

Sensors

Coherence Multiplexing of Wireless Surface Acoustic Wave (SAW) Sensors

Wireless, passive, and durable SAW gas sensors in a multi-sensor network

The Coherence Multiplexing of Wireless Surface Acoustic Wave Sensors is an integrated multi-sensor network, which is used to quickly identify gaseous leaks in extreme environments. The sensor network was developed with the University of Central Florida for usage in ground systems, spaceflight, and space exploration. The NASA component present is the innovation to the sensors multiplexing ability, which has improved the quality of data transmission by reducing data degradation, while increasing the number of sensors that can exist within the same network.

BENEFITS

- Operation in harsh environments: -270°C to 1000°C and radiation up to 400MRads
- Rapid response: < 1 s to detect and < 2 min to return to normal
- Precise leak location reporting
- Secure transceiver-sensor communication
- Signal loss minimized by 30-60dB
- Increased bandwidth, more efficient for longer distances
- Communication with multiple sensors simultaneously without degradation of performance

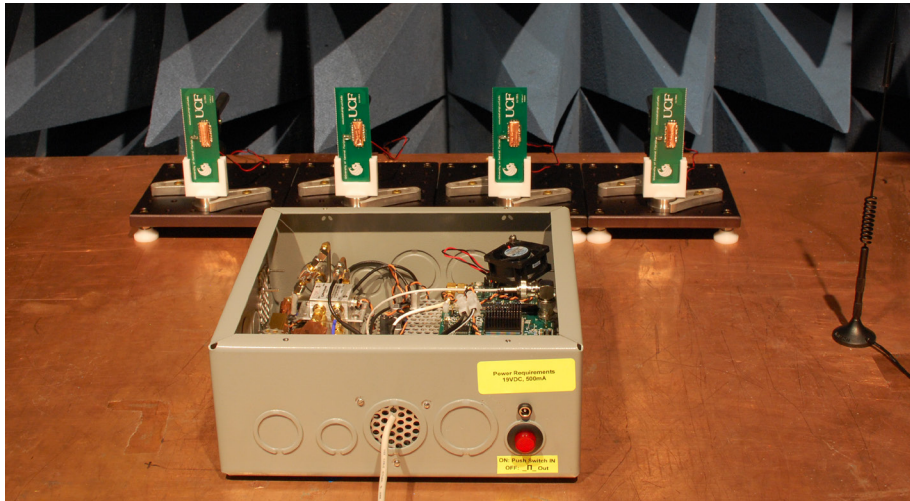
technology solution

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THE TECHNOLOGY

The sensor technology detects gaseous leaks by utilizing its chemical sensing film that is located on a piezoelectric substrate, which wirelessly transmits the data collected through pairs of antennas located on the sensor. The multiplexed system is unique because it allows multiple sensors to communicate simultaneously without incurring degradation through returning signal echoes. This innovation was developed by NASA and the University of Central Florida with the objective of improved detection speed and reliability performance within a multi-sensor network



Test setup for the Wireless Multiplexing SAW sensor system with electronics and antenna

APPLICATIONS

The technology has several potential applications:

Department of Defense – usage in aircrafts and vehicles

Power plant – usage within gaseous storage and transport areas

Manufacturing – usage within gaseous storage and transport areas

Cryogenic – usage in storage and transportation of cryogenic gases

Bridge safety – usage to monitor the strain within bridges

PUBLICATIONS

Patent Pending

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