



Fluid quality testing using millimeter waves

Background

Fluid (oil, coolant, fuel, etc.) quality assurance, especially with respect to proper engine operation and maintenance (aeronautical and automotive) is very important.

For example, the ability for early detection of contaminants in engine oil may be an indicator of an impending catastrophic failure. This information is critical in the safe operation of airplanes and automobiles. Knowing the actual condition of the fluid would also help companies tailor very specific maintenance procedures to each vehicle's or airplane's needs. This could have effect of lowering overall maintenance costs by performing costly maintenance services only when they are required.

Description of the invention

A method has been developed that enables instantaneous real time monitoring of fluid quality (testing for quality, authenticity, contaminants, viscosity among others). This technology can be used to detect the quality/purity of the fluid circulating through the engine. This technology utilizes a non-contact millimeter wave radar sensor to perform a detailed scan of the fluid and an algorithm to determine if the fluid is within the tolerances specified.

Advantages

This technology allows for monitoring of the fluid properties to be conducted inexpensively and quickly, thereby providing continuous real time information to the engine's management system. For the liquid monitoring, the system can be used as: Spot on, to check quality of sample oil; and Integrated, designed with certain components in engine for example to continuously monitor fluids.

Potential applications

This technology can be used in the following ways:

- To help detect any impurities in a fluid (like metal shavings, a coolant leak into engine oil, or a premature breakdown of the engine oil, etc.)
- To help determine the remaining amount of service life of a fluid before it needs to be changed (i.e. engine, brakes, transmission, gas tank).
- To help detect any possible premature engine/parts failures.
- To help optimize the service maintenance schedule of engines (automotive and aeronautical), compressors, and other industrial applications.

Reference

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US patent pending

Stage of development

Prototype
Ongoing research

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