

SENSING PRODUCTS

# ACCELERATION





THE SOLUTION: MANY SENSORS  
IN AN OPTICAL FIBER NETWORK  
LINKED TO A SINGLE READOUT

MINIMIZE COSTS  
BY SWITCHING FROM  
PREVENTIVE TO  
PREDICTIVE MAINTENANCE

## MAXIMISE UPTIME AND LIMIT MAINTENANCE INTERVALS

Do you have high value equipment that plays a crucial role in your activities? Did you consider monitoring your equipment and however encountered challenges with existing solutions? Chances are you had to deal with harsh conditions such as high temperature, strong EMI, remote location of your equipment and limited installation space.

Optics11 offers an optical condition monitoring solution that deals with these and many other challenging conditions. It consists of simple miniaturized acceleration sensors that only requires a low weight optical fiber network, do not influence the measurement structure, and reduce the overall costs (cost per sensing point).

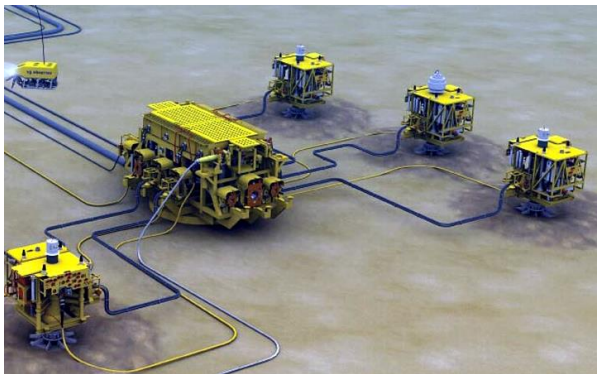
Optical sensors allow for better SNR, reliability and better modelling of systems (digital twin).



