High Power Wireless Sensing/Monitoring System

APPLICATION

The aerospace industry is a high-technology industry that produces aircraft, guided missiles, space vehicles, aircraft/rocket engines, propulsion units, and related parts. Most of this industry is geared toward government and military use and full auditable traceability is a requirement.

REQUIREMENTS

The aerospace industry deals with high value assets, in many cases the environment that these assemblies are exposed to must be closely monitored in both the production and storage phase. Exposure to extreme humidity or temperature during storage can cause irreparable damage and lead to millions of dollars of losses. Continuous proactive monitoring allows preventative action prior to damage and can provide a full audit trail.

A classic solution has been to attach passive temperature/humidity monitors to inventoried items. These require a regular manual survey of all inventoried items which is both labor intensive, prone to human error and is often reactive to problems that may occur between surveys.

Automated data collection through wireless sensors provide a robust solution. Individual sensor nodes periodically sample the environmental sensors and transmit the data to a receiver that maintains a complete database of all sampled data.

In addition to providing in-situ monitoring, the probe units must be capable of continuous monitoring even when moved from the wireless environment during transportation.

3 MAJOR CHALLENGES

Data Assurance

Data losses can occur at many levels – radio loss, receiver loss, Ethernet connectivity loss or application software failure. Although these types of failures are quickly corrected, the loss of information during the 'down time' could potentially cost millions of dollars, especially relevant if there is a mandated data collection requirement subject to audits.

A wireless solution must provide confirmation to the transmitter that the data has been correctly received, with automatic retransmission as required. Data logging at every potential failure point allows recovery of information when the system is restored.

Data Security

Cyber security is a key concern to all industries but is especially critical to aerospace and military suppliers. Although the "environmental" data may not be of critical interest, the inferred information regarding quantities, dates and material movement may be extremely sensitive.

Power Management

Wireless product power management is always a concern, especially in terms of battery life. Adaptive transmission rates

based on the measured data exceeding specified thresholds and local data logging that allows burst transmission and post event review of data can mitigate.

OMEGA'S SOLUTION

Data Assurance is the most important feature of the ZW series, which includes acknowledged transmissions and automatic retransmission ensuring that whatever data is transmitted is actually received.

ZW-ED

To ensure data is NEVER lost it must be recorded at every possible point of failure with a mechanism to recover lost data. The ZW product employs Smart Sense technology that records up to 1800 samples at the point of measurement, again at the point of measurement collection (transmitter) and finally at the receiver prior to transferring the data to the Ethernet.

System integrity is continually monitored, detecting the loss of probe data or transmitter. An email client can be used to notify remote operators in case of alarm conditions or system failure.

The ZW series provides Data Security through encrypted (SSL) connections for both data security and network access security. ZW products provide this type of the security email/data to those modern email and cloud servers (i.e.: Gmail, Bing etc.).

ZW-REC
(High Power Wireless Receiver):
http://www.omega.com/pptst/ZW-REC.html

Other key features include Power Management - allowing application specific optimization of resources based on real time events; Data Traceability - time stamped data samples, data logging at all potential failure points and uniquely identified smart sense probes; Feature Customization – powerful embedded function block allows user defined data scaling, unit conversion, complex data conversions and OEM custom opportunities.

ZW-REC

Secure Ethernet gateway/coordinator supports up to 128 End Devices. Embedded web pages provides configuration, data display and data charting with no external software. USB version optional.

ZW-ED

Universal End Device transmitter with integral Smart Sense technology supports wide range of probes or discrete analog / digital transducer inputs with time stamped logging of up to 1800 data points. Internal Function Block processor allows user defined power management, logging rates, burst transmissions, alarming and local control functions. Multi-channel input supports up to four sensor readings thru mix of digital and discrete signal inputs.

ZW-HH

Hand held Smart Sense device with integral Temperature, Humidity and Barometric pressure. Connects wirelessly, thru USB or may operate as stand-alone data logger for up to 1800 samples.

ZW-CM

Wall mounted Smart Sense enabled Temperature, Humidity, Barometric pressure and Light suitable for commercial applications.

Dashboard

Windows based server software that allows integrating all Internet accessible OMEGA Ethernet capable devices including ZW-REC into a local ‘cloud server’.

DIGITAL PROBES

zTP, zTHP, zBTHP

Legacy digital probes offing mix of Temperature, Humidity and Barometric pressure.

BTH-SP

Smart Sense digital Temperature, Humidity and Barometric pressure with internal data logging of up to 1800 data points.

BTHL-SP

Smart Sense digital Temperature, Humidity, Barometric pressure and ambient Light with internal data logging of up to 1800 points.

ZW-USB

Compact USB adaptor and transportation carrier providing power to Smart Sense probes for continuous monitoring when physically remote from ZW wireless network.