America Makes & ANSI Additive Manufacturing Standardization Collaborative (AMSC)
Roadmap v3 Working Group (WG) Architecture (updated 5/31/23)

Working Groups

The AMSC has established working groups (WGs) to update the standardization roadmap. Participation in the AMSC is open to additive manufacturing stakeholders that have operations in the United States. Participants may sign up for one or more WGs. *Italics* indicate new topics for version 3. Italics indicate new or substantially revised for v3.

SIGN UP FOR WORKING GROUPS HERE

Working Group	Topics for Discussion	
WG1 – Design **Co-Chairs:** • John Schmelzle, Ph.D., NAWC Lakehurst Additive Manufacturing and Model Based Definition Lead, NAVAIR Primary Staff Support: Christine Bernat **Recurring Calls:** 1st and 3rd Wednesdays @ 12-1:30 pm Eastern **Next Call(s):** Jun 7 @ 12-1:30 pm Eastern Jun 21 @ 12-1:30 pm Eastern	**Introduction** **Design guides** **Design tools** **Design for specific applications** - Design for as-built assemblies - Design for printed electronics - Design for medical	**Design documentation** **Design verification and validation** **Design for anti-counterfeiting**
WG2 – Precursor Materials **Co-Chairs:** • Tyler LeBrun, Ph.D., Additive Manufacturing Lead, Sandia National Labs • Vipin N. Tondare, Ph.D., Physicist, National Institute of Standards and Technology (NIST) Primary Staff Support: Jim McCabe **Recurring Calls:** 2nd & 4th Mondays @ 3-4:30 pm Eastern **Next Call(s):** Jun 12 @ 3-4:30 pm Eastern Jun 26 @ 3-4:30 pm Eastern	**Introduction** **Storage, handling and transportation** - Environmental conditions: effects on materials **Characterization of powders** - Chemical composition - Flowability - Spreadability - Density (apparent vs. tapped) - Particle size and particle size distribution - Particle morphology - *Feedstock sampling* - Hollow particles and hollow particles with entrapped gas - *Metal powder specifications for procurement activities in support of AM*	***Precursor Material Handling: Use, Reuse, Mixing, and Recycling Feedstock*** - *Terminology Related to Reuse of Feedstock Materials* **Characterization of material extrusion feedstock (filaments & pellets)** - Chemical composition - Geometry - Melt flow - Moisture content - Thermal stability **Characterization of liquid feedstock** - Chemical composition - Viscosity - Feedstock sampling
WG3 – Process Control *(includes NDE for process monitoring)* **Co-Chairs:** • Shane Collins, Senior Associate Consultant, Wohlers Associates, powered by ASTM • Scott Gold, Ph.D., Principal Engineer, GE Aviation	**Introduction** **Digital format and digital system control** **Machine calibration and preventative maintenance** ***Machine qualification*** ***Parameter control*** **Adverse machine environmental conditions: Effect on component quality**	**Precursor material flow monitoring** **Environmental health and safety: Protection of machine operators** **Configuration management** **In-Process monitoring** **Anti-counterfeiting**

Primary Staff Support: Jim McCabe **Recurring Calls:** 1st and 3rd Tuesdays @ 3-4:30 pm Eastern (next calls vary from schedule) **Next Call(s):** Jun 6 @ 3-4:30 pm Eastern Jun 20 @ 3-4:30 pm Eastern	***Stratification*** ***Powder Blending and Powder Mixing*** ***Terminology***	
WG4 – Post-processing **Co-Chairs:** • Jason Fox, Ph.D., National Institute of Standards and Technology (NIST) • Jing Zhang, Ph.D., Associate Professor, Indiana University - Purdue University Indianapolis Primary Staff Support: Jim McCabe **Recurring Calls:** 1st & 3rd Thursdays @ 12-1:30 pm Eastern **Next Call(s):** Jun 1 @ 12-1:30 pm Eastern Jun 15 @ 12-1:30 pm Eastern	**Introduction** **Heat treatment** (metals, polymers) **Hot isostatic pressing (HIP)** (metals, *ceramics*) **Surface texture** (surface finish) (metals, polymers, *ceramics*) **Machining** (metals, polymers) **Post curing methods** (polymers) ***Environmental Health and Safety (EHS) Hazards of Post-Processing***	
WG5 – Finished Material Properties **Co-Chairs:** • Doug Hall, MMPDS Program Manager, Battelle Memorial Institute • Rachael Andrulonis, Director of Advanced Materials Research, National Institute for Aviation Research, Wichita State University Primary Staff Support: Jim McCabe **Recurring Calls:** 1st and 3rd Fridays @ 12-1:30 pm Eastern **Next Call(s):** Jun 2 @ 12-1:30 pm Eastern Jun 16 @ 12-1:30 pm Eastern	**Introduction** - *Finished Material Properties Terminology* **Material Properties** - *Specification Content Requirements* - *Metals* - *Non-metals* - *Test Methods (metals and non-metals)*	**Component Testing** **Bio-compatibility of Medical AM Parts** ***Removal of AM Feedstock from Medical AM Parts*** **Chemistry** ***Material Allowables*** **Microstructure** ***AM Defect Structures***
WG6 – Qualification & Certification **Co-Chairs:** • Alison Park, Deputy Tech Fellow of Materials and AM, NASA NESC • Michael Gorelik, Ph.D., Chief Scientist, F&DT, FAA Primary Staff Support: Jim McCabe **Recurring Calls:** 1st and 3rd Wednesdays @ 2–3:30 pm Eastern **Next Call(s):** Jun 7 @ 2–3:30 pm Eastern Jun 21 @ 2–3:30 pm Eastern	***Introduction*** - *Q&C Terminology* ***Q&C Framework: Prescriptive vs Performance-based*** ***Identified Guidance Documents*** - *Too many to list* - *New ones include AIA Recommended Guidance for Certification of AM Component* ***User Group/Industry Perspectives on Q&C*** - Aerospace ▪ *Spaceflight* ▪ *Civil Aviation* - Defense - *Electronics & Electrical Products*	*User-Group Write-Ups (Aspirational)* ***Intent and motivation of each Q&C guidance and standard documents*** ***Description of prescriptive versus performance-based aspects of Q&C*** ***Summary of framework requirements*** - *Materials* - *Process/Procedures* - *Machine/Equipment* - *Part/Devices* - *Part Performance* - *Personnel/Suppliers*

