

## **Fiber Bragg Grating Sensor Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)**

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### **Report description:**

The Fiber Bragg Grating (FBG) Sensor Market is expected to register a CAGR of 7.5% during the forecast period. FBG sensors have gained considerable popularity as they are simple to manufacture by UV imprinting of a grating pattern directly onto the fiber, the sensor diameter is the same as the fiber diameter, and several different FBG sensors can be imprinted at various locations on the same fiber and can be individually addressed and multiplexed.

#### Key Highlights

FBG Sensors are intrinsically capable of measuring multiple parameters along with a single fiber, such as temperature, strain, and pressure. These are multi-point sensing arrays consisting of numerous low-cost FBGs, offering design flexibility, making them ideal for various sensing applications and being implemented in multiple fields and industries.

Due to their high sensitivity, less power consumption, and high resistance to electromagnetic interference, these sensors are witnessing their application across multiple industries, from telecommunications to LAN operations. They are also widely employed in the aerospace, energy generation plants, and infrastructure sectors.

For instance, structural health monitoring is gaining popularity in the construction and infrastructure industry because of its ability to alert the managing staff about any potentially dangerous state of the structure in advance. Technological development in the field of FBG sensors has made it possible to use them to monitor parameters such as temperature increase in concrete due to the hydration process, relatively long-term displacement between two sinking foundation blocks, and strain variation of the primary columns, etc., which is expected to boost the demand for these sensors in the infrastructure sector.

Furthermore, a rise in aircraft construction is expected to bolster the growth of the market over the forecast period. For instance, according to Japan Aircraft Development Corporation (JADC), Airbus has consistently been one of the largest commercial aircraft manufacturers, delivering 611 jets last year. It is expected to maintain its growth trajectory during the forecast period. Their main competitor, Boeing, added 340 jets to the global aircraft fleet last year. Such massive manufacturing of aircraft will drive the

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requirement of the Fiber Bragg Grating sensor market. Moreover, observing the benefits of the fiber Bragg grating sensor, the government is conducting various R&D projects to optimize its full use and develop a product. For example, the Defence R&D Organization Government of India executed a project, "Development Of Fiber Bragg Grating (FBG) Based Structural Health Monitoring (SHM) System."

Although these sensors have been witnessing increased adoption and widespread use, some of the technical hurdles, such as their transverse strain sensitivity, still need to be overcome for this technology to gain more commercial momentum and achieve robust market growth.

The COVID-19 pandemic caused a stir, especially during the initial phase, compelling governments worldwide to enact stringent regulations limiting human and vehicular movement, impacting economies and businesses in numerous nations. Fewer products, goods, and services have been produced due to the lockdown, which also slowed down the demand for FBG sensors. Additionally, due to a lack of workers in the manufacturing facilities, the FBG market participants also saw a volume decline. However, the market's future looks promising, with the impact of the pandemic fading gradually and various sectors reporting positive growth.

## Fiber Bragg Grating Sensor Market Trends

### Aerospace Segment to Witness Significant Growth

A harsh and complex operating environment characterizes the aerospace industry, and choosing a suitable sensor to withstand such external environment extremities and perform at the desired accuracy, reliability, precision, and repeatability is of prime importance for the players in the industry. In aircraft protection systems, to measure and monitor the temperature along the aircraft bleed air ducts, control valves, and critical areas of the plane, fiber optic technology configures easier and faster solutions for aircraft manufacturers to install more reliable and lighter weights.

The safety monitoring and tracking of aircraft are becoming more and more crucial. Under aerodynamic loading, the aircraft wing produces large bending and torsional deformation that seriously affects the safety of the aircraft. The FBG sensing technology for aircraft wing shape measurement has gradually proved itself to be a real-time and online dynamic measurement method with good characteristics.

There are several aircraft-making companies that are successfully using this technology. For instance, SAAB, a Swedish aerospace company, uses a Fiber Optic Sensor System Overheat Detection System (OHDS) for real-time monitoring of bleed air piping to detect hot air leakage. According to the company, FBG sensor technology provides actual temperature measurements with the ability to not only set alarm thresholds but trace trends and introduce smart alarm functions.

The increasing size of aircraft fleets owing to the increasing passenger base is expected to have a positive impact on the market's growth. For instance, according to the Federal Aviation Administration, the number of aircraft in the United States general aviation fleet is expected to reach 204,590 this year. Furthermore, according to Boeing's 2022 Commercial Market Outlook (CMO) report, the company anticipates a global demand of more than 41,000 new airplanes by 2041.

### Asia-Pacific to Witness a Significant Growth

Over the years, the Asia-Pacific region has witnessed remarkable growth in the expansion of major end-user sectors of FBG sensors, such as telecommunication, construction and infrastructure, aerospace, etc., and the R&D sector, which has made the region a promising market.

Although countries like Japan and South Korea have been among the leading countries in terms of technology and industrial sector development, the emergence of countries such as China, India, Taiwan, etc., has completely changed the market dynamics in the Asia-Pacific region, even outpacing the developed countries in some sectors. For the studied market, the region's overall growth

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creates a favorable market scenario as the demand increases across various sectors.

For instance, China has established itself as a leading country in the telecommunication sector. The country is not only expanding its domestic telecom network rapidly but is also exporting its technology and telecom equipment across various countries.

According to China's Ministry of Industry and Information Technology (MIIT), the country currently has about 1.85 million 5G base stations and is aiming to add 600,000 5G base stations across the country this year.

The aerospace industry in the Asia-Pacific region is also witnessing significant growth; countries like China and India are not among the leading consumers but are also making efforts to become leading manufacturers of aircraft. According to a news release by Airbus, by mid-2022, the in-service Airbus fleet with Chinese operators totaled over 2,070 aircraft.

The aviation industry in India is also witnessing notable growth. According to IBEF, India's air passenger traffic stood at 188.89 million in FY22 and 76.47 million in the first quarter of FY 2022-23. Furthermore, according to the International Air Transport Association (IATA) estimates, India is expected to overtake the United States and China as the world's third-largest air passenger market by 2030. Such trends are expected to drive the demand for FBG sensors in the region.

## Fiber Bragg Grating Sensor Market Competitor Analysis

The Fiber Bragg Grating Sensor Market is competitive owing to multiple vendors supplying products for multiple end-users in domestic and international markets. The market appears to be moderately concentrated, with major players adopting strategies like product innovation, mergers, and acquisitions, to expand their presence and stay competitive. Some of the major players in the market include FBGS International NV, Smart Fibres Ltd, Micron Optics, and Timbercon Inc.

In March 2022, the ANGELA Consortium finalized and delivered a flight-cleared landing gear system to Airbus Helicopters, which will be integrated into the RACER high-speed compound helicopter. Aviatest, M&S Engineering, CentreComposite, and Techno System Developments provided their technological expertise in various forms, including the smart landing gear for hard landing detection based on FBG (Fiber Bragg Grating) sensor network.

### Additional Benefits:

The market estimate (ME) sheet in Excel format  
3 months of analyst support

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