

LEADING THE DIGITAL REVOLUTION TRANSFORMING U.S. MANUFACTURING

MxD (The Digital Manufacturing Institute), a Manufacturing USA® institute, addresses the global competitiveness challenge U.S. manufacturers face from overseas competition by accelerating the development and adoption of digital technology across manufacturing operations to positively impact the way we work.

Manufacturing USA, a public-private partnership with 14 manufacturing institutes across the nation, connects companies, academic institutes, non-profits, and local, state, and federal entities to solve industry-relevant advanced manufacturing challenges in new technology areas with the goals of enhancing industrial competitiveness and economic growth and strengthening national security.



Technology Focus Area

Digital manufacturing and related design technologies connect different parts of the manufacturing life-cycle through data. That information enables organizations to make smarter, more efficient decisions and improve production times. Manufacturing innovations are connected through a digital thread – from retrofitting legacy machines with advanced cybersecurity to the use of digital models and augmented reality for enhanced productivity. MxD provides factories with the digital tools and expertise needed to build things more efficiently, more quickly, and at less cost so that U.S. manufacturers can compete for business and jobs.

Approach to Innovation and Collaboration

MxD brings together partners from universities, industry, startups, and government to solve technology advancement challenges in digital manufacturing that are too complex for any one organization to solve on its own. This is done through:



Shared R&D testbed: shared access to advanced manufacturing equipment, facilities, and technical expertise



Future Factory: a physical and digital manufacturing shop leveraging data and cutting-edge manufacturing tools which is training partner organizations to understand and apply digital manufacturing technologies



Technology roadmaps and projects focused on digital design, product development and systems engineering; cybersecurity in manufacturing; and agile, resilient supply chain



Education and workforce training through online courses, Digital Days programs for students, and a Digital Manufacturing Jobs Taxonomy created in partnership with ManpowerGroup which identified 165 roles in manufacturing that will be created or transformed by the introduction of digital technology

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COLLABORATIVE PROJECT EXAMPLES

“We really like the ability to interact with university researchers and other industry partners to take on challenging questions about how we’re going to implement digital manufacturing going forward. If you look across the country, there are very few other places that we can go where we can really have like-minded thinking in some of the new, emerging technologies that are going to drive a competitive advantage.”

– Craig Sutton, Manager, Advanced Manufacturing and Innovation Strategy, John Deere



CREATION OF THE DIGITAL CAPABILITY CENTER: MxD and McKinsey launched this mock production line to provide hands-on training in next-generation digital manufacturing technology. The center helps organizations benefit from new capabilities and produce new digital manufacturing innovations in operations, design, and productivity. One-day and multi-day workshops are designed for the positions and needs of company participants. Leaders from 50 partner organizations participated in trainings at the center in its first month of operation.

DIGITIZING LEGACY EQUIPMENT FOR EVEN THE SMALLEST MANUFACTURERS:

Manufacturers seeking to digitize their operations often need to use data from expensive legacy manufacturing equipment in new, innovative processes without disrupting production, creating failure points, or voiding equipment warranties. This project, led by the University of Cincinnati with partners including Raytheon, is developing an open source system using computer-vision-enabled cameras to read legacy displays to produce data in the emerging industry-standard format. The software and hardware toolkit is projected to cost under \$1,000 per machine.



CYBERSECURITY ASSESSMENT, TOOLS, AND SOLUTIONS:

To help organizations understand the costs, capabilities, and effectiveness of DoD-required security measures for factory operations, the University of Illinois at Urbana-Champaign, Lockheed Martin, and multiple partners developed the Cyber Secure Dashboard. The dashboard guides organizations, especially small manufacturers, through the process of securing IT systems by providing step-by-step instructions, references, best practices, templates and tools. It provides guidance for adhering to the NIST cybersecurity framework, the DoD-mandated control requirements of the NIST SP 800-171 r1, and the NIST SP 800-53r4 cybersecurity control standard.

“[MxD] is a great center of excellence where companies can come to see the digital thread in action. They can get hands-on experience with the technology and learn about technologies that are delivering solutions today and not four or five years out into the future.”

– Paul Ryznar, Founder, President & CEO, Light Guide Systems