

# ITEA Magazine

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# PROFcomms

## Probing sensor application possibilities

PROFcomms, a distributor of active components for network applications specialising in services for companies that use and build telecommunication networks, is an active participant in the ITEA community and part of the LifeWear project that took up the challenge to develop a new platform to create new market opportunities as well as boost the position of European technology in the new generation of wearable computers.

“Our research is focused on strain, pressure and bending sensors. The sensors we have developed are used in the industrial environment for the optical sense of quantity and able to span the large distance between the sensor and the interrogation or evaluation system,” says Frantisek Urban of PROFcomms. Most of the sensors are developed on the basis of Fiber Bragg Gratings (FBGs) that consist of a diffractive structure created in optical fibre core (see figure 1).

### Interrogation system

“We are able to get specific reflected and transmitted signals while using broadband light sources. Most of our sensors use the deformation of optical fibre and hence induced change in the



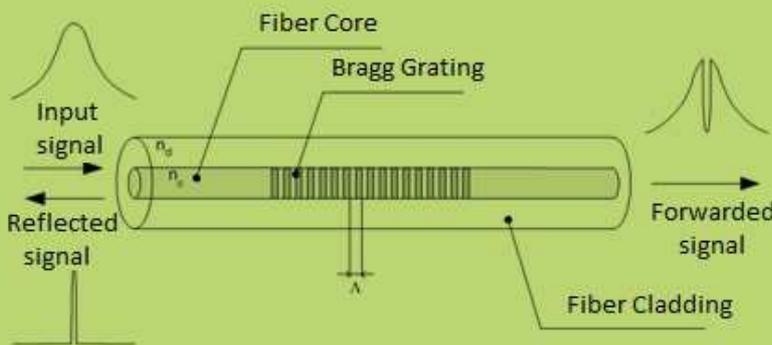
**Figure 2** Interrogation system with built-in broadband light source, spectrum analyser and four FBG sensor multiplexer

central wavelength of the reflected light.” Optical fibre deformation of is generated by a measured force delivered by a mechanical transducer. The package or substrate of the optical sensor usually acts as the transducer. Tensile strength, compressive strength and bending angle are possible quantities to be measured with these sensors. Optical spectral analysis is necessary for processing and evaluating received light signals. Our interrogation system consists of a broadband source and tuneable filter able to perform a spectral analysis of the incidental light signal.

The system also includes a TCP/IP interface for communication. “Our system can multiplex simultaneously up to four FBG sensors through optical switch,” Urban says. The interrogation system is shown in figure 2. The interface for the connected PC is created using LabView software.

### Early stage

PROFcomms’ first sensors are still at the prototype stage and, as such, are undergoing long-term stability (ageing) evaluation and reliability testing. Nonetheless, two applications for the sensor are already being explored: strain measurement on the large concrete structures used in power stations (from fossil to nuclear) and the weighing of moving vehicles on the road through a weight-in-motion (WIM) system. Potential first customers include the Czech Research Institute for Nuclear Energy, which is working on the implementation of the sensors, and a private sector company that will implement WIM systems. Before these sensors actually reach the market, they will be customised to determine the best application match before further development enables them to be delivered as a commercially viable product.



**Figure 1** Fiber Bragg Grating function description