

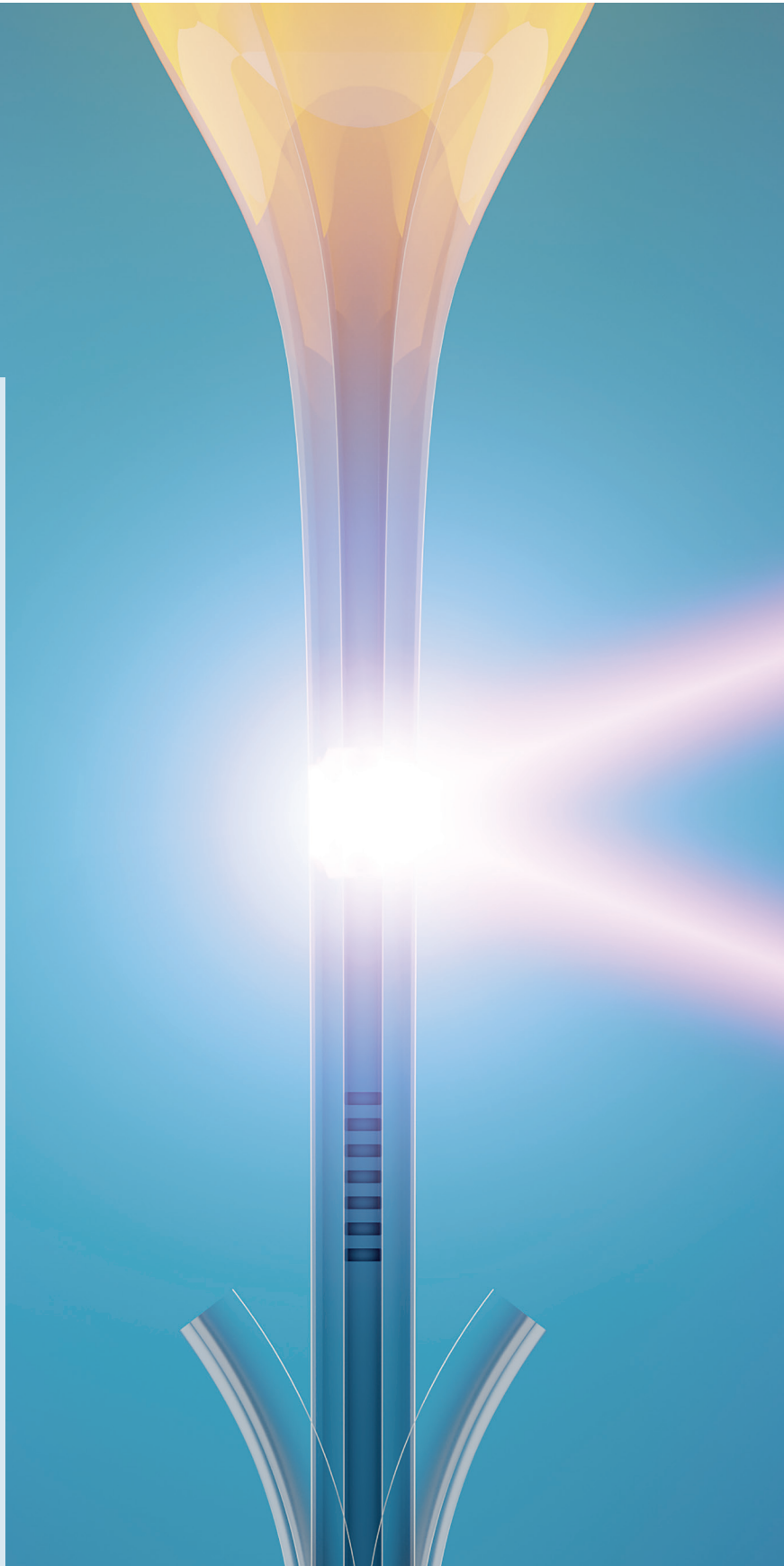


## Tailored Fiber Optic Sensing Components & Solutions

Company Brochure

### About Fiber Optic Sensing

The growing interconnectability of people, devices and machines has led to a rapidly increasing need for sensing solutions allowing to measure a variety of parameters in a broad range of applications. The limits and shortcomings of traditional sensing technologies paved the way for the emerging field of fiber optic sensing. Optical fibers are light weight, passive and unobtrusive sensing wires with a thickness comparable to a human hair. Sensing features can be tailored to the needs of the application and the unprecedented multiplexing capabilities allows to move away from traditional discrete measurement points to continuous measurements visualizing strain and temperature gradients, pressure, multi-directional force, curvature and shape information. The technology is today being used in various industries ranging from industrial processing, structural health monitoring and energy to aerospace, medical and safety & security.

