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Belgian Era Sensing Fiber Optics



Overview

Sentea aspires to be a market leader in advanced fiber-optic solutions for structural health and process monitoring.

Key Takeaways

Belgium has been a key hub for fiber optic sensing innovation, with Sentea and research groups at Ghent University and B-PHOT leading the development of advanced FBG and microstructured optical fiber sensors.Key Players and Research

Sentea, founded in 2018 as a spin-off from Ghent University's Photonics Research Group (PRG) and imec, commercializes over a decade of research in silicon photonics-based fiber optic sensing . Their technology focuses on fiber Bragg grating (FBG) sensors and cost-effective interrogators, enabling precise monitoring of strain, temperature, vibration, and other parameters across civil, industrial, and renewable energy applications . Sentea's sensors are particularly valued for their robustness, small size, and immunity to electromagnetic interference, making them suitable for harsh environments . At B-PHOT (Vrije Universiteit Brussel), research emphasizes microstructured optical fibers (MOFs) and FBG-based sensors with high sensitivity to pressure, transverse force, and shear strain while minimizing temperature cross-sensitivity . These sensors have been integrated into composite materials for structural health monitoring, enabling simultaneous measurement of multiple strain components and detection of residual stresses in industrial applications .

Technology and Applications

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Belgian fiber optic sensing leverages FBG and MOF technologies to convert optical signals into measurable physical parameters. FBG sensors use periodic refractive index modulations in the fiber core to detect sub-micron deformations or temperature changes with high precision . MOFs enhance sensitivity to mechanical forces and allow integration into complex materials for industrial and civil engineering monitoring . Applications include:

• Structural Health Monitoring (SHM): Bridges, buildings, wind turbines, nuclear plants, and tunnels benefit from continuous monitoring to detect early signs of damage, prevent catastrophic failures, and extend asset lifetimes .

• Industrial Process Control: Motors, bearings, drive trains, and chemical processes are monitored for efficiency and predictive maintenance .

• Smart Infrastructure: Fiber optic sensors integrated with existing fiber networks enable smart city and smart grid monitoring, supporting IoT and edge computing applications .

• Medical and Aerospace: High-precision FBG sensors are used in surgical instruments and aerospace structural monitoring, including UAVs and spacecraft components .

Advantages

Belgian fiber optic sensing technologies offer:

• High spatial resolution and distributed sensing over kilometers of fiber

• Passive operation with low attenuation and immunity to electromagnetic interference

• Compact, lightweight, and robust sensors suitable for harsh environments

• Cost-effective interrogators through silicon photonics integration, enabling broader adoption

Conclusion

Belgium's contributions to fiber optic sensing, particularly through Sentea, Ghent University, and B-PHOT, have established the country as a leader in advanced FBG and MOF sensor technologies. These innovations support structural health monitoring, industrial process optimization, and smart infrastructure, combining high precision, robustness, and cost-effectiveness to meet modern engineering and industrial challenges .

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Article Content

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Sentea unveils the world''s first FBG fiber sensor Interrogator-on-Chip ...

This breakthrough enables unprecedented sensing accuracy in a compact and cost-effective package, making FBG sensing more

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This resilience allows fiber optic sensors to thrive in industrial settings, including water, oil and gas pipelines, where they can

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Optical fiber-based sensing stands as a cornerstone measurement and detection technology across diverse fields and

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About

FBGS is a Germany / Belgium based developer and manufacturer of high strength Fiber

B-SENS – Creative sensing solutions

B-SENS designs and develops OEM temperature, strain & gas sensors based on optical fiber gratings. These full sensing solutions

Fiberflux

Through our proprietary pipeline hardware & installation systems, we deploy fiber optic cables safely inside operational pipelines

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We develop highly birefringent Microstructured Optical Fiber Bragg-grating-based sensors that feature unprecedented sensitivity to

Special Issue “Fiber Optic Sensors and Applications”: An Overview

In “Hybrid Plasmonic Fiber-Optic Sensors” , the development of plasmonics-based fiber-optic sensors was reviewed to reveal and

Introduction to Fiber Optic Sensing

Distributed and quasi-distributed fiber optic sensors are systems that connect opto-electronic interrogators to an optical fiber (or

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Fiber optic sensors are compact because the detection circuit is located in the amplifier, allowing for

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Industrialized optical fiber grating sensing solutions B-SENS develops fully-customizable temperature, strain & gas multipoint

Recent Advances in Fiber Optic Sensor Technology

In recent years, optical fiber sensing technology has resulted in significant advancements in various fields,

PRESS RELEASE

Earlier this year the company launched its suite of fiber Bragg grating (FBG) read-out systems, also referred to as interrogators,

Fiber optic shape sensing – a paradigm shift in medical applications

Mission & Locations FBGS is a Germany/Belgium based developer and manufacturer of high quality Fiber Bragg Grating products

(PDF) Fiber-Optic Sensing: A Historical Perspective

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Sensing via fiber optics has occupied R&D groups for over 40 years, and some important transitions into the

Distributed Fiber Optic Sensor Market Size, Share and Trends

In conclusion, the Distributed Fiber Optic Sensor Market is poised for significant growth, driven by technological advancements and

Fiber Optic Sensors in Tactile Sensing: A Review

Fiber Optic Sensors in Tactile Sensing: A Review Abstract: Tactile is an important source of information for people to explore the

What is Fiber Optic Sensing?

Learn how fiber optic sensing technology, including distributed acoustic sensing (DAS), distributed temperature sensing (DTS), and

SENTEA Fiber Optic Sensing

Fiber optic sensing allows for highly accurate and robust structural health monitoring solutions, predicting and preventing failures

Finindus invests in Sentea, a fiber optic sensing spin-off launched by ...

Silicon photonics based fiber optic sensing allows for highly accurate, small, robust and cost-efficient structural health monitoring and

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Tailored fiber optic sensing components & solutions

With our unique fiber optic technologies we offer high-quality components and groundbreaking total solutions for the next generation

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Fiber Optic Sensing Technology: What It Is and How it Works

This article explains what fiber optics are and how they work in industrial applications. Learn important terms and the basics of fiber

Pipeline Monitoring with Farys | Client Story | Fluves

Fluves installed the DALI system, integrating fiber optics with Distributed Acoustic Sensing (DAS). This setup turned the pipeline into

Com&Sens presents workshop on fiber optic sensing for

Three-day workshop in June in Belgium, will equip participants with a better understanding

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