

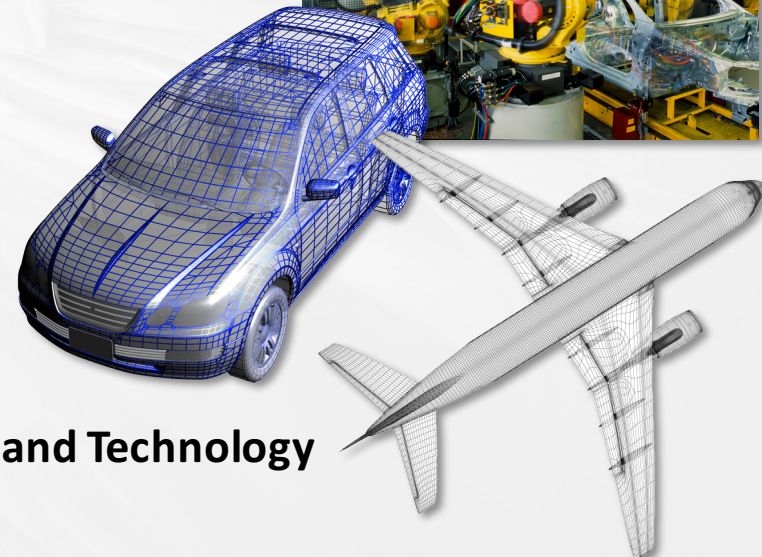


Standards Development for Smart Manufacturing

October 5th, 2016

Panel Session: PHM Standards Experience for Manufacturing
PHM 2016 – 8th Annual Conference of the Prognostics and Health Management Society
Denver, Colorado

Brian A. Weiss, PhD



**Intelligent Systems Division
Engineering Laboratory
National Institute of Standards and Technology
U.S. Department of Commerce**

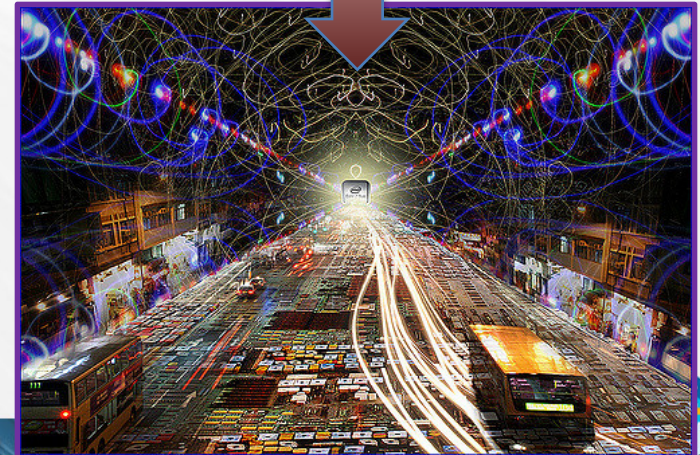
Why am I here?

- *...promote U.S. innovation and competitiveness by advancing measurement science, standards, and technology for engineered systems in ways that enhance economic security and improve quality of life*
- *Carry out mission related activities in...*
 - *Engineering and manufacturing products, processes, equipment, technical data, and standards*
 - *Manufacturing enterprise integration*
 - *Intelligent systems and control*
 - *Robotics and automation*
 - *Cyber-physical systems*



Why Smart Manufacturing?

- Enable manufacturers to...
 - make what you want, where you want it, and when you want it.
 - respond in real time to meet changing demands and conditions
 - easily and rapidly reconfigure factory production and supply networks to optimize system performance
 - deal effectively with uncertainty and abnormal events and learn from past experience to enable continuous improvement
 - maintain seamless interoperability between factory processes and supply networks and between large manufacturers and small manufacturers



Why Standards are Needed?

Data Can Improve Production Control

- Complex system, sub-system, and component interactions/relationships within manufacturing systems make it challenging to determine the specific influences on performance
- Increasing interest and ability to leverage data and analysis to generate actionable intelligence about system interactions/relationships for control
- No uniform process exists that guides sensing, monitoring, and control at all levels from the component to the system to the enterprise
- Non-standard data and processes hamper an organization's ability to identify, collect, analyze, and make informed decisions in a timely and efficient manner.



Manufacturing Standards Focus

- Identify data and information needed to make an informed decision with respect to setting and updating control points
- Define data collection requirements to minimize the collection of "big data."
- Determine appropriate structure, organization, and analysis of data to gain actionable intelligence
- Enable feedback of intelligence through the system to update control for optimal production
- **Expected Impact:** Improved decision-making support and automation with a focus on vendor-neutral approaches and plug-and-play solutions



Examination of Aerospace Standards

- Identification and dissection of product-focused standards that can be leveraged for the process domain
- Rigor and *attention-to-detail* of the aerospace community's PHM-related standards can present lessons learned

TASK at HAND

- *What aerospace standards can serve as a guide for the development of manufacturing process PHM standards?*
- *What specific standards elements are required (as governed by regulatory bodies) v. best practices?*
- *What pitfalls and challenges were experienced in the development, adoption, and acceptance of these standards?*
- *Are guidelines, practices, standards used in aerospace adaptable enough for manufacturing at the enterprise level*



Emerging Manufacturing Standards

Subject Matter Experts Wanted for ASME's Advanced Manufacturing Standards Committee

Based on discussions that took place between numerous stakeholders, including the United States Department of Defense and the National Institute of Standards and Technology, the Board on Standardization and Testing is currently working on a proposal to form a new Standards Committee on Advanced Manufacturing. The new standards committee would look into development of standards that define which data is required in a 3D data set; define how a CAD/CAM 3D model and its associated technical data should be structured; [enable enhancement of maintenance and control strategies within manufacturing operations at the factory-floor](#); and explore other issues as they evolve.

This effort reflects a growing interest among standards development committees to advance new manufacturing technologies and methods. ASME is currently soliciting subject matter experts and affected stakeholders to help support these efforts.

For more information contact [Steven Weinman \(+1.212.591.7002\)](#).

