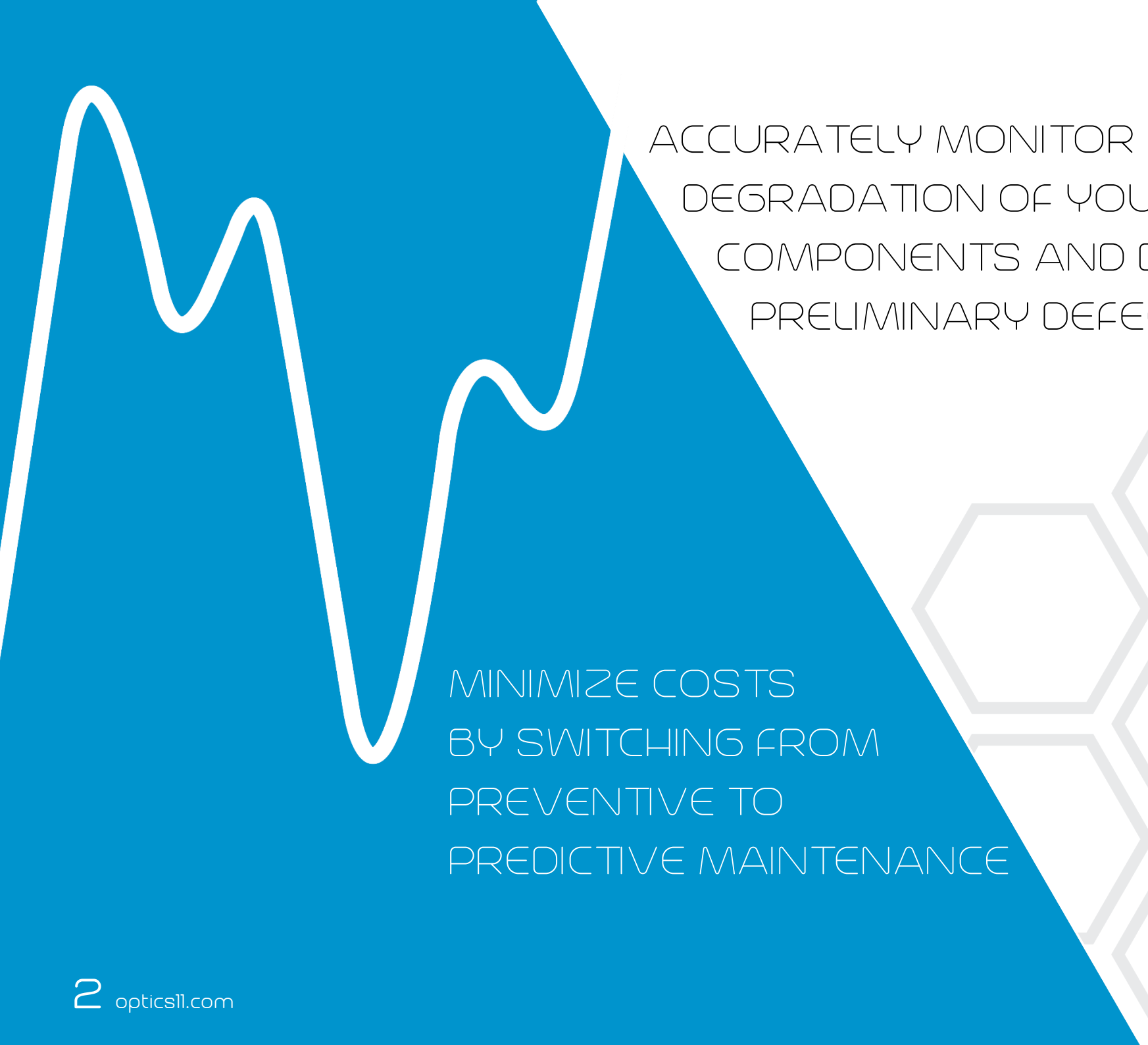
OPTICS11

WIND TURBINE
CONDITION MONITORING

OPTICAL ACOUSTIC EMISSION SENSING SYSTEM



ACCURATELY MONITOR THE DEGRADATION OF YOUR COMPONENTS AND DETECT PRELIMINARY DEFECTS

MINIMIZE COSTS BY SWITCHING FROM PREVENTIVE TO PREDICTIVE MAINTENANCE

DETECT DAMAGE INDICATORS MONTHS BEFORE FAILURE AND PREVENT DOWNTIME

Measure acoustic excitations originating from critical locations and accurately monitor the degradation of your mechanical components. Condition monitoring of critical components enables your company to switch from preventive maintenance towards predictive maintenance decreasing your maintenance cost and unwanted wind turbine downtime.

Optics11 fiber-optic sensing solutions are highly suitable for challenging environments such the offshore ones. Thanks to their completely passive nature, our sensors are immune to any form of electrical interference and can withstand the harshest measuring conditions, ensuring a long and maintenance-free system lifetime.

