

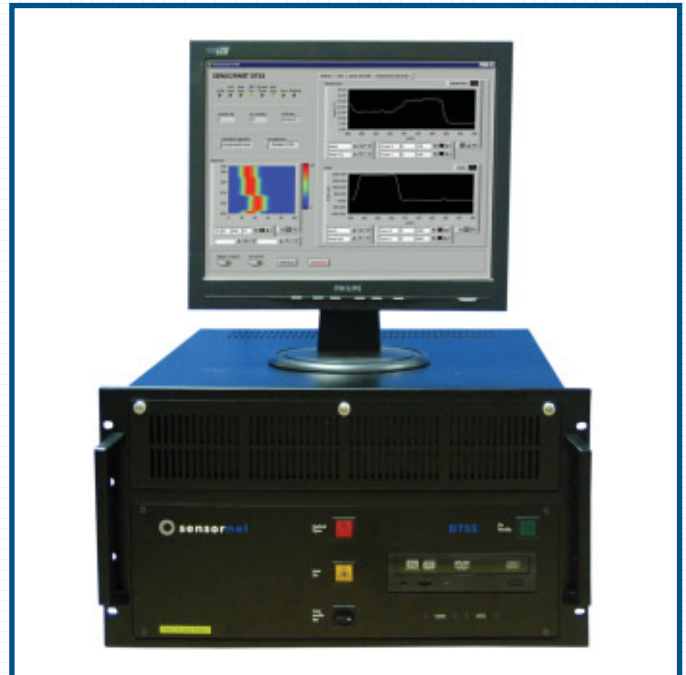
DTSS Distributed Temperature & Strain Sensor

“SensorNet’s unique strain measuring capability provided the measurement we needed to verify the robustness of our aerial cable routes.”

Robin Parsons, *Energis*

The SensorNet DTSS is a unique instrument capable of independently measuring strain and temperature at all points along a single length of optical fibre.

Other Brillouin based sensors suffer from a temperature and strain cross-sensitivity. SensorNet’s DTSS uniquely takes an independent temperature measurement to ensure there is no cross-sensitivity (temperature compensated strain). With appropriate cabling, the DTSS can also make fully distributed temperature independent pressure measurements. The DTSS is optimised for single-ended measurements, needing access to just one end of the optical fibre. It can be controlled and interrogated remotely.



The SensorNet DTSS

DTSS applications include

- Structural health monitoring eg. bridges, buildings
- Subsidence monitoring
- Compaction monitoring
- Dam movement
- Foundation monitoring
- Umbilical/riser strain monitoring
- Downhole pressure monitoring
- Railway integrity monitoring
- Dynamic strain monitoring - please see reverse

Summary of sensing capabilities

	TEMPERATURE COMPENSATED STRAIN	UNCOMPENSATED STRAIN
Range	0 – 24 km	0 – 24 km
Spatial resolution	1 m	1 m
Measurement time	From 2 minutes	From 2 minutes
Temperature resolution*	1°C	N/A
Strain resolution*	20 µε	10 µε
Pressure resolution*	2 psi	1 psi

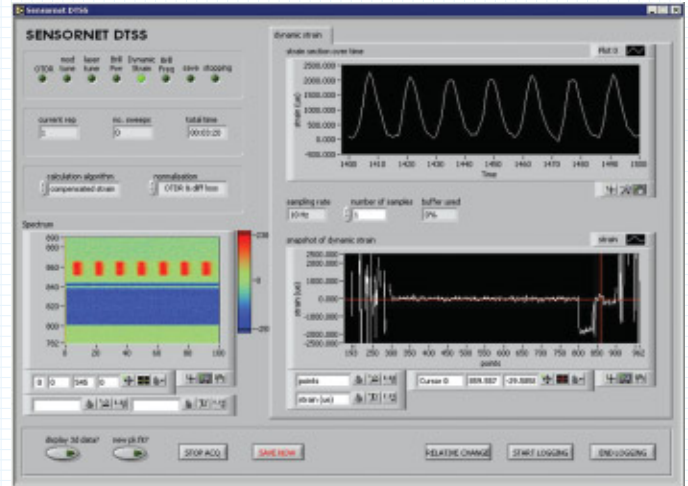
*Specific resolution depends on the range, spatial resolution and measurement time. Please contact a SensorNet representative for further information.



Dynamic Strain Sensing Capability of the DTSS

The DTSS incorporates Sensornet's unique technology that allows fast, fully distributed measurements of strain at acquisition rates of up to 10Hz.

This is a unique capability, being able to achieve real-time measures of strain at all points along the fibre. This will enable the introduction of distributed optical fibre sensors into a range of new applications.



Distributed measurement of simple harmonic motion

Dynamic strain applications include

- Dynamic monitoring of deep water risers for fatigue prediction
- Perimeter security detection systems
- Dynamic monitoring of large structures such as bridges
- Dynamic structural railway monitoring

Examples of sensing capabilities*

STRAIN RESOLUTION	MEASUREMENT TIME DEPENDING ON RANGE		
	0 - 1km	1 - 2km	2 - 5km
50 $\mu\epsilon$	100ms (10Hz)	400ms (2.5Hz)	2.5 seconds
5 $\mu\epsilon$	10 seconds	40 seconds	4 minutes 10 seconds

*Spatial resolution 1m as standard.

These specifications provide a simple illustration of what is possible with this unique technology. Measurements of up to 24km in range are also possible. The technology allows the strain resolution to be tuned, so that specifications can be modified depending on the requirements of a particular application. The list above are simply examples and Sensornet welcomes enquiries for new applications.

