



# **Qualification of Metals and Other Materials**

**SAMS**  
**1 May 2019**

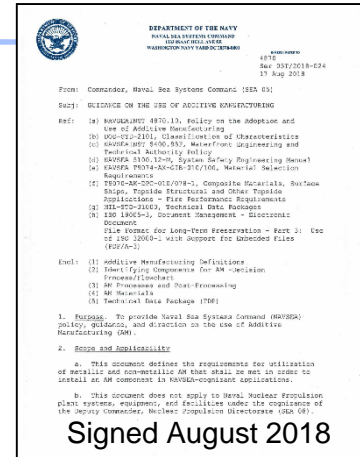
Dr. Justin Rettaliata  
Additive Manufacturing Technical Warrant Holder

- Develop & align engineering and acquisition competency and expertise to:
  - Ensure AM ship and weapon system components are safe, reliable and effective
  - Leverage AM as another manufacturing technique ‘in the tool box’
    - Grow AM knowledge base through investment and collaboration
    - Push AM capabilities and authorities to waterfront (depots and shipyards), afloat, etc.
  - Employ AM in maintenance & repair
  - Expand the current use of AM for rapid design development, prototyping & tooling
  - Identify S&T/R&D investment to enable AM capabilities for the NAVSEA enterprise
  - Connect AM digital backbone application with cybersecurity strategy
- Work with Directorates and PEOs to identify areas for application that improve capability and/or reduce cost
- Establish processes, specifications and standards for use of AM for ship design, acquisition, maintenance, and operational support
- Coordinate & collaborate with NAVAIR and other SYSCOMs
- Leverage NR&DE and NSYs/RMCs

Operationalize AM in support of the Fleet where it makes sense

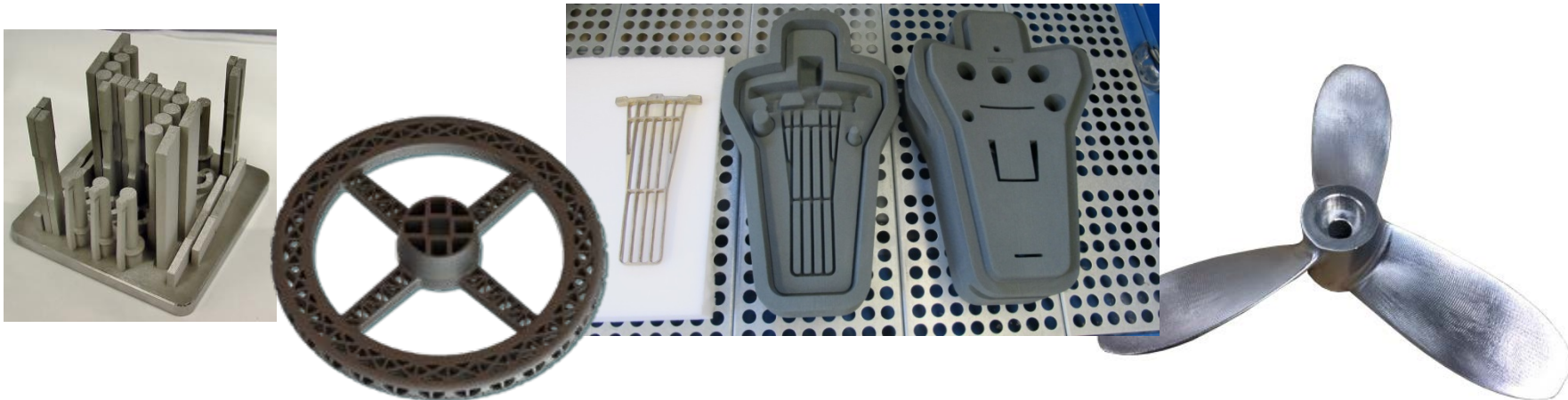
# AM Approval/Guidance/Information

- NAVSEA AM Guidance (Ser 05T/2018-024):
  - Decision/Approval Process
  - Definitions
  - AM Process
  - AM Materials (including Fire/Smoke/Toxicity limitations for polymer)
  - Technical Data Package Requirements
  
- Does:
  - Requirements for shipboard components
  - Submittal/approval process for AM components installed shipboard (**NAVSEA\_AM@navy.mil**)
  - Applicable for all vessels
    - EXCEPTION: No AM Polymer material is permitted on a submarine w/o NAVSEA approval (off gassing of material needs further investigation)
  - Fire/Smoke/Toxicity compliant polymer materials
  - Requirements for incorporation of polymer materials shipboard
  - Metallic material requirements/considerations
  
- Does NOT:
  - Apply to Naval Nuclear Propulsion plant systems, equipment and facilities under cognizance of Naval Reactors (SEA08)
  - Apply to Strategic Weapons Systems and Attach Weapons Systems under cognizance of Strategic Systems Programs
  - Provide guidance for AM equipment installation shipboard



# Spec/Standard Development

- Specifications, Standards, and Technical Publications related to Additive Manufacturing Processes
  - Powder Bed Fusion Specification (NAVSEA Technical Publication)
  - Development of Directed Energy Deposition Specification (NAVSEA Technical Publication) completed by end of FY19
  - Requirements for indirect AM applications (casting molds, etc.)
- Leverage Standard Development Organizations to understand industry requirements for these processes





- Afloat R&D:
  - Outfit a limited number of platforms/hulls with AM Equipment
  - Establish networking requirements and means to transfer digital files securely
  - Identify ship modifications
  - Assess performance of equipment and materials in non-static, non-laboratory environments
- Equipment Installation Challenges:
  - Networking of equipment/alternative IT approvals to allow stand alone
  - Electrical requirements for industrial equipment
  - Space configuration and shock mounting
- Other Metrics and Outcomes:
  - Identify the ‘use case’ for the equipment
  - Define workforce development requirements (bottom up vs. top down)
  - Fleet establish requirement for equipment, and ID/prioritize platforms/hulls to receive equipment
- Equipment Installation Path Forward
  - Current: AM equipment installed shipboard **MUST** be via a Ship Change Document (SCD)
  - Future: Establish “green box” for AM equipment, identifying requirements for desktop printers (power, etc.), installation requirements (mounting, etc.) **and IT and Infrastructure requirements (computers, networking, etc.)**



# Questions?

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