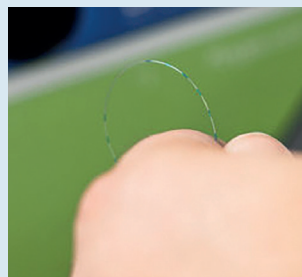
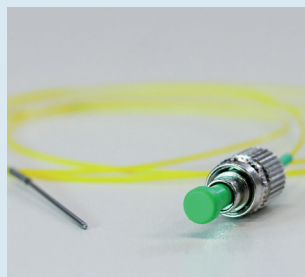
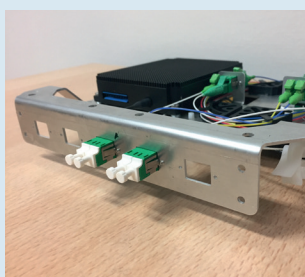
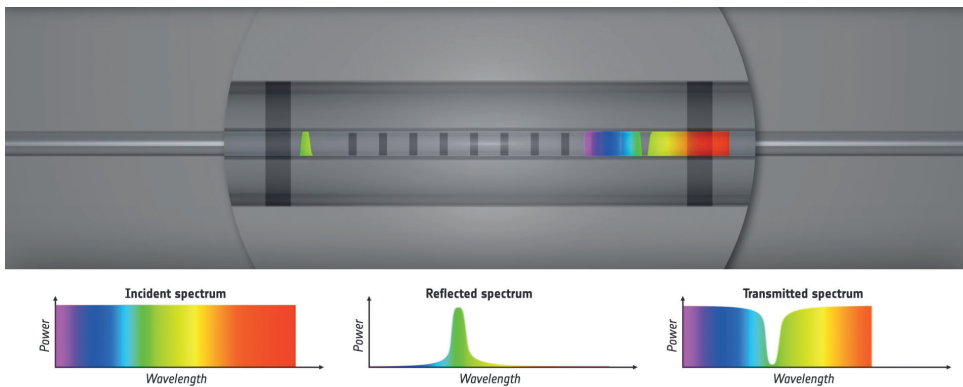


# FBG Sensor Principle

Fiber Bragg Gratings (FBGs) are made by lateral exposure of an optical fiber with a periodic pattern of intense laser light. The generated pattern will be translated into a permanent refractive index change inside the fiber core forming a grating. The resulting FBG acts as a wavelength selective mirror for one distinct wavelength (Bragg wavelength). By exposing a fiber with several FBGs with broadband light, each grating is reflecting a certain amount of light at a different Bragg wavelength which can be spectrally detected. If the FBG fiber is manipulated by variations of strain and temperature a shift of the Bragg wavelength is measured, which can be used to calculate strain and temperature values very accurately. From the basic functionality of measuring strain and temperature many other measurands like force, pressure, shape, flow, acceleration, weight and displacement can be additionally derived.

# About FBGS

FBGS is a Germany / Belgium based developer and manufacturer of high strength Fiber Bragg Gratings (FBGs), Interrogators, Sensors and custom-made fiber optic sensing solutions. FBGS has developed two unique and fully automated production processes for FBGs which result in very high quality and cost-effective sensing components with unique optical and mechanical characteristics. FBGS's products are suitable for both standard and bespoke applications in industries such as: medical, composite, transport, process, civil & geo, telecom and R&D. FBGS supplies 'Draw Tower Gratings' – DTG® and 'FemtoSecond Gratings' – FSG® as an OEM component to our worldwide customers. Furthermore FBGS is also developing and manufacturing customized sensing solutions for selected markets.



Our Components

## Components



### Draw Tower Gratings (DTG®)

Our Draw Tower Gratings (DTG®s) are produced during the drawing process of the fiber itself, before the primary coating is applied. This is a cost effective production process for high quality Fiber Bragg Gratings with unique characteristics such as extremely high mechanical strength.



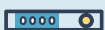
### All Grating Fibers (AGF®)

Our All Grating Fiber (AGF®) consists of an optical fiber with densely spaced Draw Tower Gratings (DTG®s) over its entire length. The AGF is enabling a wavelength selective backscattering enhancement without significant attenuation increase and is developed for users of scattering based measurement systems such as OFDR or DAS.



### FemtoSecond Grating (FSG®)

The featured FemtoSecond Grating (FSG®) is a uniform apodized grating fabricated with ultra-short laser pulses, using a special through-the-coating inscription technique. The inscribed FSG® maintains the pristine high strength of the optical fiber and adds new performance features.



### Measurement Devices

We offer dynamic, high precision measurement devices for Fiber Bragg Grating (FBG) sensors. Available with different numbers of optical channels it allows our customers to measure strain, force, temperature, pressure and shape. Each measurement device comes with a dedicated and universal software.



### Sensors

Optical fiber sensors present undeniable advantages such as high fatigue limits, multiplexing and immunity to electromagnetic interferences. With our variety of high quality Fiber Bragg Grating sensors one can measure strain, force, temperature, pressure and shape.

## Solutions



### Force Sensing

The importance of controlling the interaction force between minimum invasive surgery tools and the human tissue has been well-recognized by the medical community. FBGS offers a turn key solution for directional force measurements based on MultiCore Fibers with Draw Tower Gratings (MCF-DTG®).



