



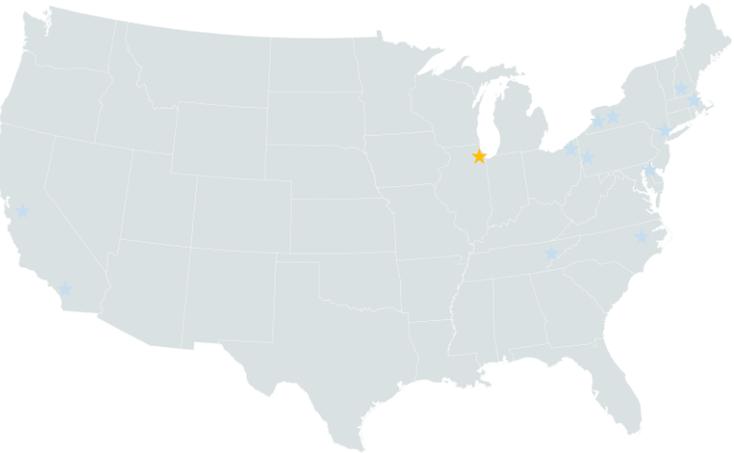
DMDII
+ a UI LABS Collaboration

DMDII FUTURE FACTORY

ACCELERATING PHM TECHNOLOGY ADOPTION THROUGH
ADVANCED RESEARCH AND AGILE TESTBEDS

Tyler Vizek – Project Innovation Engineer, Future Factory Thrust Lead

Manufacturing USA – Spurring the Development of Disruptive Technologies



Biofabrication
Manchester, NH



Advanced Functional Fibers & Fabrics
Boston, MA



Photonics Integrated Circuits
Rochester, NY



Additive Manufacturing
Youngstown, OH



Robotics
Pittsburgh, PA



Chemical Processing
New York, NY



Lightweight Metal Manufacturing
Detroit, MI



Smart Sensors & Process Controllers
Los Angeles, CA



Digital Manufacturing & Design
Chicago, IL



Advanced Composites Manufacturing
Knoxville, TN



Recycling
Rochester, NY



Flexible Hybrid Electronics
San Jose, CA



Biopharmaceuticals
Newark, DE

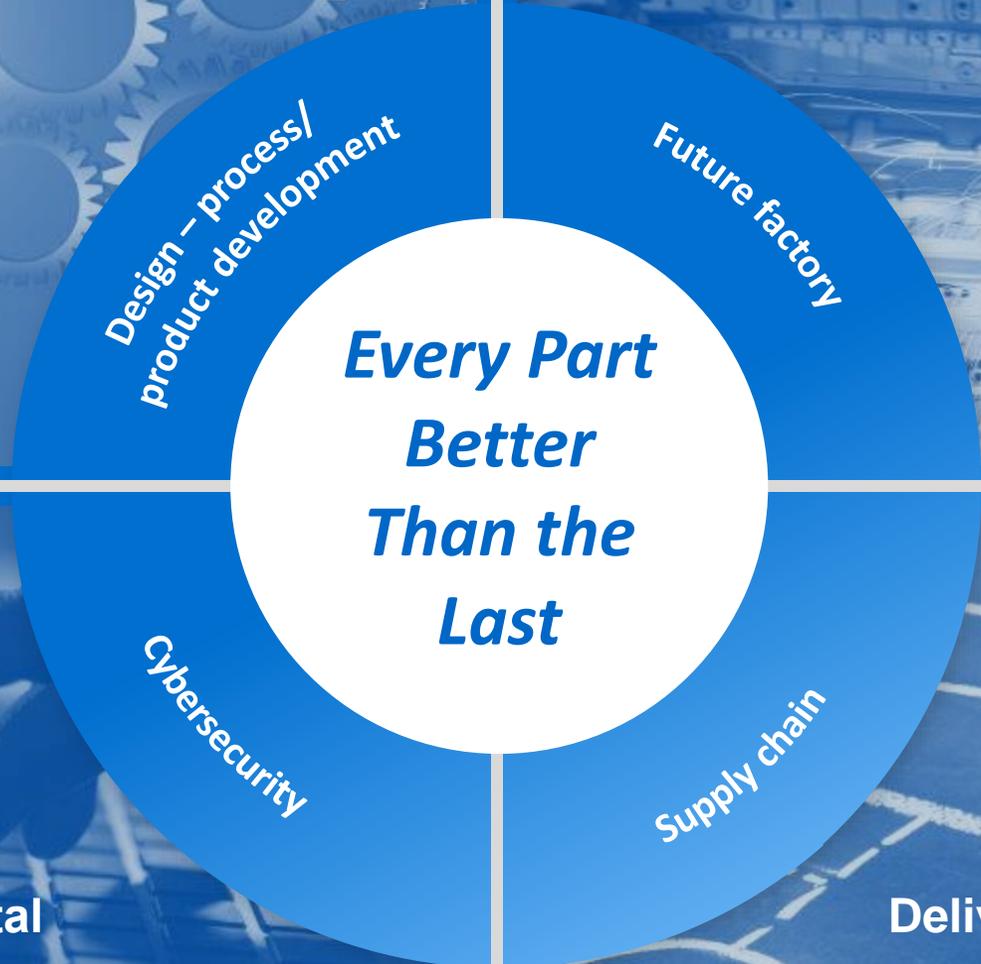


Wide Bandgap Semiconductors
Raleigh, NC



Move Manufacturing to the Left

Integrate, Reduce-to-Practice to Drive ROI



Protect America's Growing Digital Manufacturing Advantage

Deliver Promise of the Digital Thread & Digital Twin

RESEARCH PROJECTS THAT ADVANCE THE STATE OF **PROGNOSTICS AND HEALTH MANAGEMENT** TECHNOLOGY ON THE FACTORY FLOOR:



15-14-09: Bottom-Up Plug-and-Play Hardware/Software Toolkit for Monitoring, Diagnostics and Self-Correction



15-14-01: Cloud Enabled Machines with Data Driven Intelligence



16-04-01: Achieving Smart Factory Through Predictive Dynamic Scheduling

15-14-09: Bottom-Up Plug-and-Play Toolkit for Monitoring, Diagnosis and Self-Correction

National Center for Manufacturing Sciences | Georgia Institute of Technology | Perisense



Industry Challenge

- Legacy platforms are vital to the manufacturing ecosystem but have no digital footprint
