LogiLube and Winergy Collaborate to Test SmartGear™ Platform

Proof of concept for LogiLube oil condition monitoring and data analytics platform to be validated on a special 1.5 MW Winergy gearbox at NREL.

LARAMIE, WYOMING, USA, February 8, 2018 /EINPresswire.com/ -- LogiLube and Flender Corporation have signed a collaboration agreement to test the SmartGear™ condition monitoring technology platform on a Winergy gearbox for a GE 1.5 MW wind turbine. The proof of concept tests are taking place at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in Golden, Colorado where Winergy has installed a gearbox specifically instrumented with measurement equipment to evaluate advanced drivetrain technologies under a 12-month Cooperative Research and Development Agreement (CRADA).

Comprised of Internet of Things (IoT) enabled sensors, real-time oil condition monitoring, oil sampling and analysis, edge computing and data analytics, as well as cyber-security features, "SmartGear™ is an advanced sensor suite that will provide the team critical information about the operating environment of the gearbox lubricant," says Jon Keller, the Project Leader for the CRADA.

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Under real operational conditions, the test will validate the SmartGear™ platform's capability to provide in-line, real-time oil condition monitoring for wind turbine systems. The automated in-service oil sample collection process is coupled with LogiLube's SmartLab™ mobile application comprising a full suite of tracking and reporting tools. Both, Winergy and LogiLube expect that the central processing of dozens of parameters by the onboard mounted edge-processor will allow real-time analysis and reporting without interrupting run-time of the turbine. Particle count and size, water contamination, oil viscosity and the presence of aerated (foamed) oil are but a few of the critical parameters monitored in real-time by the SmartGear™ system. Proprietary algorithms are edge processed and the results are transmitted wirelessly every

30 seconds to a secure client accessible web-based dashboard, providing actionable intelligence.

Gearbox lube oil samples are autonomously collected while the turbine is in full operating mode and are tracked and protected with end-to-end chain-of-custody providing a data log from 'edge-to-lab-to-cloud'. LogiLube's SmartLab™ smartphone app ensures the physical oil sample is matched with raw wind turbine operational data that is uncorrupted, thereby lowering the risk of human error and providing unparalleled data integrity. SmartGear™ has the ability to monitor fluid samples for particles (ferrous and non-ferrous) of as small as 4 microns in size, which is approximately 10X smaller than conventional wind industry oil monitoring solutions today. Twenty times smaller than the diameter of a human hair, detection of 4 micron particles gives wind turbine operators the ability to monitor wear particle behavior in real time. Coupling the real-time capability of SmartGear™ with the physical oil sample analysis of SmartLab™ will provide the corroborating evidence to support a data-driven O&M response.

"Having access to the data provided by this technology will significantly increase availability. The method of measuring continuously key oil condition parameters and verifying them through oil samples is unique in the industry" says Edwin Hidding, Head of Digital Gearbox at Winergy. The autonomously filled sample bottle containing gear lube oil is representative of in-service oil harvested while the gearbox is in operation. Water contamination, metal wear particles, dirt, debris and oil additives are therefore homogeneously mixed within the physical oil sample. Throughout the 12-month CRADA, NREL researchers will climb the tower of the GE 1.5 MW wind turbine to collect the used oil sample bottles every 2 weeks. The resulting oil analysis reports will be coupled with 100 million data points of real-time gearbox operational and oil quality data reported by the SmartOil™ system every 30 seconds and accessible via a secure web dashboard.

Additionally, LogiLube will be using their SmartData™ platform and remote app servers to analyze the real-time data from the NREL test. The calibration and preliminary testing on the Winergy gearbox appears to indicate that the operational intelligence developed by the SmartGear™ platform is capable of providing actionable insight to make informed predictive maintenance decisions. Dynamic changes of wear particles (4µm, 6µm, 14µm and 21µm) have been observed in real-time as the gearbox is subjected to increased loads and RPM. The SmartOil™ platform not only plots the particle counts on the web-dashboard, but reports out an ISO 4406 cleanliness code for the operator to reference in real-time. Should the particle count, absolute value, as well as rate of change, exceed a pre-set threshold, a SMS text message and email is automatically generated and sent to appropriate personnel for further action. A proprietary algorithm that discerns air bubbles (foam, aeration) from ferrous wear particles is edge-processed by the on-board microprocessor to minimize false alarms.

"Asset owners, gearbox manufacturers and wind turbine OEMs have already provided us feedback that the use of fleet-wide operations and performance data to spot condition-based changes which signify potential component failures is a key element to their successful operations," says Bill Gillette, LogiLube founder and CEO. He continued by indicating that, "SmartGear™ is the singular solution which can provide all of the industry stakeholders, from OEMs to insurance carriers, with visibility and certainty to the performance data that is critical for predictive maintenance of wind turbine gearboxes. The U.S. wind fleet is available 94% of the time. Every 1% increase in availability is equivalent to an extra 2.4TWh of generation." The cyber-security features will also be validated through the use of the company's one-way air gap unidirectional gateway technology as an integral part of the SmartGear™ ecosystem. This SmartSecurity™ feature safeguards monitored assets and sensitive corporate data to guarantee that both are protected against typical IoT vulnerabilities and hacking.

LogiLube and Winergy will present results of the project at the upcoming American Wind Energy Association Windpower Conference in May, 2018.

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