ASTM International

Richard Huff

Director, Industry Consortium & Partnerships

AI FOR MANUFACTURING WORKSHOP

Standards Landscape, Ongoing Activities & Strategy

Current Landscape | **Ongoing Activities** | **Strategy & Roadmap**

May 27–28, 2026 · NIST, Gaithersburg, Maryland

Current Landscape & Ongoing Activities

LANDSCAPE

Current Standards Landscape

- **Key standards relevant to AI in Manufacturing**
  - **F3490-21** Standard Practice for Additive Manufacturing — General Principles — Overview of Data Pedigree
  - **F3560-22** Standard Specification for Additive Manufacturing – Data – Common Exchange Format for Particle Size Analysis by Light Scattering
  - **F3605-23** Standard Guide for Additive Manufacturing of Metals — Data — File Structure for In-Process Monitoring of Powder Bed Fusion (PBF)
  - **ISO/ASTM52953-25** Additive manufacturing for metals — General principles — Registration of data acquired from process monitoring and for quality control
- **Coverage areas**
  - Data & interoperability

ONGOING

Ongoing Activities

- **Active working groups & committees**
  - F42.08 Additive Manufacturing Data
  - F50 Additive Manufacturing for Manufacturing Systems
- Related AI-specific initiatives or task forces
  - Consortium for Materials Data and Standardization (CMDS)

Consortium for Materials Data & Standardization (CMDS)

ADDITIVE MANUFACTURING CENTER OF EXCELLENCE

Research to Standards program initiated to engage with external organizations, in addition to existing AM CoE partners, to standardize the requirements and best practices for generating and managing high-pedigree AM Materials Data.

REQUIREMENTS & BEST PRACTICES

- Terminology, Pedigree, Build & Test Plans, Specimen Geometry
- Identify ***Process-Structure-Property*** Relationships
- ***Equivalency***/Combinability of new and/or existing **Data**

GENERATE HIGH-PEDIGREE DATA

- Consortia-funded R&D projects create ***shared*** high-pedigree "reference" material datasets to drive process-based material specifications
- Build ***trusted data lake*** of new & existing **Data**

DATA – MANAGEMENT & LEARNING

- Secure, Access-controlled Data Management System
- Establish/Follow standard data management principles (e.g., CDD, CDM, CDEF, FAIR*)
- AI/ML/Analytics to transform Data into **Insights and Knowledge**

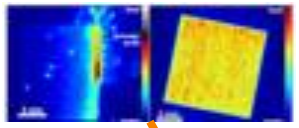
STANDARDS DEVELOPMENT

- Transferring lessons learned and consortium approved materials data to ASTM technical committees to accelerate the development of industry consensus **Standards**

ASTM CMDS – DATA Workstream

ADDITIVE MANUFACTURING CENTER OF EXCELLENCE

In-Situ Monitoring Data
(e.g., thermal gradient, cooling rate)



Heat Treatment Data
(Atmosphere and Thermal Cycles)

Process Control Document

DATA Workflows

Standardize-Optimize-Automate

Machine Data, Process Parameters

DATA CAPTURE, CURRATE AND ANNOTATE

Physical

CDM/CDEF INGESTION

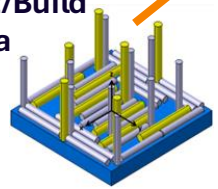
DATA COMMONS PLATFORM

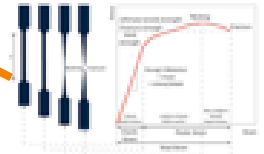
Synthetic

CDM/CDEF LEARNING & BENCHMARKING

TRAIN & RUN AI/ML MODELS

Part/Build Data





Material Test Data

Material Characterization Data

Common Data Dictionary (CDD): Defines terms, but no structure/relationships – good for humans, not machines.
Common Data Model (CDM): Defines logical structure and relationships in a human- and computer-readable format.
Common Data Exchange Formats (CDEF): Defines format for systems to share data, aligned to the CDM in both structure and terms.

Process Control Document

Advancing Standardization for Critical and Emerging Technologies (ASCET)

ASCET
CENTER OF EXCELLENCE

Multi-SDO Engagement: NIST, ASME, ISO, IEEE, IEC, MT Connect

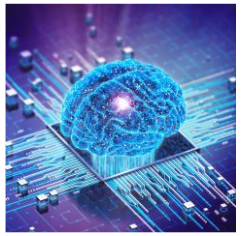
The goal of the ASCET Center of Excellence:

- ASTM and NIST working together to create and maintain a U.S. Center of Excellence to support U.S. engagement in international standardization for critical and emerging technologies (CETs) that are essential to U.S. economic competitiveness and national security.

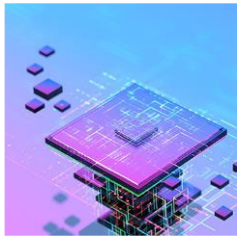
ASCET Center of Excellence will *initially* focus on the following CETs:

1. Artificial Intelligence

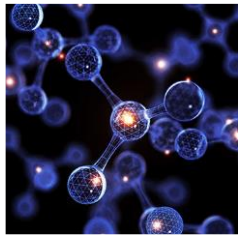
2. Biotechnology



3. Semiconductors & Microelectronics

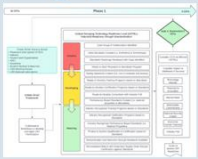


4. Quantum Technology



ASCET will focus on four broad areas:

A Pre-standardization Engagement



Engage and support private sector-driven participation in international standardization

B Information & Data Sharing Hub

Enable real-time insight sharing across CET domains

C Workforce Capacity Building

Develop pipeline of professionals & executives who lead in standardization

D Collaborative Pilot Programs

Pilot programs w/NIST to accelerate development industry-driven standards

ASTM Technical Committee on AI for Manufacturing Systems (F50)

ADDITIVE MANUFACTURING CENTER OF EXCELLENCE

Public Launch: June 3-4, 2026
Dallas, TX

DRAFT SCOPE

The ASTM Technical Committee on Artificial Intelligence in Manufacturing (**F50**) will **develop and maintain international consensus standards**, including test methods, specifications, guides, practices, classifications and terminology related to the design, development, implementation, validation, and governance of **AI technologies within manufacturing environments**.

Scope shall include (but not limited to):

- ✓ Terminology and Taxonomy
- ✓ Data and Model Standards
- ✓ System Integration and Interoperability
- ✓ Performance Metrics and Benchmarking
- ✓ Ethics, Trustworthiness, and Governance
- ✓ Safety and Security
- ✓ Conformance and Testing
- ✓ Education and Workforce
- ✓ Quality of Data

Proposed Committee Structure

Executive | Terminology | Data | Critical Requirements