KEY FEATURES

- Immune to any electrical interference (e.g. lightning or partial discharge)
- Long system lifetime (robust passive sensors)
- High sensitivity in the high AE frequency domain (up to 500 kHz)
- Multiple sensitive zones enabling triangulation of events

APPLICATIONS

- Bearing, gearbox and generator condition monitoring to detect preliminary failures of mechanical components.
- Blade early-crack detection
- Impact detection on the surfaces of the wind turbine

MEASURE RIGHT AT THE LOCATION OF THE ACOUSTIC SOURCE

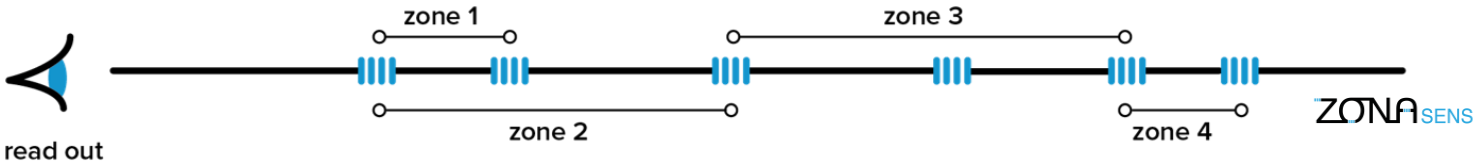
unique patented technology

TECHNOLOGY

Acoustic emission measurements are best performed with optical fiber technology, since it is highly sensitive and can measure with extremely low noise in exceptionally harsh environments. The underlying technology of our sensors is the ZonaSens technology.

This patented interferometric principle measures between two reflective parts in a fiber (FBGs), therefore makes that part of the fiber extremely sensitive to strain. Minute changes to the fiber caused by acoustic waves will be detected.

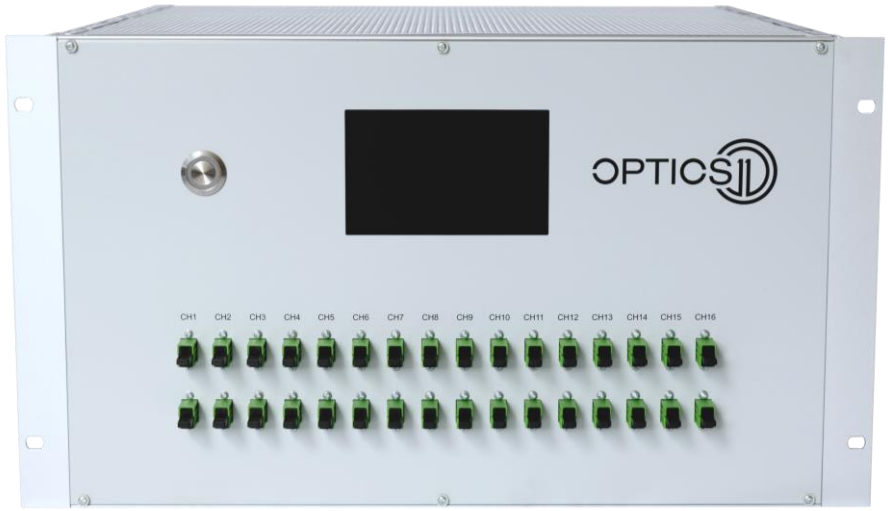
Besides the optical advantages – such as the possibility to have kilometers of fiber between the readout and sensors, adding sensors without compromising measuring speed and the resistance to EMI – our sensors are fully passive. Just a small mandrel wrapped with optical fiber, with no electric signals involved. Simple and elegant.



HARDWARE

All Optics11 acoustic emission sensors exclusively work with the OptimAE interrogator. OptimAE is a modular system which can be configured to a maximum of 16 channels, sampling each channel at 1 MS/s simultaneously. Besides continuous raw data acquisition, the system also provides automated event detection and AE features extraction.

Using interferometry as a measurement principle, the system achieves state-of-the-art sensitivity and can compete with the best electrical systems available on the market.



TECHNICAL SPECIFICATIONS

Sensors specifications[1]		*Acoustic Emission sensor*	*Embedded AE sensor*
Sensitivity		-20 dB re nm/µbar	-20 dB re nm/µbar [2]
Frequency range		20 to 400 kHz	20 to 500 kHz
Spectral noise density		150 fε/√Hz	down to 50 fε/√Hz[2]
IP rating		IP68	--
Dimensions		17.5 x 22 x 22 mm	⌀ 250 µm (fiber)
Weight		16 gr	--
Sensors versions[1]			
Standard		-40 to 80 °C	-40 to 80 °C
High temperature	(beta)	-40 to 250 °C	-40 to 250 °C
Cryogenic	(beta)	-196 to 40 °C	-196 to 40 °C
Radiation hardened	(beta)		
ATEX	(beta)		

OptimAE interrogator	
Sampling rate	1 MS/s
Signal resolution	32 bit
Multiplexing capability	16 sensors
Signal acquisition	true simultaneous
Versions (upgrades possible)	2, 4, 8, 12, 16 channels
Dimensions	19” rack, 6U
Weight	18 kg
Operating conditions	-5 to 50 °C

[1] Different sensor configurations are possible, please contact us for full options.
[2] Value might vary depending on embedded sensor design and application.

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 acoustic monitoring, acceleration & strain sensing and more.

The combination of unique interferometry concepts and advanced mechanical transducers (microfabricated) provides exceptional characteristics of 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 for more information, technical data sheets, or to speak with a representative.

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