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Keynote Address – Overcoming Barriers to Qualification and Certification in Advanced Manufacturing

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MITRE Advanced Manufacturing Trust Showcase

To accelerate the adoption and industrialization of additive manufacturing.

Certification & Qualification in AM

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- Many Regulatory Bodies and Certifying Agencies Have Detailed Definitions
- All Engineered Products are Certified and Qualified to Some Extent
- My Basic Definitions
  - Certification – A Component That Meets Design Intent is Fit for Service in a System
  - Qualification – A Component Meets Design Intent, Including the Supplier, Machine, and Processing
- Common Approach for Critical and Seemingly Mundane Applications
  - Certification – Jack Lincoln Aircraft Structural Integrity Framework
  - Qualification – Supplier, Machine/Process (OQ), Part (PQ), Lot Acceptance

Barriers to Part Qualification & Certification

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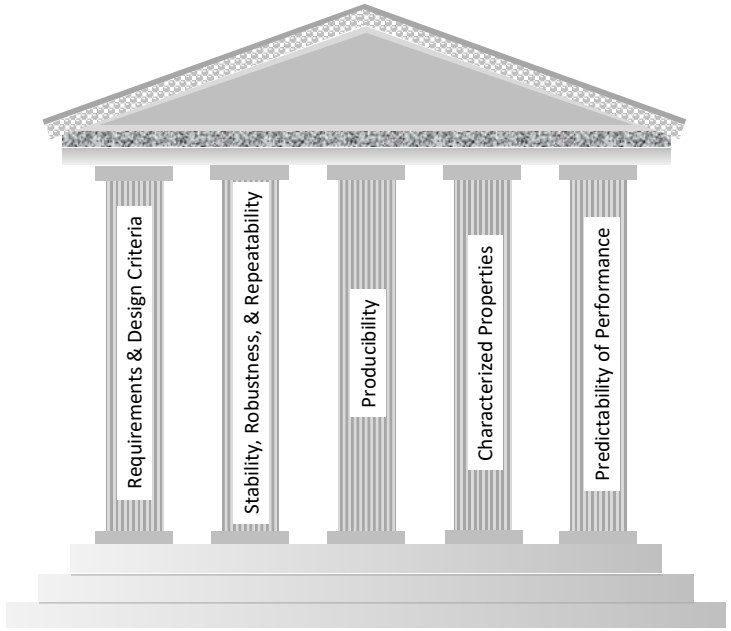
- Will Part Meet Service & Production Requirements?
  - Environment, Loads, Frequency
  - Cost & Yield
- How do I Convince Myself and Others That Parts Will Repeatedly Meet Production & Service Requirements?
  - Material and Process Development
  - Part / Product Development
  - Integration with System Certification Methodology
- Will Parts Arrive on Time?



AFRL (88ABW-2016-1012)

Keys to Overcoming Barriers

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- Having a Compelling Case to Use Advanced Manufacturing
- Understanding Product and Part Requirements
  - True versus Assumed versus Free Requirements
  - Part versus Material & Process Requirements
  - Consistent Approach to Determining Requirements are Being Met
- Understanding Capabilities and Limitations of Material & Process
  - Unique versus Same Geometry
  - Process Robustness
- Integrated Development, Design, and Testing
  - Determine End State for Advanced Manufacturing
    - Single or Multiple Applications
    - Short-Run versus Continuing Production
  - All Work Prepares for the End Goal
  - Consider Downstream Processes from the Beginning

Working Together to Overcome Barriers

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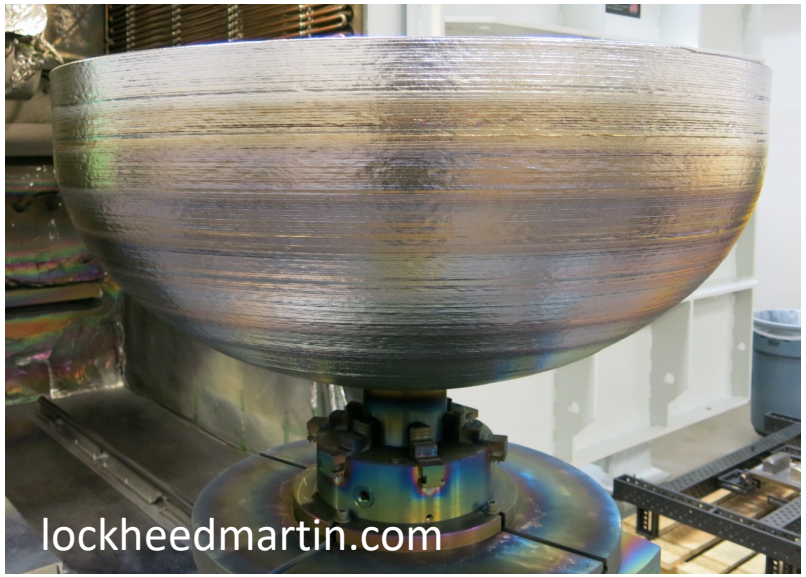
- Consistent Approach & Definitions for a Given Industry Segment (e.g. AIAA / SAE AMSAM) – Robust Processes Strengthen Supply Chains by Establishing What is Acceptable and Why
- Development of Public Specifications and Datasets (Distribution Statement C, When Possible)
- Development of Public (or Distribution C) Examples of Certification and Qualification for Advanced Manufacturing



Biography

Kevin T. Slattery, D.Sc is a Principal ADDvisor® at The Barnes Global Advisors. His primary expertise is in Metallic Additive and Metals Manufacturing, focusing on test program development, process and product verification, qualification, and certification. He is a 2020 Ambassador for America Makes and was part of the Materials Challenge Silver Medal team in the USAF Rapid Sustainment Office Additive Manufacturing Olympics. He was previously the Chief Scientist for AM and Metals in Boeing Research and Technology leading a multi-skilled team to deliver the technology throughout the company. He was a Division Chief Engineer in Boeing's Military Sustainment group from 2012 to 2015. Prior to that, he led the implementation of the first metal AM structural aircraft components. Additionally, he has 6 other first in the industry technology implementations. He currently holds 39 US patents, with 13 applications pending.

Thank you!

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