



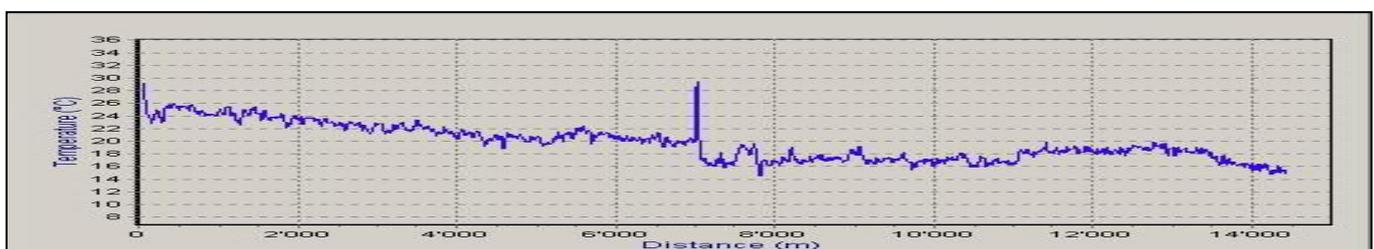
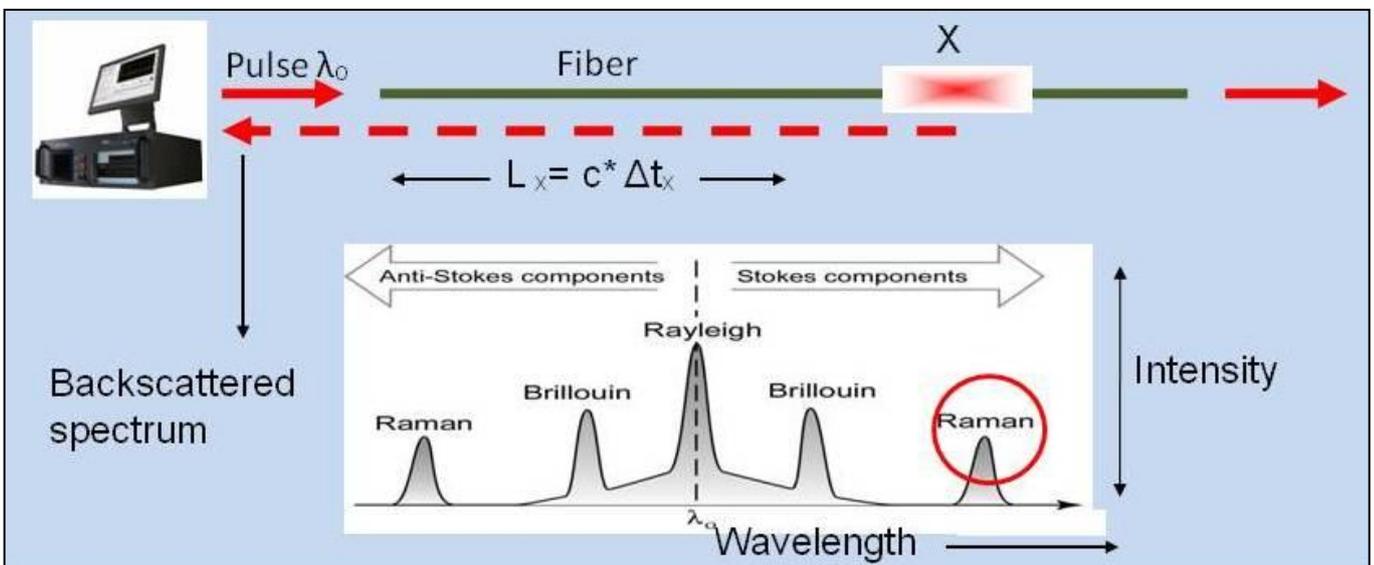
DTS / DITEMP

DISTRIBUTED TEMPERATURE SENSING

- Pipeline leak detection
- High voltage lines
- Faulty sewer connections
- Geothermal energy
- Geohydrology
- Offshore

DISTRIBUTED TEMPERATURE SENSING (DTS)

