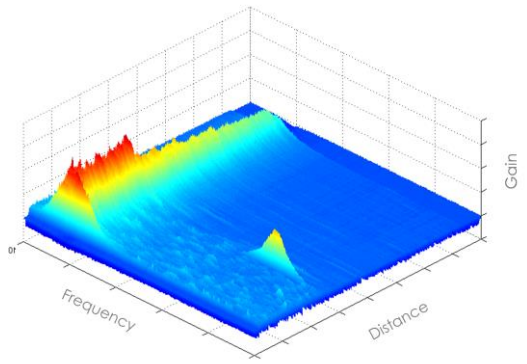
FIber NEtwork Strain and Temperature distributed Sensor (FINEST).

FINEST is a powerful distributed strain and temperature sensor system capable of monitoring absolute temperature and strain changes in optical fiber. It allows for real-time distributed surveillance of the vicinity of critical infrastructure with minimal investment (e.g. gas/oil leaks, fires, structural damage). The system is based on Brillouin Optical Time Domain Analysis (BOTDA) technology. FINEST can detect, identify the position and register the temperature and strain changes on the fiber. The distance covered by the sensor is 2 to 80 km, with a minimum resolution of 0.5 meters (i.e. the system can distinguish two different events spaced by 0.5 meters). The temperature resolution is < 1 ºC. The strain resolution is < 20 µstrain. The measurement period is a couple of minutes. Although this is the standard performance values, FOCUS can accommodate different ranges and resolutions on demand, within the limits set by the BOTDA technology (contact FOCUS for special requests).

Once a suspicious event is detected at a given position, the variation at this position is recorded.



3D Visualization of temperature evolution along fiber with non-homogenous section (hot-spot)

External appearance

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Specifications

Optical/Electrical			
Wavelength	1550.12 nm		
Frequency range & resolution	8 to 12.5 GHz, 1 kHz		
Distance range & fiber type	Up to 50 km (G652 fiber). More distance can be accommodated using our proprietary Raman-assistance technology		
Typical spatial resolution* (minimum distance between events)	1 m (20 Km reach) to 2 m (80 Km reach) in increments of 0.1 m		
Acquisition resolution	500 MS/s, 20 cm per datapoint		
Temperature uncertainty	2.8 ºC for 50 cm spatial resolution, 0.5 ºC for 5 m spatial resolution		
Measurement	Frequency shift	Temperature*	Strain
Minimum	8 GHz	-273 ºC	-3% compression
Maximum	12.5 GHz	700 ºC	3% elongation
Resolution	1 kHz	0.001 ºC	2 με
Acquisition time (typical)	6 minutes for 2 Km of optical fiber with 50 cm resolution (4000 datapoints)		
Mechanical & Interface			
Output optical connector	FC/APC other (SC/APC, etc) on demand, preferably APC technology		
Power Supply	230 VAC; 50 Hz; max 300 W		
Distance uncertainty	$U(L)= (5 + 1\cdot10^{-5} \cdot L)$ m		
Working temperature Humidity	(22 ± 2) ºC (10 ~ 70) % RH		
Dimensions	8U 19” rack-mount (48.2x45x35.36 cm WxDxH)		
Weight	< 20 kg		

*Limits may vary depending on the physical parameteres of the optical fiber being used for the measurements.