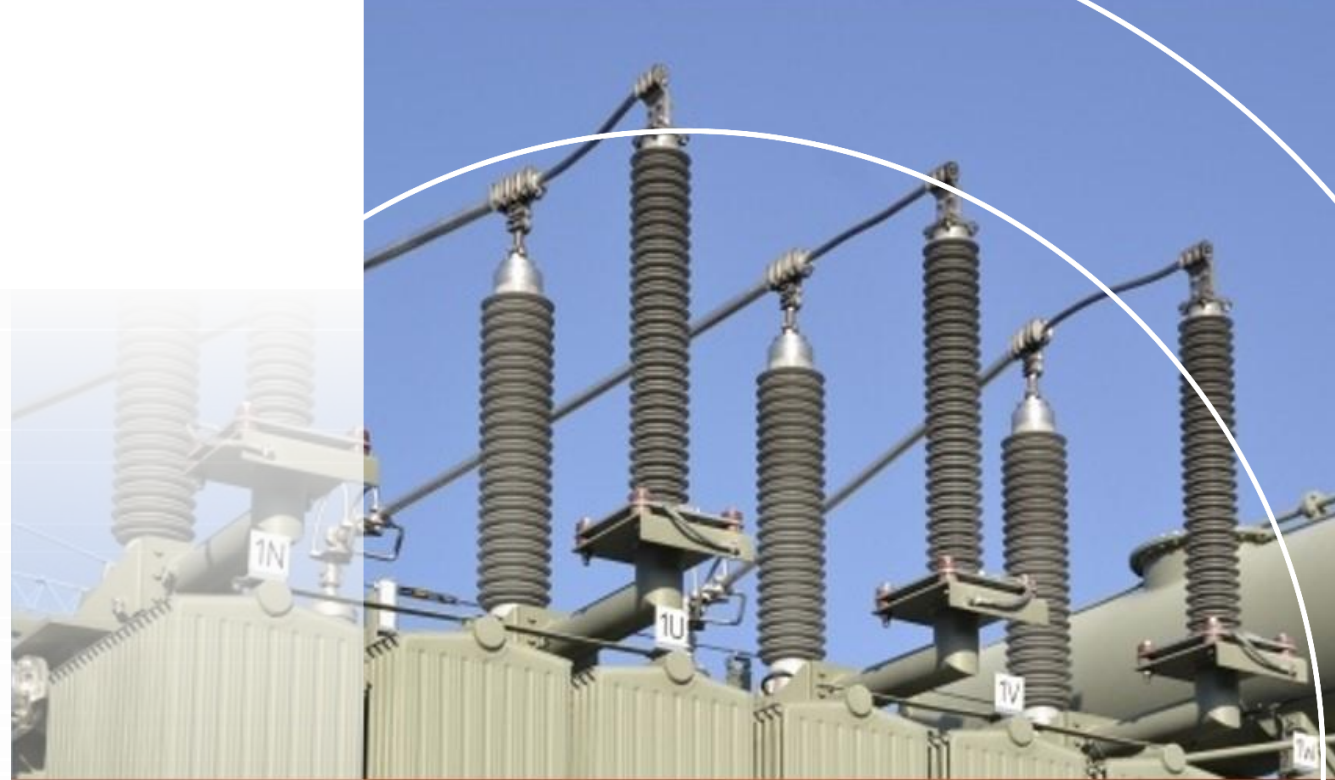
# APPLICATIONS

There are many applications that benefit from our solution:

- High voltage equipment (electric generators, transformers, turbines)
- Remote placed equipment (installed on the seabed, offshore)
- Nuclear facilities
- Aerospace and rail equipment
- Light weight structures
- Bridges, concrete structures
- Bearings and rotating equipment



UNVEIL  
UNKNOWN  
VIBRATION  
PATTERNS



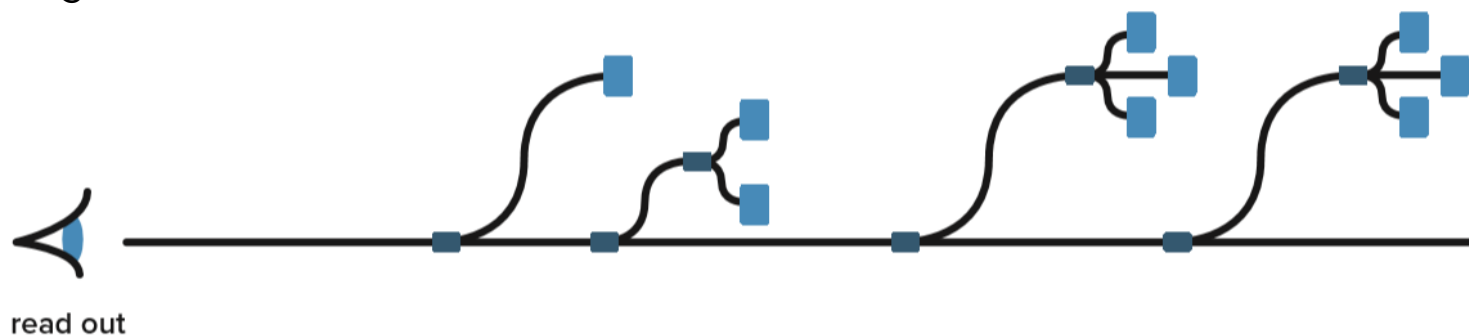
unique  
patented  
technology

## TECHNOLOGY

Sensing acceleration at nano-g level is best achieved using optical fiber technology since it is highly sensitive and can measure with extremely low noise floor in exceptionally harsh environments. The underlying technology of our sensors is the DeltaSens technology.

This patented interferometric principle allows to multiplex Fabry-Pérot sensors without compromising on sensitivity and acquisition speed. Using just a single optical lead in fiber, multiple sensors can be simultaneously measured in a network.

Next to the optical advantages - like the possibility to have kilometres of fiber between the readout and/or the sensors, the immunity to EMI, liquid environments, and extreme temperatures – our sensors are completely passive. They consist of only glass and adhesives with no moving parts. Simple and elegant.



## HARDWARE

All acceleration sensors exclusively work with the DeltaSens readout. This standalone interrogator can measure simultaneously multiple miniaturized sensors in a standard telecom optical fiber network.