A reading unit constantly launches a high frequency light pulse of one specific wave length through an optical fiber. The major part of the light exits the fiber at the far end. A small part of the light however is backscattered to the reading unit. This backscattering occurs at every point along the fiber. As a result of photo-acoustic phenomena the backscattered spectrum does not only show the original frequency of the light that is launched into the fiber but contains two additional frequencies: the so-called Brillouin and Raman frequencies. The latter is utilised in DTS: there is a defined relation between the intensity of the Raman frequency and the temperature of the fiber. Measuring the Raman frequency at length intervals of e.g. 1,00m results in the distributed temperature over the length of the fiber and thus of the object (e.g. a pipe line) to which the fiber is connected or of the medium (e.g. soil) in which the fiber is embedded. The location of each measurement results from measuring the time that has lapsed between launching of the pulse and receipt of the backscattered light (Radar principle – the speed of light is constant).



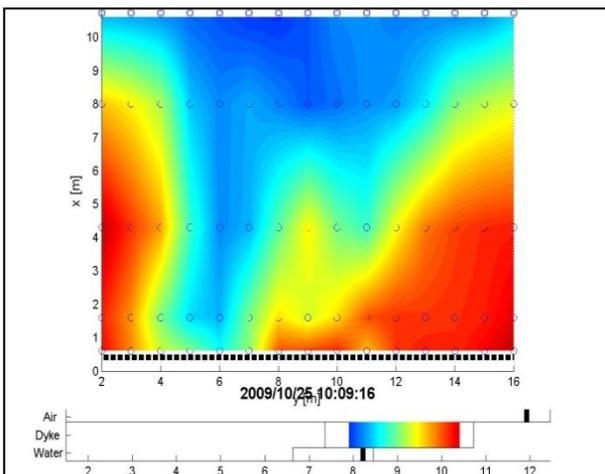
Distributed temperature of a 14km long pipe line



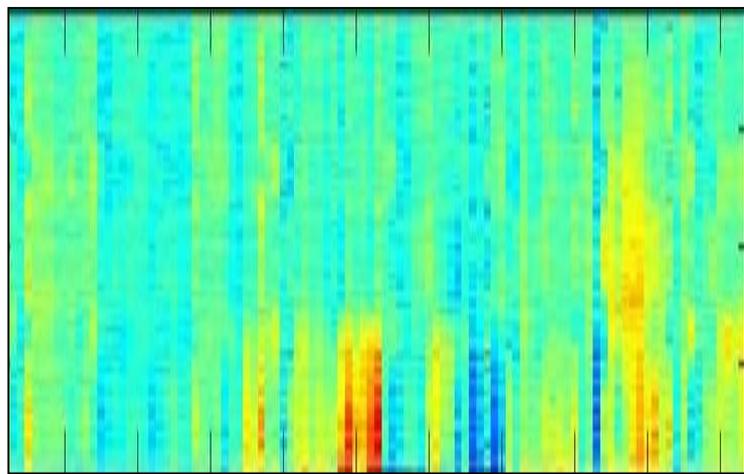
DTS measurements at a HV switch station

APPLICATIONS

- Liquid and gas pipelines : leak detection
- High voltage Lines : operational management
- Offshore Pipelines : production management
- Sewers : locating erroneous connections
- Geothermal energy : monitoring temperature distribution
- Geotechnical / Geohydrological : groundwater flow patterns.



Groundwater flow pattern



Rainwater sewer with faulty connections

TECHNICAL SPECIFICATION

Measurement range	: up to 50km
Number of channels on the reading unit	: 2, 4, 8 or 16 (with multiplexer)
Type of optical fiber	: multi mode or single mode depending on application
Spatial resolution	: 1,00m
Temperature range	: -25° to +80°C with standard sensing cable -25° to +300°C with special cable
Temperature resolution	: 0,005° to 1,0° depending on measuring time and desired spatial resolution
Measuring time	: 10 seconds to 15 minutes depending on desired resolution
Power requirement	: max. 120W

SPECIALISTS IN FIBER OPTICS

Inventec is front runner in fiber optics applications in civil/structural engineering, geotechnical engineering, piping, energy and security.



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