Medical Section: Jun 9 @ 1–2:30 pm Eastern Jun 23 @ 1–2:30 pm Eastern	- *Energy* ▪ *Oil & Natural Gas* ▪ *Nuclear* - *Medical* ***Conclusions***	- *Framework for Enabling AM Suppliers* - *Requirements Integration* - *Quality Assurance* ***Summary of gaps identified*** **abbreviated outline*
WG7 – Nondestructive Evaluation (of Finished Parts) **Co-Chairs:** • Patrick Howard, Consulting Engineer, GE Aviation • Jess Waller, Ph.D., Professor of Practice, New Mexico State University, Mechanical and Aerospace Engineering Department Primary Staff Support: Christine Bernat **Recurring Calls:** 1st and 3rd Tuesdays @ 10:30 am – 12 pm Eastern **Next Call(s):** Jun 6 @ 10:30 am – 12 pm Eastern Jun 20 @ 10:30 am – 12 pm Eastern	**Introduction (metals)** **Common defects catalog using a common language for AM fabricated parts** **Test methods or best practice guides for NDE of AM parts** **Dimensional metrology of internal features** **Data fusion**	**NDE of polymers and other non-metallic materials** **NDE of counterfeit AM parts** **NDE acceptance criteria for fracture critical AM parts** ***Effect-of-Defect of Technologically Important AM Defects*** ***In-Service NDE***
WG8 – Maintenance and Repair **Co-Chairs:** • Jay S. Keist, Ph.D., Department Head (Acting), Materials Engineering & Evaluation, Applied Research Laboratory, Pennsylvania State University Primary Staff Support: Christine Bernat **Recurring Calls:** 2nd & 4th Tuesdays starting @ 3–4:30 pm Eastern **Next Call(s):** Jun 13 @ 3-4:30 pm Eastern Jun 27 @ 3-4:30 pm Eastern	**Introduction** **Maintenance and sustainment of machines** **Standard repair procedures** **Standard technical inspection processes** **Model-based inspection** **Standards for tracking maintenance operations** **Additive repair**	
WG9 – Data (NEW) **Co-Chairs:** • Paul Witherell, Ph.D., Mechanical Engineer, National Institute of Standards and Technology (NIST) • Yan Lu, Ph.D., Supervisory Industrial Engineer, National Institute of Standards and Technology (NIST) Primary Staff Support: Christine Bernat **Recurring Calls:** 1st and 3rd Mondays @ 1-2:30 pm Eastern **Next Call(s):** Jun 5 @ 1-2:30 pm Eastern Jun 12 @ 1-2:30 pm Eastern Jun 26 @ 1-2:30 pm Eastern	***Introduction*** ***Data Formats and Representation*** ***Data Registration, Fusion, and Visualization (managing data sets)*** ***Data Collection, Extract, Transform and Load (ETL) and Provenance*** ***Data Management Best Practices (top down approach, across AM value chain)*** ***AM Value Chain Usage and Data Management*** ***Data Through Part Development Lifecycle*** ***AM Data Security & IP Protection*** ***AM Data for Models & Machine Learning*** ***Data Architecture Integration & Interoperability*** ***Sector-related Needs***	
