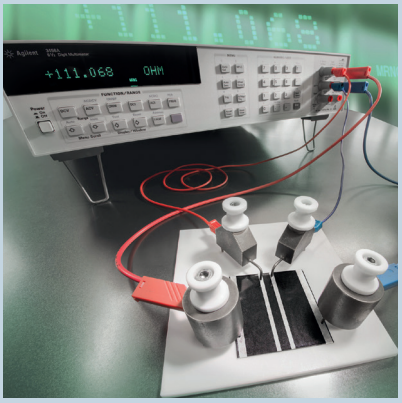

IOT

Composite manufacturing: Internet of Things pushes the envelope of production efficiencies

Leading aerospace companies are now deploying advanced control and measurement applications that leverage the benefits of the Internet of Things (IoT). To make the IoT useful, one must turn the data into knowledge, and then move up to context-aware optimized decision-making.

By

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The Internet of Things (IoT) is defined as the technology of connecting devices, systems and services that goes beyond machine-to-machine communications. But while this technology is now setting footprints in various sectors like healthcare, transportation and energy, it has become a necessity for survival and competitiveness in the aerospace and composite component manufacturing industries.

The goal of leading aerospace manufacturers to increase quality, productivity and traceability becomes especially challenging since building an aircraft requires collecting hundreds of thousands of data points throughout the process. While economies of scale are expected to reduce the unit cost with the increase in production volume, in many cases over time, the opposite result is achieved due to a loss of process control causing an accelerated increase in waste. Research shows that the waste is estimated at hundreds of thousands to millions of dollars per year for a mid-size fabricator.

Bringing the world of IoT to composite parts fabrication

IoT in manufacturing, leveraging RFID and mobility technologies, helps better track and manage materials, kits, tooling, assemblies and staff on the production floor. Combining best-of-class engineering and manufacturing practices and technologies, OEMs and fabricators can further push the productivity envelope, reducing buy-to-fly ratios.

Step 1: Regain control and visibility

RFID technology enables real-time, accurate information on kits and rolls in and out of the freezer and provides alerts. Mobility platforms (tablets, smartphones) and wearable devices replace paper forms, barcode scanners and enable real-time reporting, collaboration

How to

Two steps to implementing IoT:
Step 1: Digital tracking
Step 2: Context-aware optimized decisions

Fig. 1: Automatically tracking inventory and kits on the production floor to further increase productivity and reduce waste

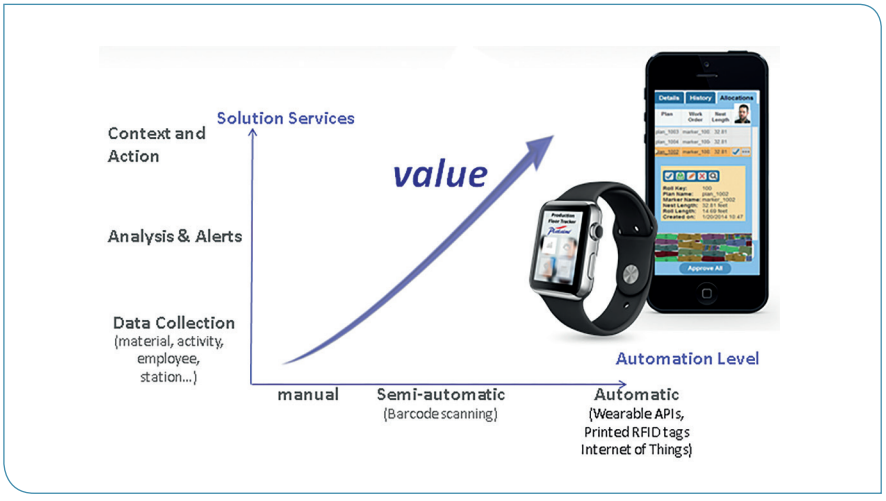

Fig. 2: Higher level of automation increases context awareness and enables optimized actions in real time

and immediate action.
Throughout the production line, assets inherit information from "parent" assets: assemblies inherit data from kits and kits inherit data from materials. In addition, the tracking of tools and stations, reaching total control and visibility, results in a gigantic collection of data points over a variety of timeframes. Being able to only access this data is itself of limited benefit.

Intelligent automation able to detect events, recognize context and act accordingly on the production floor is what is missing in order to take real-time data-driven actions. Some actions, if not taken at the right time, are no longer beneficial and can in some cases result in loss.

Step 2: Make context-aware and real-time data-driven optimized actions by looking at the complete picture

To make the IoT useful, one must leverage the data into analytics and optimized decision-making. While current practices rely on serial decision-making by separate teams using loosely integrated systems, the IoT brings to the production floor an opportunity to practice a holistic approach. A fully integrated total production optimization system bridges the gap between engineering and manufacturing, together with full tracking of assets on the production floor, to create a true, real-time holistic optimized decision framework.

Context-aware decisions that can arise following a holistic approach are: which material to use based on expiration date, ETL (Exposure Time Left) or roll length; Triggering of work orders based on availability of tools; Creation of optimized cut plan and update of roll length according to actual work on the production floor and tool maintenance plan; Purchasing decisions and submission to bids based on real-time data. ■

More information:
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