Introduction to DTS

WHAT IS Distributed Temperature Sensing?

Distributed Temperature Sensing (DTS) is a fiber-optic sensing technology for measuring spatially resolved temperature profiles along fiber-optic sensor cables. Sensor cables may be installed near linear assets as well as on 2- or 3-dimensional objects for measuring their temperature profiles.

HOW DOES IT WORK?

The DTS device sends laser light into an optical fiber. A part of that light is in-elastically backscattered to the device where the backscattered light is analyzed. Inelastic scattering is a physical interaction of light and matter that changes propagation direction and wavelength of light. Since it depends on temperature, the characteristics of the backscattered light provide a measure of temperature in the fiber. The time delay of the returning light with respect to the excitation is used to obtain spatially resolved temperature information.

WHAT ARE THE APPLICATIONS OF DTS?

Major applications of DTS are fire detection in tunnels and buildings, power cable monitoring, monitoring of industrial equipment such as ovens and reactors, and oil and gas production as well as leak detection at pipelines and storage tanks. Any application requiring the measurement of temperatures at high numbers of locations and/or great distance is well suited to DTS.

WHAT ARE THE BENEFITS OF DTS?

DTS just requires the installation of standard optical fibers (or in some cases special purpose cables) without a need for individual sensing elements or electricity in the application. It is immune against electromagnetic interference. A single DTS may monitor thousands of locations at distances up to 65 km (40 miles). Thus, DTS avoids the complexity of running multiple wires and linking up numerous point temperature sensors. DTS can be intrinsically safe for monitoring explosive environments. DTS fire detection is based on heat only and thus not affected by dust. Many devices can be configured to operate in two directions effectively doubling the coverage.

WHO ARE THE FOSA DTS SUPPLIERS?

AP Sensing, Electronic and Optical Sensing Solution (EOSS), FEBUS Optics, Hifi, Luna Innovations, NEC Corporation of America, OZ Optics, Prysmian

THE FIBER OPTIC SENSING ASSOCIATION (FOSA)

FOSA is the nation's premier trade association dedicated to fiber optic sensing technology. FOSA serves as the voice of the industry, providing comprehensive knowledge sharing, strong advocacy, and a unified vision for the future 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, Electronic and Optical Sensing Solution (EOSS), FEBUS Optics, Go!Foton, Graz University of Technology, Hifi, Indian Oil, Luna Innovations (LIOS, OptaSense, Silixa), NEC Corporation of America, Network Integrity Systems, Novacomm, OZ Optics, Prysmian (Omnisens), SAMM Teknoloji, Sensonic, Sintela, Smartpipe Technologies, Texas811, Underline, The University of California - Berkeley, VIAVI Solutions, ACI Monitoring, Indeximate, Optical Strategies, and Prop Systems. For further information, please visit https://fiberopticsensing.org.