Pacific Northwest NATIONAL LABORATORY

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Battelle Number(s):

12241-E, 12898-B

Patent(s) Issued

Available for licensing in all fields

U.S. DEPARTMENT OF ENERGY

Available Technologies

Machine Diagnostics via Wireless Networks

SUMMARY

This is a system and method for diagnosing and predicting the operating condition of vehicles and other types of machines using a wireless network. The system is made up of one or more wireless sensors that form a network with one or more sensor interrogators, data concentrators, or processing nodes, and a way to communicate the information generated by the sensors with an operator or automated monitor. Parameters that can be monitored, analyzed and communicated by the system include temperature, pressure, vibration, fluid quality, and many others. The information can be used to predict the useful life of the machine, fluids, etc and to establish maintenance schedules. The sensors maybe connected to wireless transponders that transmit the sensor data to data collection devices. The system is particularly useful for situations in which a fleet of vehicles or other types of machines are scattered in remote locations and there is a need to monitor and manage the condition of these machines on a consistent basis from a central location. The technology also includes a computerized system and method for predicting the remaining service life of an operating system, such as an engine or other mechanical component. The method involves computation of various figures of merit (FOM) for the operating system using sensor data. Examples of FOMs include percentage leakage, oil performance loss, bearing performance loss, change in pressure and many others. The computed figures of merit are then trended against one or more independent variables, such as calendar time, system component running time, distance traveled, etc. The trendlines and any uncertainties are then compared to one of more degradation thresholds. The threshold signifies an FOM value at which maintenance is required. The method also includes a predictive capability in which the trend data is used to develop a model that predicts when maintenance will be needed in the future.

Patents & Intellectual Property

- Patent #: 6,662,091
- Patent #: 6,941,202
- Patent #: 7,457,785

Technology Portfolio(s)

- Electronics
- Combination Sensors

Potential Industry Applications

- Aerospace & Defense
- Agriculture & Mining
- Automotive & Transportation
- Oil & Gas

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