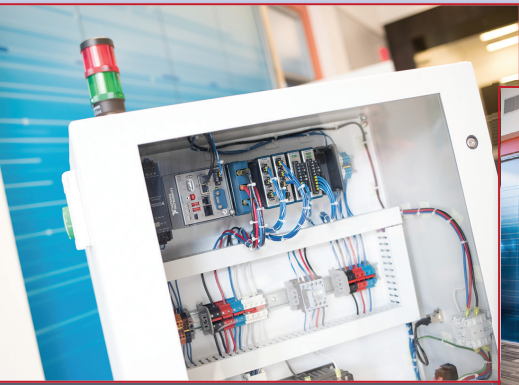# FABS and LABS

NI's Industrial IoT Lab Creates Real World Ecosystems

We hear a lot about the Internet of Things (IoT), a world where "everything" has an IP address and is connected to the cloud. This interconnected web won't happen organically. It will require intense collaboration to establish the technology enablers and failsafe handshakes among a massive number of players: sensors to measure the world, chipsets to process the data, protocols to navigate the networks, security systems to authenticate and verify data and user integrity, spectrum and telecommunications networks to transport the data, data centers to host the applications, and the software that gives it all meaning.

To provide a sandbox where the players in this IoT ecosystem can play and test their pieces of this vast puzzle with other pieces, National Instruments (NI) has established a lab dedicated to the industrial applications of the IoT. Located in Austin, Texas at NI's headquarters, the Industrial IoT (IIoT) lab aims to connect the companies working on the operational and information technology pieces, helping them to learn what they need to know and don't yet know. A lab where companies collaborate fosters interoperability. Companies with expertise in communications protocols, controller hardware, I/O components, processing elements and software platforms can work together to ensure their respective pieces, joined together, create an end-to-end solution. Participants can test these solutions to identify and resolve the challenges of real-world applications. This engaged development process will speed release to the market and adoption by industry.

Initially, the IIoT lab is focusing the collaboration on microgrid control and communication, advanced control for manufacturing and asset monitoring for heavy equipment.

A microgrid is a small electric power system, often with renewable energy sources, that can operate stand-alone yet is usually connected to the main power grid. The lab has a microgrid demonstrator developed by the Industrial Internet Consortium (IIC) that supports testing various approaches for monitoring and controlling microgrids and evaluating interoperability among suppliers and protocol standards.

A second IIC testbed addresses flexible manufacturing that requires time-sensitive networking (TSN). The time sensitivity usually reflects manufacturing process or machine control, where the IoT application is part of a closed loop. Low network latency and jitter are key to maintaining process control and the quality of the output. This IIC testbed currently integrates IoT components from more than 12 companies and is supporting the development of TSN requirements that will be added to the Ethernet standards.

The asset monitoring testbed helps companies use IoT technologies to monitor the operational performance of expensive assets, ensuring consistent performance and timely maintenance — avoiding unexpected, expensive and time-consuming failures and repairs. The asset monitoring demo comprises a pump and motor that uses data acquisition, software analytics and edge computing to monitor the health of the system.

The benefits of collaborating to create an end-to-end IoT environment seem pretty clear, judging by the companies that are sponsoring NI's Industrial IoT Lab: Analog Devices, Avnu Alliance, Calnex, Cisco, Hewlett Packard Enterprise, Industrial Internet Consortium, Intel, Kalypso, OPC Foundation, OSIsoft, PTC, Real-Time Innovations, SparkCognition, Semikron, Viewpoint Systems and Xilinx. By participating in various demonstrations, these companies are sharing experiences and expertise that will lead to more innovative IoT solutions and speed adoption by industry.

www.ni.com/iiot-lab