Integrating Wireless Systems and Rotorcraft HUMS
Microstrain wireless sensing and data acquisition system application

THE PROBLEM: How do you deploy Health and Usage Management Systems (HUMS) in rotorcraft?

There are a lot of moving parts, all of them under stress from varying loads. You can put sensors in place, but how do you get data? Traditional hardwired solutions become complex very quickly, with added slip rings and hardware that has to be adapted for use with rotating parts. Installation complexity and expense can be prohibitive.

THE SOLUTION: MicroStrain wireless to the rescue!

Microstrain's Wireless Sensor Network enables bi-directional communication with the rotorcraft management system. The ability to monitor multiple sensors allows for a broader data set. Data collection can be event triggered, during specific flight regimes, and/or both. Data collection and storage can be in a centralized location.

SG-Link-RGD-LXRS

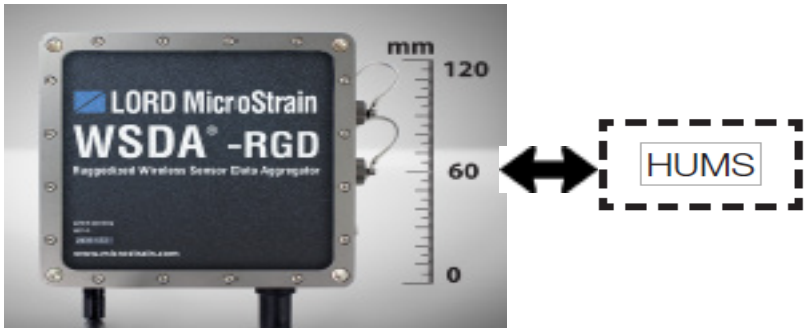
Wireless Analog Input Sensor Node

·Four input channels + triaxial accelerometer

·Strain sensor signal conditioning

·Custom sample rates up to 4096 Hz

·MIL-STD-461F



WSDA-RGD

Ruggedized Wireless Sensor Data Aggregator

·± 32 microsecond node-to-node synchronization

·Up to 2km line-of-sight range

·MIL-STD-810F (environmental) and MIL-STD-461E (EMI/RFI)

Parker

ENGINEERING YOUR SUCCESS

MicroStrain LXRS® Protocol

MicroStrain's proprietary Lossless Extended Range Synchronized (LXRS®) wireless protocol is a 2.4GHz, IEEE 802.15.4-compliant communication architecture combining microsecond time-synchronization with a scalable star network. User-controllable sampling rates are automatically coordinated over thousands of wireless sensor nodes, all with 100% reliable data throughput under most operating conditions.

Real world application:

Integrating a MicroStrain Wireless Sensor Network with a Goodrich IVHMU

Because the interior of a rotorcraft airframe is considered a harsh RF environment, it is not hospitable for certain communication models required for HUMS monitoring. MicroStrain's proprietary LXRS technology, however, is able to overcome this challenge and successfully record, transmit, and store the relevant data.

When integrated with a Goodrich IVHMU (with a 10/100 Base-T Ethernet interface and operating on a static IP network via TCP or UDP packets), the MicroStrain Wireless Sensor Network (WSN) collected data with a success rate of more than 99.99%. Of the almost two million packets of data sent during the verification test, only ten were dropped.

In addition the WSN, acting as a network coordinator and data conduit, queried the Goodrich IVHMU for weight-on-wheels status. When the IVHMU indicated airborne status, the WSN and IVHMU synchronized, beginning a sampling session; when the IVHMU indicated touchdown, the WSN ceased sampling and entered sleep mode. This significantly increases battery life for the WSN, saving power which would otherwise be consumed while collecting unnecessary data.

Further, the WSN is able to successfully synchronize multiple nodes to within ±32 microseconds, giving the user a robust and comprehensive WSN for health and usage monitoring.

Note: MicroStrain developed software specifically to integrate its WSN with the Goodrich IMHVU. Software solutions are available for other manufacturers' HUMS. Please contact our Sales and Support Staff for more information.

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