



fiber optic sensing solutions

Optics11



Amsterdam based company that offers high-end sensing systems for a variety of applications

Unique technology

- World's only high-end acoustic emission sensing system
 - OptimAE
- World's highest accuracy and precision FBG interrogators
 - acquisition of FAZ – Fugro
- Broad portfolio of fiber optic sensors
- Broad application experience



Fiber optic system overview



Immune to EMI

Optical signal ensures low-noise level over long distances.



Remote locations

Readout and sensors can be spaced kilometers apart.

Passive sensors

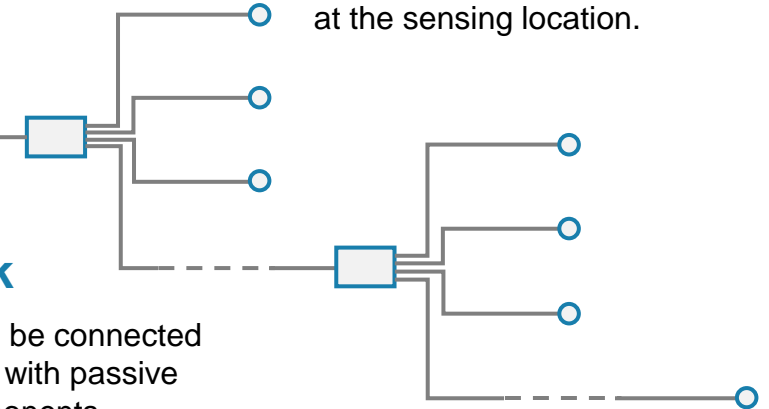
No power source needed at the sensing location.

Single lead cable

A single telecom fiber can stream the signal of multiple sensors.

Network

Sensors can be connected in a network with passive optical components.



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Applications overview

BRIDGE MONITORING

OPTICS11
LEAD ON THE TOP OF A FIBER

- Bridge over river IJssel
 - Required dynamic strain measurement
- 1 monitoring system
 - Mounted on side of bridge
 - Powered using solar and fuel cell
- 35 sensing points
 - 70 FBGs being monitored
 - Each sensing point measuring temperature and strain
 - Each sensing point recorded at 250Hz

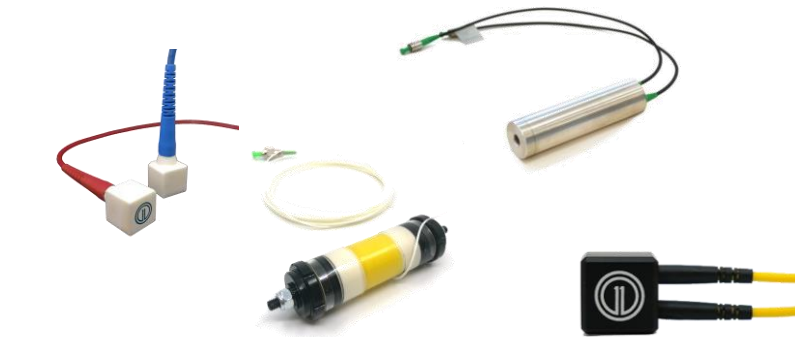




ACOUSTIC EMISSION PD DETECTION

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LEAD ON THE TOP OF A FIBER

- Detect Partial Discharge in High voltage applications
 - Pantographs
 - Transformers
 - Cable joints
 - Generators



One-stop shop for all monitoring parameters

STRUCTURAL HEALTH MONITORING OF CAVES

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LEAD ON THE TOP OF A FIBER

- Cave stability
 - Cave consists of Marl
 - Dug out over the centuries
 - used for tours and need to be monitored for risk of collapse
- 2 different networks monitored
 - 2 installations
 - Each with and 14 + M64S4 expansion module
- 80 sensing points
 - 160 FBGs being monitored
 - Each sensing point measuring temperature and strain
 - Each sensing point recorded every 60 seconds




STRUCTURAL MONITORING OF WIND TURBINES

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LEAD ON THE TOP OF A FIBER

- High number of sensing points
- Possible to embed on to the (concrete) foundation rebar
- Single readout unit – FAZT-14 Interrogator
- High frequency data collection
- Remote location
- 112 embedded strain gauges
- 4 discrete strain gauges
- 7 temperature gauges
- 2D Inclinometers
- 2 axis accelerometers

Long distance cabling

Ruggedized fiber optic strain & temperature gauges

Installation with standard spot welding technique







ROAD & TRAFFIC MONITORING

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LEAD ON THE TOP OF A FIBER


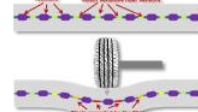





- High sensitivity to low strain levels
 - nε-level resolution
- Localized & high density measurements
- High speed recording
 - Vehicle passing: a millisecond event
- Cost effective: Single recorder unit for multiple lanes
- Completely buried system no surface visibility
 - Longer lifetime, harder to avoid detection

Van Unloaded (2500 kg) 80 km/h

Truck Unloaded (8000 kg) 80 km/h

Van Loaded (2100 kg) 80 km/h

Truck Loaded (15000 kg) 80 km/h

Questions ?



Team – 55 and growing

Headquarters & distributors

