

WHAT IS FIBER OPTIC SENSING?

Distributed and quasi-distributed fiber optic sensors are systems that connect opto-electronic interrogators to an optical fiber (or cable), converting the fiber to an array of distributed sensors. The fiber becomes the sensor while the interrogator injects laser energy into the fiber and detects events along the fiber.

This technology can be deployed to continuously monitor vehicle movement, human traffic, digging activity, seismic activity, temperatures, structural integrity, liquid or gas leaks, and many other conditions, and activities. It is used around the world to monitor power stations, telecom networks, railways, roads, bridges, international borders, critical infrastructure, terrestrial or subsea power cables or pipelines, and downhole applications in oil, gas and enhanced geothermal electricity generation. Fiber optic sensing is not constrained by line of sight or remote power access and, depending on system configuration, can be deployed in continuous lengths exceeding 45 km (30 miles) with detection at every point along its path. Cost per sensing point over great distances cannot be matched by competing technologies and often existing deployed fibers can be utilized.

HOW DOES IT WORK?

Fiber optic sensing measures changes in the naturally occurring “backscattering” of light occurring in an optical fiber (or designed in methods of controlled reflection such as Fiber Bragg Gratings). Measurable change is observed when the fiber encounters vibration, strain or temperature change. The fiber serves as sensor over its entire length, delivering real time information on physical surroundings and security. Furthermore, the data pinpoints the precise location of events and conditions occurring at or near the sensor cable.

HOW BIG IS THE MARKET?

Leading market research firms estimate global distributed fiber optic sensing sales at over \$600 million for 2016, with growth projected to over \$2 billion by 2025.

[THE FIBER OPTIC SENSING ASSOCIATION \(FOSA\)](#)

FOSA is a non-profit organization created in Washington DC in 2017 with the mission of educating industry, government, and the public on the benefits of fiber optic sensing. Through webinars, videos, white papers, public presentations and public policy advocacy, the organization provides information on the use of fiber optic sensing to secure critical facilities, enhance public safety and protect the environment.

FOSA Members include AP Sensing, Corning, Ditch Witch, Dura-Line, FEBUS Optics, Graz University of Technology, Hifi, LUNA, NEC Corporation of America, Network Integrity Systems, OFS, OZ Optics, Prysmian Group, SAMM Teknoloji, Sonsonic, Smartpipe Technologies, Underline, the University of California - Berkeley, and VIAVI Solutions. For further information, please visit <https://fiberopticsensing.org>.