### Shape Sensing

FBGS offers an unprecedented solution for performing optical shape sensing using our dedicated developed MultiCore Fiber technology (MCF) in combination with our Draw Tower Gratings (DTG®). This technology will enable complete new application fields in the medical industry.



### Temperature Sensing

The reflection wavelength of the FBG depends on the grating characteristics and is influenced by the ambient conditions such as temperature. FBGS is offering turn key temperature sensing solution for different industries such as steel or petrochemical industry.



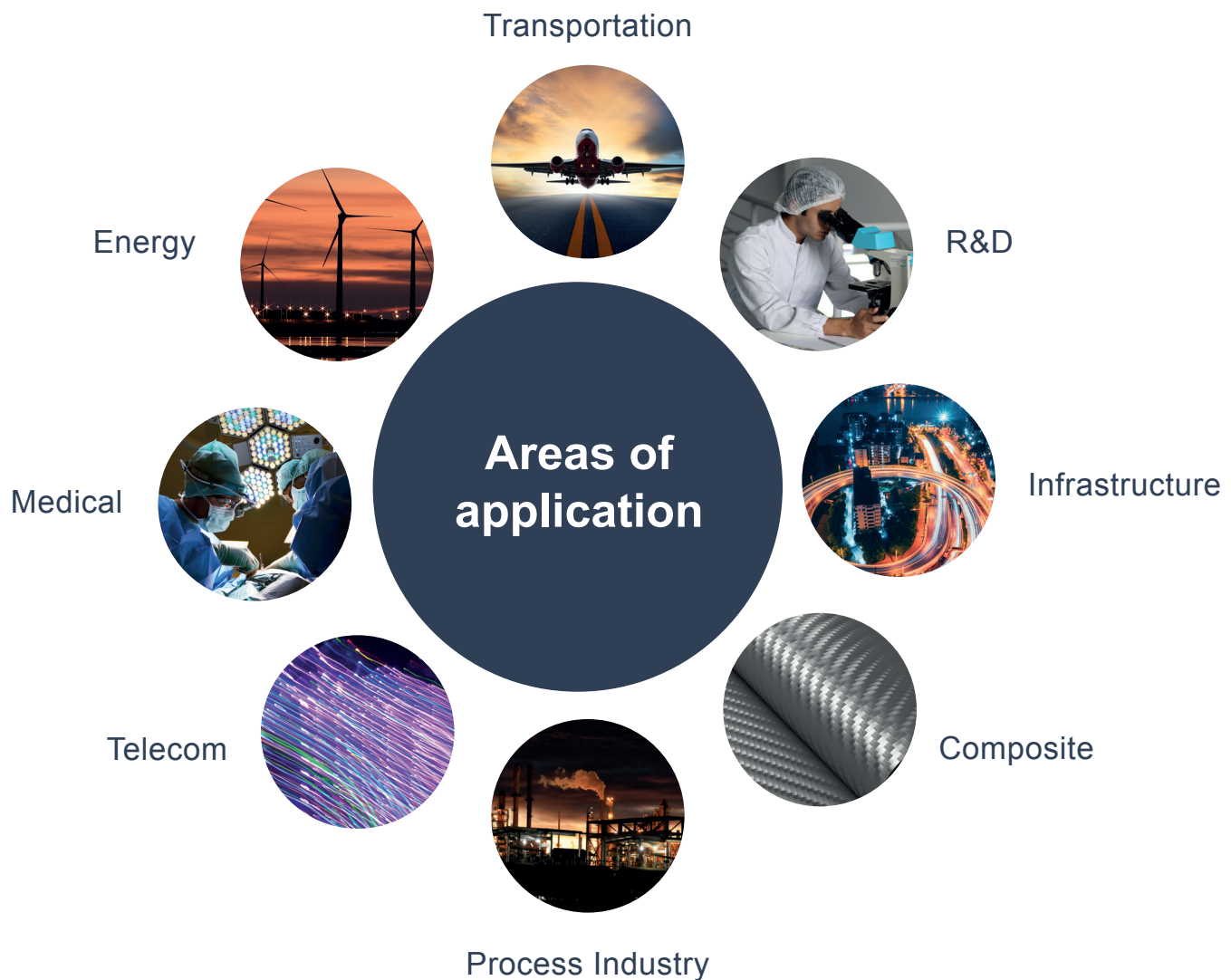
### Pressure Sensing

FBG sensors are well suited for pressure measurements in different challenging environments in the medical market, process industry or in the oil and gas sector. They offer many advantages like electromagnetic immunity, small size, mechanical robustness and non-inflammability due to the used glass.



### Strain Sensing

Fiber Bragg Gratings are known to have a stable and reliable Sensor response as function of the applied strain. Therefore, FBG sensors gaining an increasing attention in the field of static and dynamic strain measurements in different industries, for which FBGS, is offering total solutions.



## Locations

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