- There are few affordable, turnkey solutions that enable flexible data collection and visualization



Project Solution

- Development of a sensor retrofit kit offering that is adaptable to a variety of production use cases
- Development of cloud application that aggregates and analyzes sensor data to inform decision making



Impact for PHM

- Affordable, flexible, plug-and-play retrofit kits that add value in both transparency and predictive maintenance use cases
- Ability to gather a rich pool of production necessary for PHM analytics

15-14-01: Cloud Enabled Machines with Data Driven Intelligence

Pennsylvania State University | GE | Microsoft | Case Western Reserve University | University of Central Florida



Industry Challenge

- Lack of infrastructure to support in-process, remote monitoring, diagnosis, prognosis and self-correction
- Limitations in accessing, synchronizing and processing massive, high-speed data streams



Project Solution

- Development of parallel and distributed machine learning algorithms for online diagnosis and prognosis
- Development of a hybrid cloud prototype that integrates local, private cloud with public HPC cloud



Impact for PHM

- Validated machine learning algorithms for degradation events and predicting remaining useful life
- Scalable, high-performance computing infrastructure for prognostics and health management applications

16-04-01: Achieving Smart Factory through Predictive Dynamic Scheduling

FORCAM | Lockheed Martin | Predictrics | Northeastern University



Industry Challenge

- MES OEE, machine health, and maintenance scheduling information are siloed in disparate systems
- Time-based preventative maintenance without effective equipment health monitoring