The digital and analog outputs allow easy integration with your existing control and acquisition system (SCADA).



# TECHNICAL SPECIFICATIONS

## Sensors performance<sup>1</sup>

	<i>Low frequency</i>	<i>High frequency</i>	<i>High range</i>
Range <sup>2</sup>	± 1 g	± 320 g	± 25 000 g
Sensitivity	24.9 µm/g	62.1 nm/g	0.77 nm/g
Frequency response ± 5 %	35 Hz	650 Hz	6 000 Hz
Frequency response ± 10 %	50 Hz	1 000 Hz	8 500 Hz
Spectral noise density <sup>3</sup>	40 ng/√Hz	16 µg/√Hz	1.3 mg/√Hz
Broadband noise floor <sup>3</sup>	285 ng rms	500 µg rms	120 mg rms
Measurement axes		1 or 3 axes	
Non-Linearity		< 1%	
Transverse sensitivity		< 1%	

## Sensors physical

Operating temperature	-40 to 80 °C (ST version) -40 to 250 °C (HT version)
IP rating	IP68
Dimensions	15 x 15 x 26 mm
Mounting method	Adhesive
Cable bend radius	≥ 5 mm

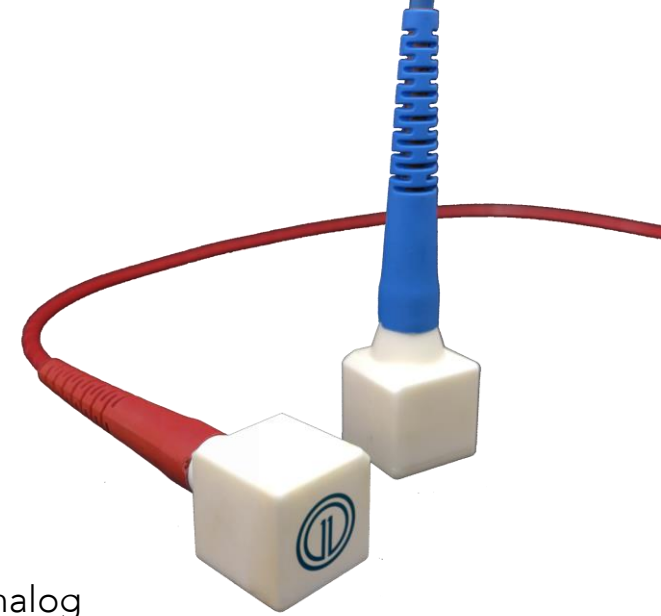


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### DeltaSens interrogator

Sampling rate  
Noise floor  
Dynamic range  
Signal resolution  
Data output  
Multiplexing capability<sup>4</sup>  
Signal acquisition  
Distance sensors to readout

up to 17 kHz  
1 pm/√Hz  
140 dB  
32 bit digital / 16 bit analog  
Digital (TDMS file) / Analog (± 10 V)  
12 sensors  
True simultaneous  
Up to 10 km



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<sup>1</sup> Custom sensors available upon request.

