NIST SME Workshop
Panel 2 Discussion
LSI Challenges

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AM Supplier Qualification
Additive Manufacturing Process Basics

Processing

- Raw Material
  - Alloy Chemistry
- AM Process

Microstructure

Post Processing

Properties and Performance

Control = Quality + Consistency
Additive Manufacturing Process Basics

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Additive Manufacturing Process Basics

Control = Quality + Consistency

- SDO's
- Properties and Performance
- Qualification/Certification
- Regulatory

AM Process and Material Standards

Raw Material + AM Process = Post Processing
Additive Manufacturing Process Basics

Control = Quality + Consistency

- SDO’s
- Regulatory
- Current Gap
- Qualification/Certification
- Entry into Service

AM Process and Material Standards

Properties and Performance

Processing
- Raw Material
- AM Process

Microstructure
- Post Processing
AM Supply Chain Challenges Today

- Limited ‘qualified’ AM parts supplier base
- Limited understanding of ‘qualification’ requirements
  - Part, Material, Supplier, Equipment, Operator
  - IQ, OQ, PQ (materials and parts)
- Cost of developing and qualifying AM suppliers
- Supplier Oversite (auditing and certification)

Supply chain is developing. Qualification and oversite need to develop with it.
AM Supplier Qualification Today

- AS9100
- Customer supplier qualification (general quality system requirements)
- Customer AM process site qualification (site audit by process)
- AM material qualification (by machine serial number and material spec)
- AM part qualification (by part serial number)
- Periodic special process audit (site accreditation renewal)

This is very OEM-specific, i.e., does not transfer. Cost and effort are significant.
AM Supplier Qualification Today – Timeline and Cost

• AS9100 = up to supplier
• Customer supplier qualification = 12-18 months = $
• Customer special process qualification = 6-12 months = $
• AM material qualification = 12-18 months, $$
• AM part qualification = 6-12 months = $$$
• Periodic special process audit = 3-6 months, every 1-3 yrs = $

Up to several years to qualify a supplier and first part number.
AM Supplier Qualification – Future (for discussion)

- AM Ecosystem
- Qualification pre-work
  - AS9100 or similar accreditation
  - Nadcap or similar accreditation for AM special processes
  - AM baseline material pre-qualification (common database)
  - AM representative part pre-qualification (representative part geometry)
  - Periodic special process audit (Nadcap)
- Supplier completes prework to establish process and demonstrate capability, then approaches OEMs.
- Would still need OEM-specific qualification but at significantly reduced effort.

50-80% of qualification effort would not be OEM-specific and would be transferable.
Thank You