

TECH OFFER

Wireless Fiber Optic Sensing For Structural Health Monitoring



KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Lasers, Optics & Photonics

Green Building - Sensor, Network, Building Control & Optimisation

Infocomm - Big Data, Data Analytics, Data Mining & Data Visualisation

Infocomm - Wireless Technology

Electronics - Printed Electronics

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174928**

OVERVIEW

Wireless monitoring solutions are gaining traction worldwide due to their added benefits of continuous monitoring capability 24/7. An innovative technology has been devised that has a way of converting variations in the reflected wavelength from fiber grating based sensors into intensity variations that can be easily processed through the electronic circuits and transmitted wirelessly. Conventional fiber grating based sensors measure the wavelength shift of the reflected light to determine the mechanical strain experienced by the medium in which the grating is embedded. This is conventionally done through a Fabre Perot interferometer which is referred to as the Interrogator but is a costly solution. The innovative circuitry eliminates the need

of the costly, and typically more bulky interferometer, replacing them with cost effective and compact fiber components configured in such a way that converts mechanical strain into intensity changes.

TECHNOLOGY FEATURES & SPECIFICATIONS

Fiber Bragg Grating based fiber optic sensors connected to a LoRaWAN (923MHz) based wireless network.

1550nm Centre wavelength sensors connected to a configured wireless node to capture data and send to a designated server.

Low powered, battery operated device with fully configurable sensor inputs.

Suitable for players in the condition monitoring/structural health monitoring/ FEA validation fields.

POTENTIAL APPLICATIONS

The system is designed for structural health monitoring applications which is agnostic in terms of specific industry. The system can be deployed in any industry that requires some form of monitoring of their asset, e.g. Aerospace/Oil and Gas, Civil Infrastructure, Rail, Mining etc.

UNIQUE VALUE PROPOSITION

Conventional wireless technologies do not cater for fiber optic sensors, where fiber optic solutions may have significant advantages in specific use cases. This system provides all of the benefits of a wireless system but based on fiber optic sensors.

Conventional fiber optic systems are expensive in comparison to conventional electrical systems and are also not readily suitable for on-site deployment. This system reduces the cost of the optical components with the simplified architecture, as well as provides a system that is suitable to be deployed directly in the field.