to demonstrate a single change to a selected baseline process by employing advanced numerical, analytical, and experimental methodologies to accelerate process change and reduce the cost of doing so. The goal is to achieve at least the equivalent performance of the baseline material.



AMERICA MAKES
TECHNOLOGY
DEVELOPMENT
ROADMAP

This project aligns to:



PROCESS

ASTM PROCESS
CATEGORY
Powder Bed Fusion

EQUIPMENT
N/A

MATERIAL
N/A

TECHNICAL APPROACH

The project will use the following technical approach:

- The Boeing Company and Northrop Grumman will define the technical requirements of re-qualifications.
- The Joint Metals AM Database Definition (JMADD) project and/or the Rapid Sustainment Offices Technical Orders for the Ti6V4Al powder bed AM materials will be leveraged for baseline qualification.
- Multiple technical teams will be selected via a project call to conduct Major and Minor Delta Qualification Demonstrations.
 - Major and Minor Delta Qualifications are defined by complexity of change and associated level of effort.
- A Red Team will be leveraged throughout the project to:
 - Serve as subject matter experts to collect AM standards and map how Standards Organizations can improve language for updating AM process qualification.
 - Evaluate the efforts of the technical teams conducting the Major and Minor Delta Qualifications.
 - Collect and leverage lessons learned and success stories from the technical teams to provide recommendations and inputs to Standards Organizations with the goal of modifying the AM standards.

PROJECT START DATE

March 2023

EXPECTED END DATE

September 2025

EXPECTED DELIVERABLES

- Final Report

FUNDING

\$8,349,795 total project budget

(\$6,000,000 in public funding/\$2,349,795 in private funding)

PROJECT PARTICIPANTS

Project Principal:

The Boeing Company
Northrop Grumman Corporation

Other Project Participants:

NCDMM/America Makes
The Barnes Global Advisors
RTX Corporation
Honeywell
EOS
Senvol

Public Participants:

U.S. Department of Defense