Project Solution

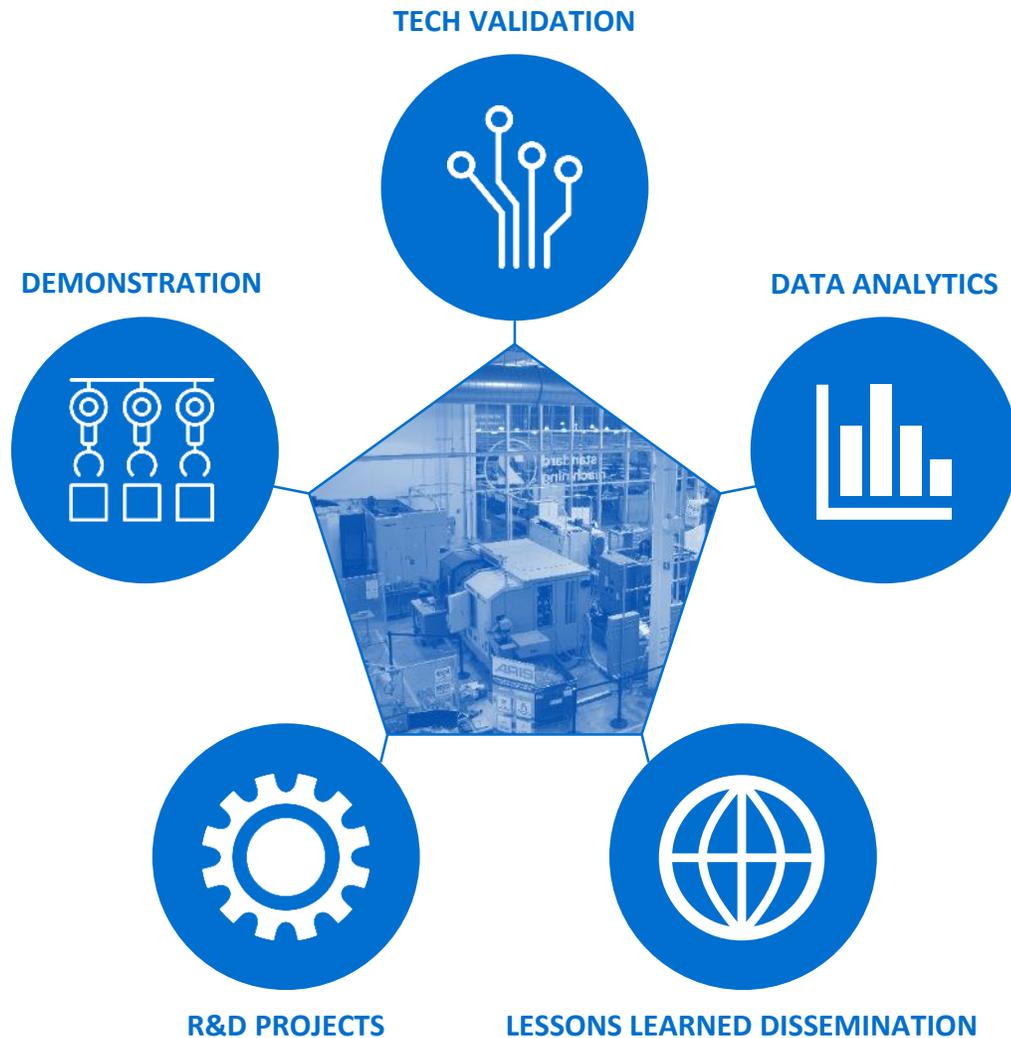
- Unified OEE and machine health dashboard
- Dynamic scheduling module that incorporates production OEE and machine health information to optimize maintenance activities



Impact for PHM

- Aggregation of key manufacturing information into one source of truth
- Dynamic schedule optimizer leverages data to improve uptime, productivity and spare parts management with “just-in-time maintenance”

DMDII TESTBEDS CREATE A SANDBOX ENVIRONMENT FOR EXPERIMENTATION AND VALIDATION OF **PROGNOSTICS AND HEALTH MANAGEMENT** TECHNOLOGY



DISCRETE TESTBED

PREDICTIVE MAINTENANCE FOR MACHINES + AUXILIARY EQUIPMENT IN DISCRETE MANUFACTURING

PROCESS TESTBED

DESIGNING AROUND HIGH VALUE USE CASES FROM PROCESS MANUFACTURING MEMBERS





A vision for US Manufacturing

Every part better than the last



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