



# Wireless Integrity Sensing Platform (WISP)-EVAL

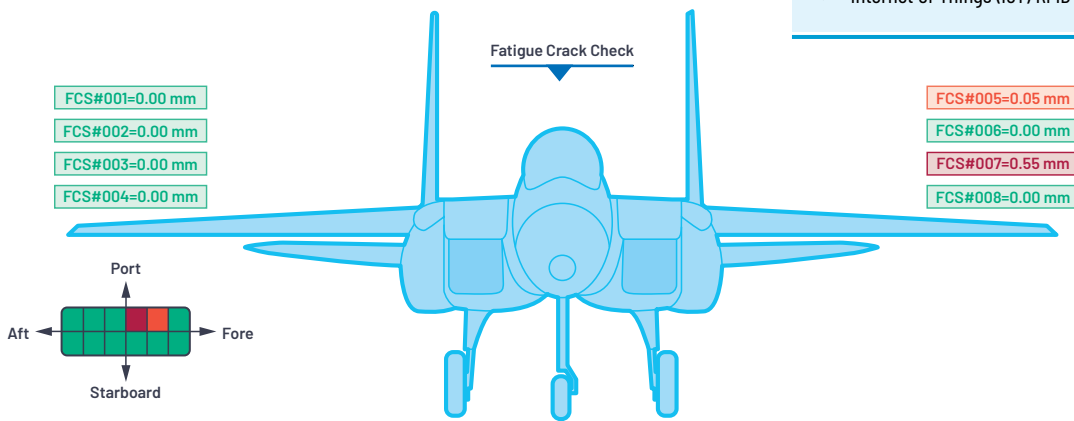
To improve avionic asset availability, ADI developed a passive wireless integrity sensing platform (WISP). WISPs are postage stamp-sized crack sensors that use carbon nanotube technology. These sensors can be placed in difficult to access locations on aircraft where cracks are likely to occur (so-called hot spots). The passive sensor status is read wirelessly over an ultra low power Bluetooth® connection by a securely paired handheld reader that also provides wireless power to the sensor.

With no batteries and no wires, WISPs are ready to be installed on new or aging structures.

The first sensor to be integrated with WISP nodes is a carbon nanotube crack gauge, which can provide unprecedented accurate sub-millimeter fatigue crack measurements, even in harsh operating and environmental conditions. Other structural health monitoring (SHM) sensors are also in development. These sensors have well-understood physics, and, when coupled with WISP nodes, they offer a remote inspection alternative for many applications. More generally, WISP architecture will help enable condition-based maintenance for a more efficient approach to sustainment.

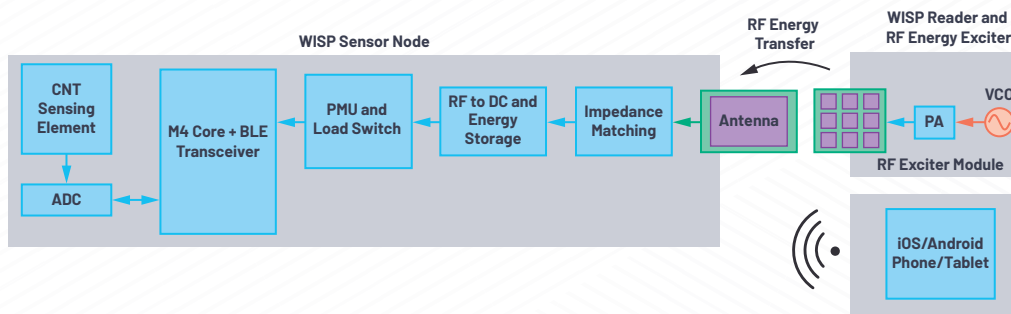
## Key Features

- ▶ Easy installation: no rewiring or redesign of aircraft needed—can apply immediately to hot spots
- ▶ No power necessary: sensor records via permanent physical changes
- ▶ Carbon nanotube (CNT) polymer nanocomposite for smart, multifunctional sensing material
- ▶ No cables, connectors, or batteries needed for data acquisition
- ▶ Internet of Things (IoT) RFID-like operation

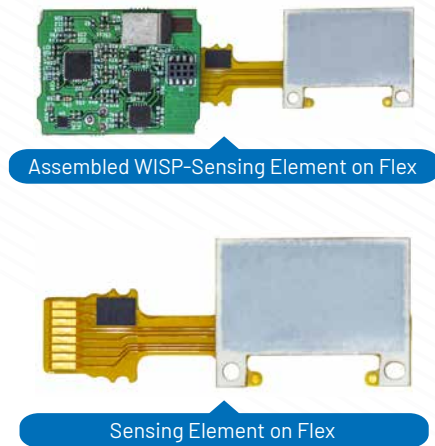


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# Complete Signal Chain for Structural Health Monitoring



## System Components



## Specifications

- ▶ Crack sensing element:
  - Thickness: ~200 micron
  - Mass: ~10 mg/cm<sup>2</sup>
  - Bend radius: ~5 mm
  - Size: 25.4 mm × 25.4 mm
  - Crack length accuracy 0.1 mm to 10 mm: 0.1 mm
  - PoD 90% with 95% confidence level: 1 mm
  - Crack length sensitivity: 0.1 mm
- ▶ BLE transmit power: -20 dBm to +2 dBm
- ▶ BLE data link frequency: 2.4 GHz
- ▶ Platform form factor: 24 mm × 30 mm × 6 mm
- ▶ RF exciter frequency: 5.8 GHz
- ▶ Operating temperature range: -10°C to +65°C
- ▶ Range of operation: 0.5 m to 1 m

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