Department of Defense—U.S. Navy
Naval Research Laboratory (NRL)

LaserNet Fines Optical Debris Monitor

Industry studies show that about 25 percent of U.S. production capacity is inoperative at any given time due to mechanical failure. The consequences of such failures vary from inflated prices, lost productivity, production delays and increased costs, to loss of life and personal tragedy if the equipment that fails is a component of an airplane, helicopter, or other vehicle. Maintaining equipment properly to avoid failure is also time-consuming and expensive. The NRL team has developed a system that can automatically detect mechanical defects.

The LaserNet Fines (LNF) Optical Debris Monitor is a broadly applicable, optically based system that automatically detects and identifies faults or incipient failure in mechanical systems due to excess wear, and detects contamination in hydraulic and fuel systems. The monitor determines the size distributions of debris particles in lubricating systems and classifies the particles according to the mechanical process responsible for their production. The LNF also identifies contaminants in hydraulic and fuel systems from external sources such as sand, fiber, and water.

The NRL team transferred the technology by entering into a licensing agreement with Lockheed Martin, which in turn entered into an agreement with Spectro Inc. for marketing and distributing the monitor. In addition, the LNF system is already deployed onboard ships to improve the Navy's condition-based maintenance programs.

The LNF will benefit numerous industries, including railroad and trucking, electric power generation, construction, commercial shipping, commercial airlines, mining, and offshore oil drilling. Use of the LNF results in the improved safety, reliability, and availability of a wide range of mechanical equipment, accompanied by substantially reduced maintenance costs in terms of both personnel and operations. Additionally, safety is increased by substantially reducing failures that occur during operation, which lowers liability costs.