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Multipoint Fiber Optic Sensor Network for Detection of Oxygen Leaks in Aircraft Fuel Tanks and Cryogenic Fuel Tanks and Pipeline Delivery Systems

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Redondo Optics Inc. (ROI) in collaboration with Aviation Safety Facilitators (ASF) is in the process of developing an all optical fiber sensor for the closed-loop-control monitoring of the inert atmosphere environment inside the fuel tanks of military and commercial aircraft, or for fuel leak detection from the cryogenic tanks of high altitude rockets. The all-optical atmosphere environment control sensor is a passive optical sensor device with no electrical connections leading to the install sensors in the fuel tanks of an aircraft. An array of multiple sensors is deployed at multiple locations within the fuel tanks of an aircraft, and a remote multi-channel optoelectronic system is used to monitor the status of all the sensors in real time. The deployed sensors are connected to the optoelectronic system via a fiber optic conduit. The all optical sensor consist of an integrated multi-parameter fiber optic sensor probe that integrates a fluorescence based optical oxygen optrode with built-in temperature and pressure optical sensors within the same probe for compensation of temperature and pressure variants induced in the fluorescence response of the oxygen optrode. ROI has developed a multichannel frequency-domain fiber optic sensor read-out (FOxSense™) system capable of monitoring the optical signal of all three sensors in real-time and displaying the status of the sensor in a user friendly display suitable for aircraft status and alarm applications. ROI is in the process of developing a multiplex system using the FOxSense™ technology for monitoring an array of atmosphere environment sensors at multiple locations within all the fuel tanks of an aircraft.

Ключевые слова:

Содержание.

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