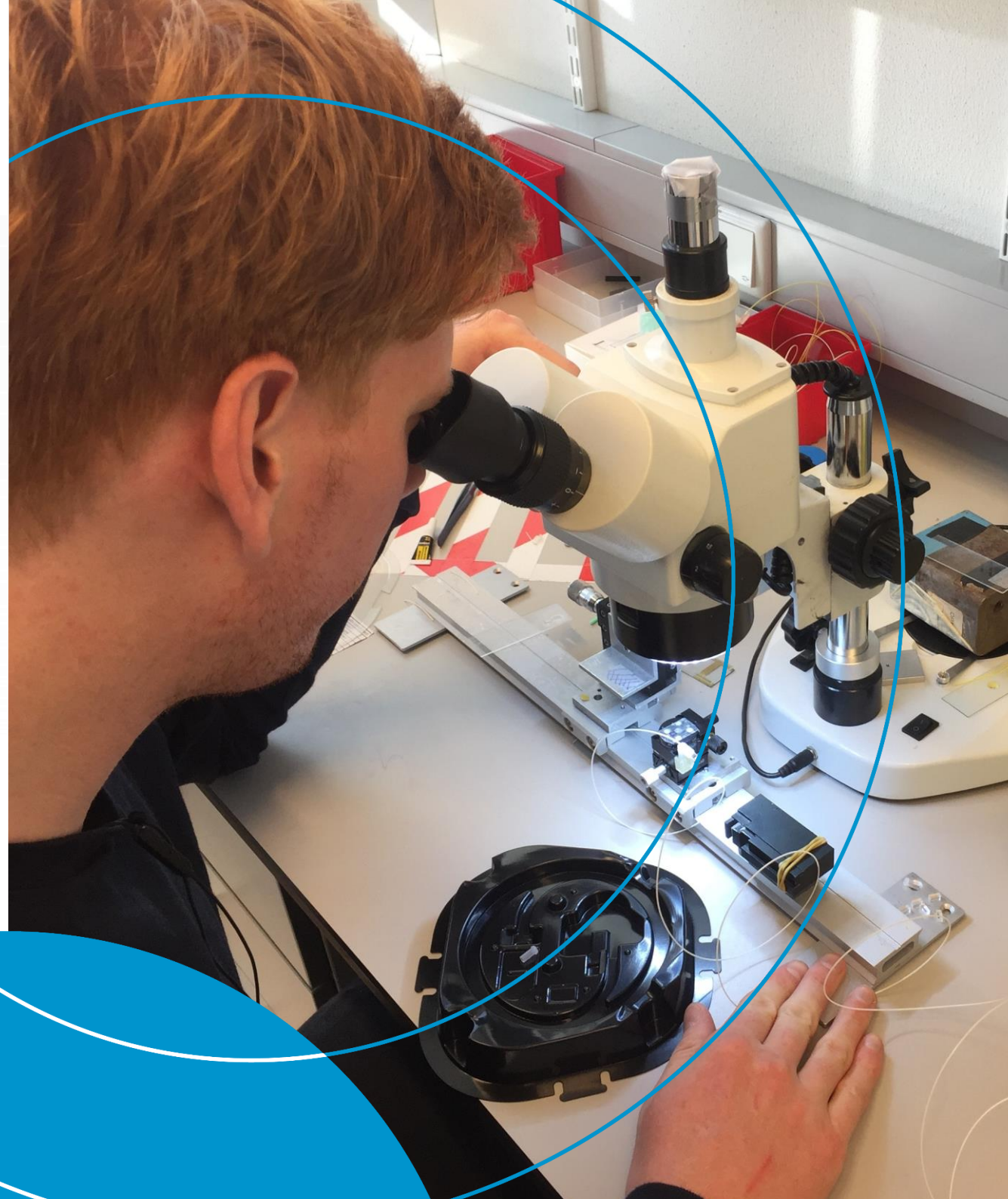
<sup>2</sup> Range at 25 Hz, estimated based on sensor design.

<sup>3</sup> Based on DeltaSens interrogator noise floor.

<sup>4</sup> Maximum number of 1D sensors, 3D sensors have a maximum of 4 sensors per readout.



ALL SENSORS  
ARE INDIVIDUALLY  
CHECKED ON  
PERFORMANCE,  
ASSEMBLY AND  
OVERALL  
QUALITY



## ABOUT OPTICS11

Optics11 is a fast-growing high-tech company that offers revolutionary new optical fiber measurement systems for applications in acceleration, acoustic monitoring, strain sensing and more.

The combination of unique interferometry concepts and advanced mechanical transducers (MEMS) provides exceptional characteristics to our systems. The underlying shared technology enables our systems to be more sensitive, affordable and have a higher bandwidth compared to existing industry standards.

**We love making cutting-edge technology fit for use!**

Please contact us at [info@optics11.com](mailto:info@optics11.com) for more information, technical data sheets, or to speak with a representative.





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