SUCCESS STORY

COLLECT READINGS FROM HUNDREDS OF HETEROGENEOUS SENSORS

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This Dianomic client is a large defense and technologies company with more than 15,000 employees worldwide. They are a leading manufacturer of unmanned aerial vehicles (UAVs). These UAVs can be remotely piloted from anywhere in the world and are capable of very long duration, high altitude flights while carrying significant payloads. They are widely used by world militaries for intelligence, surveillance and offensive operations as well as by civilian organizations for border enforcement, firefighting and scientific applications.

The key requirement for the project was a data management solution that could collect readings from hundreds of heterogeneous sensors and reliably transmit information to the multiple information systems that require it. To accomplish this, the client selected FogLAMP software supported by Dianomic Systems.

The Need

UAVs are crafted from composite materials in an exacting process that demands high degrees of precision. If any step is executed under improper conditions, the entire aircraft may need to be reworked or even scrapped. The client wants to instrument every aspect of the manufacturing process to ensure that it is performed correctly and efficiently. By doing this, they expect to increase quality while reducing expenses from rework and scrappage.

To completely monitor the production process, the client expects to deploy hundreds of sensors across multiple manufacturing stages. Data from these sensors must be available to personnel on the production floor, to supervisory personnel and for historic review.

The Solution

The key requirement for the project was a data management solution that could collect readings from hundreds of heterogeneous sensors and reliably transmit information to the multiple information systems that require it. To accomplish this, the client selected FogLAMP software supported by Dianomic Systems. FogLAMP is an open, industry-wide solution for monitoring the Internet of Things that collects data from sensors, processes it at the edge and delivers it to data systems or the cloud. The client integrated FogLAMP with their existing OSIsoft PI system to provide central monitoring and historical archiving.

DIANOMIC

Simplify IoT Data

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The initial stage of the project was to monitor the UAV painting process. UAVs are painted with multiple layers of primer and topcoat. These must be applied within strict ranges of temperature and humidity to ensure proper drying and curing. The client instrumented each paint booth with 4 temperature and humidity sensors—one set in each corner. These sensors are attached to A/D converters and then to FogLAMP software running on Advantech Embedded IoT Gateways.

The FogLAMP software converts the sensor readings to JSON format and reliably delivers the data to OSIsoft PI. In addition, FogLAMP connects with local displays at each paint booth to display temperature and humidity information on the factory floor. The display is green/red color coded to alert production personnel when environmental conditions are appropriate to begin the painting process.

With the pilot project complete, the client is now moving towards their vision of complete visibility into the entire production process. FogLAMP's open architecture will enable them to easily integrate the large numbers of varied sensors needed to ensure their operations are highy reliable and productive.

The Results

FogLAMP-based monitoring has enabled the client to optimize the UAV painting process. Production now immediately begins when environmental conditions are met, eliminating the delays caused by manual measurement and communication. Supervisory personnel are alerted when conditions move outside specifications and can immediately rectify the situation. Further, manufacturing engineering now use historical data on temperature to better plan cycle times and to identify cost saving opportunities such as insulation and cooling devices.

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The next stage is to monitor autoclaves as they press and cure composite materials into UAV components. The client wants to review autoclave operations to ensure they have precisely executed the series of temperature/pressure/time stages necessary to eliminate bubbles and create structurally sound components. With the FogLAMP and PI infrastructures already in place, deploying monitoring for this process will be as simple as attaching additional pressure and temperature sensors to the FogLAMP gateways.

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