## **AMMTO Peer Review**

# **Manufacturing Digital Transformation**

### **Smart Manufacturing and Cybersecurity for Manufacturing**

AMMTO Mission: Advance energy-related materials and manufacturing technologies to increase domestic competitiveness and build a clean, decarbonized economy. AMMTO Vision: A competitive U.S. manufacturing sector that accelerates the adoption of innovative material and manufacturing technologies in support of a clean, decarbonized economy. AMMTO Approach: To catalyze, accelerate, and diffuse advances in a broader community, such as through innovation ecosystems.

> Dr. Sudarsan Rachuri AMMTO

Acknowledgements: DOE Team (HQ + Golden) + Contractors + CESMII and CYMANII

## **Digital Transformation Imperative for Manufacturers**



- enables modernization of American workforce new jobs, skilled workforce
- key to building a strong, vibrant, and competitive U.S. Manufacturing
- key to smart manufacturing and enabling cybersecurity for manufacturing & supply chain.
- holds great promise to help improve the safety, productivity, efficiency and sustainability of energy systems<sup>1</sup>.

2 1. INTERNATIONAL ENERGY AGENCY - https://www.iea.org/reports/digitalisation-and-energy

## **Digital Transformation Imperative for Manufacturers**

- Including many crosscutting technologies
  - Convergence of computing, communication, and smart sensors
  - An OS for industrial internet Platform for CPS for manufacturing
  - Standards and Protocols
  - The U.S. economy is digitalizing at an extremely rapid pace and create new jobs and job transition<sup>1,2</sup>.



2. https://www.weforum.org/reports/the-future-of-jobs-report-2020/

3

 <sup>&</sup>lt;u>0\*NET 27.2 Database at 0\*NET Resource Center (onetcenter.org)</u> The Occupational Information Network

### Development of a National Plan for Smart Manufacturing DOE Sponsored Study at the National Academies of Science, Engineering, and Medicine (NASEM)

### 1) Energy Act of 2020: Section 6006

The National Academies of SCIENCES • ENGINEERING • MEDICINE

Workshops convened national experts to inform the National Smart Manufacturing Plan\*

- 1. State of the art smart manufacturing and future directions and needs [Feb. 6, 2023]
- 2. Education, training, and workforce needs for smart manufacturing [Feb. 28, 2023]
- **3. Broader impacts** of smart manufacturing [Mar. 7-8, 2023]

#### https://www.nationalacademies.org/our-work/options-for-a-national-plan-for-smart-manufacturing

#### Key Dates/Targeted Milestones

Winter 2023: NASEM workshops
Spring 2023: NASEM drafts report
Spring 2023: DOE begins internal coordination Summer 2023: DOE begins
drafting plan
August 31, 2023: Public Release of NASEM Smart Manufacturing Report
January 31, 2024: DOE completes the DRAFT version National Plan for
Smart Manufacturing
May 31, 20224 DOE Completes the National Plan

- 2) Bipartisan Infrastructure Law: PART II–Smart Manufacturing: (working closely with MESC)
  - Sec. 40533. Leveraging smart manufacturing infrastructure (High performance computing) at National Laboratories.
  - Sec. 40534. State manufacturing leadership.

## **Digital Transformation of Manufacturing Enterprise System**



U.S. DEPARTMENT OF ENERGY OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY

### **CESMII R&D Projects Portfolio**



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https://www.cesmii.org/projects/ 8/4/2023

### **Digital Transformation – Cybersecurity for Manufacturing**



8/4/2023

### **Digital Transformation- Cybersecurity for Manufacturing**

### Cyber security for manufacturing

- secure automation and control, resilient digital supply network
- Address Cyber vulnerabilities enumeration and disclosures (CWE/CVD) in industrial control systems<sup>1</sup>
- Convergence of Computing, Communication, Sensor Technologies and hyper connectivity
  - Need a strong computing infrastructure Edge, Cloud, and HPC computing
- Close collaborations among AMMTO investments
  - CESMII, CYMANII, and MDF
- Implementing of smart and cyber secure manufacturing requires many types semiconductor chips
  - sensors, edge devices, wireless communication chipsets, 5G, signal processing and image processing chips, AI/ML chips
     <sub>8</sub>

8/4/2023

### **Our Investment in CYMANII and the Approach**



UTSA is a Minority Serving Institution – have opportunity to unlock massive workforce gains in a traditionally underserved population 8/4/2023

# **THANK YOU**