Latvian Fiber Optic Sensor Applications



Overview

Project description: The project will develop a high-precision fibre optic temperature sensor device designed for applications in environments with high-intensity electromagnetic noise.

Key Takeaways

Fiber optic sensors in Latvia are applied across navigation, infrastructure monitoring, transportation, and research, leveraging high sensitivity, immunity to electromagnetic interference, and real-time measurement capabilities.

Industrial and Navigation Applications

Latvia hosts Fiber Optical Solutions (FOS), a vertically integrated company specializing in high-precision Fiber Optic Gyroscopes (FOG) and FOG-based Inertial Measurement Units (IMU) and Strapdown Inertial Navigation Systems. Their production includes polymeric-coated fibers, fiber welding, and raw fiber manufacturing using chemical vapor deposition, enabling cost-effective, high-quality devices for navigation and defense applications. These systems are critical for precise navigation in aerospace, maritime, and defense sectors.

Infrastructure and Structural Monitoring



© 2026 METRA FIBER MARKET - All rights reserved

Fiber optic sensors are widely used in structural health monitoring of concrete, composite materials, and road surfaces. The Fiber Optical Sensor Research Group at Riga Technical University (RTU) focuses on fiber optical scattering sensors, which provide real-time temperature and deformation monitoring along the entire fiber length. These sensors are particularly valuable for large-scale structures where traditional sensor networks are inefficient, enabling continuous monitoring over hundreds of meters.

Transportation and Smart Road Systems

Latvia has implemented fiber optic sensor technologies in transportation infrastructure, particularly for smart road applications. Fiber Bragg Grating (FBG) sensors and distributed sensing systems are used for traffic monitoring, weigh-in-motion (WIM) systems, pavement condition evaluation, and vehicle classification. These sensors integrate with digital twins, machine learning, AI, and IoT platforms to optimize road maintenance, reduce costs, and prevent damage from overweight vehicles.

The Transport and Telecommunication Institute (TSI) has led projects to automate truck weight measurement and improve road safety using fiber optic sensors.

Research and Development

Latvian research institutions are advancing high-sensitivity, high-speed, and high-accuracy fiber optic sensor technologies.

RTU and TS

I collaborate on developing multifunctional fiber optical sensing systems for telecommunications, civil engineering, and material sciences. These initiatives include real-time signal processing, deformation monitoring, and integration of fiber optic sensors into complex monitoring networks.

Key Advantages

Passive operation: no external power requiredHigh sensitivity: capable of detecting minute strain, temperature, or deformation changesElectromagnetic immunity: suitable for harsh industrial and transportation environmentsScalability: can monitor long structures or distributed networks efficientlySummaryIn Latvia, fiber optic sensors are applied in navigation systems, structural health monitoring, smart transportation infrastructure, and advanced research. Companies like Fiber Optical Solutions provide industrial-grade FOG and IMU devices, while RTU and TSI focus on research-driven applications for real-time monitoring and smart road systems.

These technologies enhance precision, safety, and cost-efficiency across multiple sectors.

© 2026 METRA FIBER MARKET - All rights reserved

Article Content

All-optical fibre-based temperature sensor device in extended ...

Project description: The project will develop a high-precision fibre optic temperature sensor device designed for applications in environments with high-intensity electromagnetic noise. The

News | – FOS | Fiber Optical Solutions

Visit us at our exhibition booth to meet our team and explore our latest innovations, including our smallest IFOS-2 Inertial Measurement Unit (IMU) and a range of

Fiber Optic Solutions & Custom Assemblies | CeramOptec

With production excellence in Latvia and a strong international network, we deliver fiber optic solutions tailored to the most demanding applications – from industrial laser technology to cutting-edge

Latvian Fiber Optic Sensor Applications

AITAF provides end-to-end optical communication solutions, structured cabling, ODN, optical modules, fiber testing instruments, data center networks, base station energy, smart city communications, and

Directory

“Fiber Optical Solution” is vertically integrated company specializing in high precision Fiber Optic Gyroscopes (FOG) production. The company has a unique

Fiber-Optical-Sensor-Based Technologies for Future Smart-Road

This review critically examines the current landscape of classical mechanical and electrical sensor realization in monitoring solutions.

Optical fibre temperature sensor device in extended

Durable optical sensor that measures temperature in harsh environments – energy, manufacturing and aerospace sectors. It uses a luminescent material that allows

RTU''s New Scientific Equipment Will Help Develop Optical Sensor

He develops multifunctional fiber optic sensor systems for various applications, such as monitoring the quality of roads or the condition of buildings and objects.

Development of the Multifunctional Fiber Optical Sensing System and

The aim of Thesis is to integrate an FBG sensor network in optical communication systems and to evaluate application of FBG sensors in road monitoring solutions.

© 2026 METRA FIBER MARKET - All rights reserved

Optical Fiber Sensors and Sensing Networks: Overview of the Main

Optical fibers provide sensing solutions for many types of applications and environments with high performance. The design of the fiber sensors can take advantage of one or several optical

Company | FOS

“Fiber Optical Solution” is vertically integrated company specializing in high precision Fiber Optic Gyroscopes (FOG) production. The company has a unique combination of all the technologies

Overview of Fiber Optic Sensor Applications

Overview of Fiber Optic Sensor Applications Abstract: The article discusses the main applications of fiber-optic sensors, including monitoring of production processes, medical diagnostics, and scientific

Optical Fiber Technology | Distributed Fiber Optic Sensing ...

This turns an entire optical fiber into a sensing system. In comparison with other sensing technologies, distributed fiber sensors enable detection and localization of various physical

Realization of the importance of using fiber optic sensor technology in ...

Potential applications of fiber optic sensor technology are broad. Based on the articles identified, Fiber optic sensor technology is classified into two categories: (1) applications in

Fiber Optic Sensors: Short Review and Applications

An extensive review of optical fiber sensors and the most beneficial applications is presented in this chapter. Although electrical sensing technologies have been successfully deployed

Fiber-Optical-Sensor-Based Technologies for Future Smart-Road

Focus is also given to fiber-optic-sensor-based solutions for smart road applications, encompassing both well-established techniques such as Fiber Bragg Grating (FBG) sensors and

optical fiber Companies and Suppliers near Latvia | ...

Our wide range of sensors and switches gives you good solutions for various automation applications and material handling. You get also equipment for sensing liquid level, pressure, temperature and flow.

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

© 2026 METRA FIBER MARKET - All rights reserved

We present here the recent advance in exploring new detection mechanisms, materials, processes, and applications of fiber optic sensors.

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

Contact Us

Continue your research online:

Website: https://metramarket.es
Technical inquiry: https://metramarket.es/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 METRA FIBER MARKET - All rights reserved