



Subsea Transmission Link

Sicily to Calabria, Italy

To monitor and protect the overland sections of this important link, AP Sensing's fiber-optic based DTS (Distributed Temperature Sensing) solution was selected.

The extra high voltage power links run between power stations in Sicily and Calabria, crossing the Messina straits. The **total cable route is approximately 44 km long**, of which 6 kilometers are over land – these stretches are monitored by AP Sensing – and 38 kilometers are subsea. Both circuits are crossing different regions (e.g covered trench, buried sections, ocean, tunnel) between the power stations. The complex land installation included a 300m vertical shaft and a 3km tunnel, sloped at 12%.

Two 8 km Linear Power Series DTS devices, each with 2 channels and 44 relays, were installed in a **single-ended configuration** to monitor the temperature of the central phase of 2 circuits of power cable. The power cable itself is a **double-circuit 380 kV HVAC system**.



Cable produced in Arco Felice, Italy



Central phase monitored

Photo © 2016 Prysmian Group

Power cables in general **suffer from strain caused by the operation of the cable**. To minimize the unwanted strain effect, **the cables were installed with some slight sagging at intervals** (see the photo below). Furthermore, **a DTS device based on Raman technology is used for temperature monitoring, which is insensitive to strain-crosstalk**.

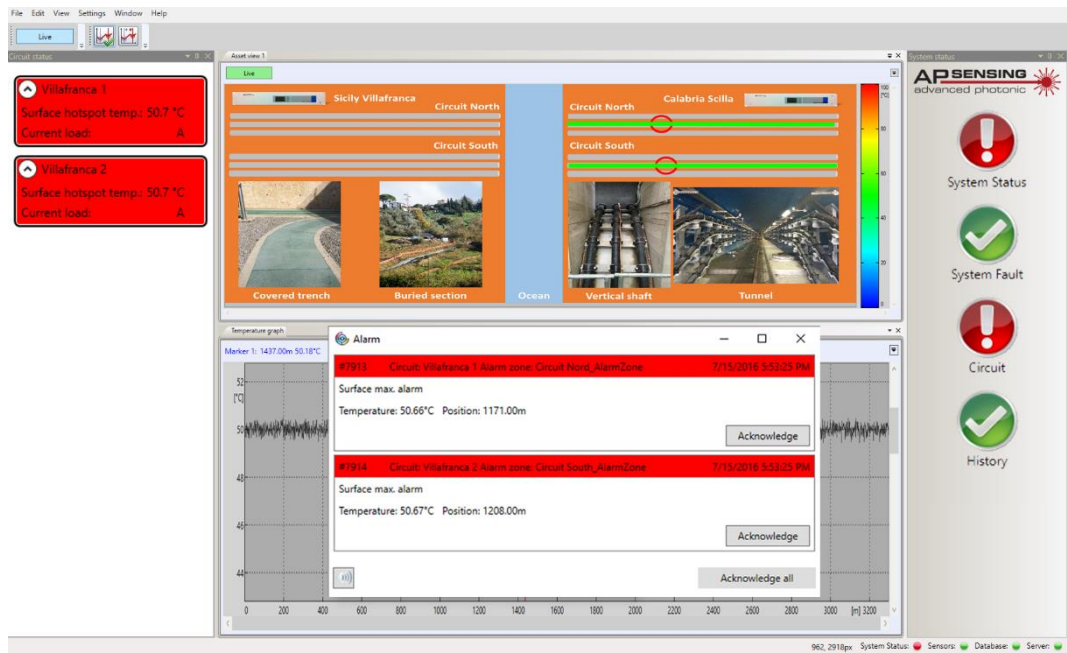


Power circuit through tunnel with sagging



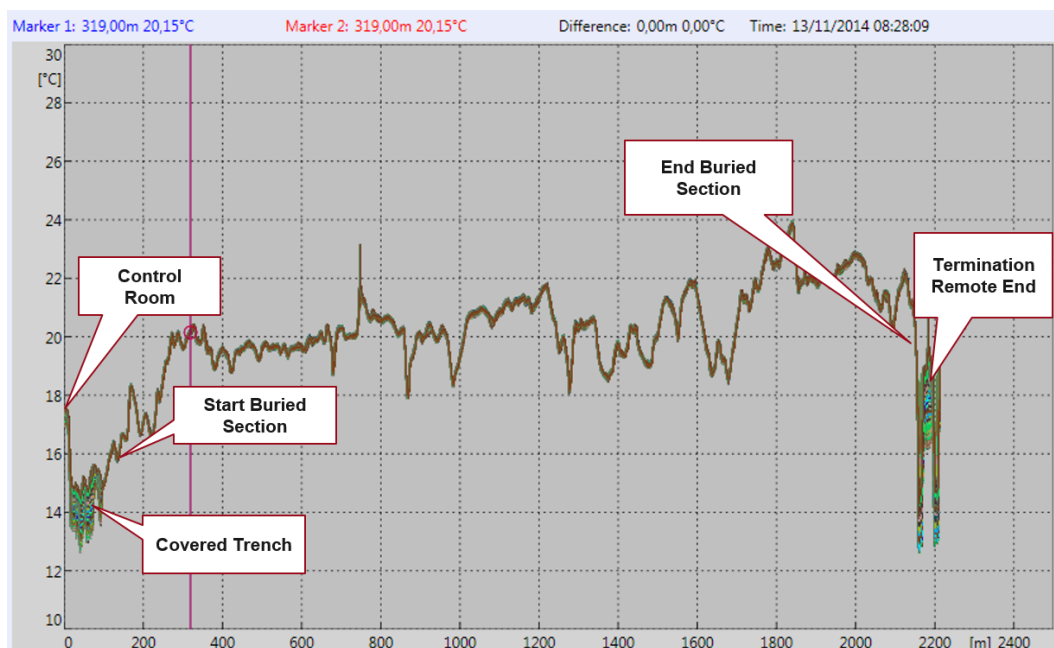
Messina straits: Circuits left and right between Sicily and Calabria

The installation was further **enhanced with our SmartVision information management suite**. SmartVision provides a **color-coded asset visualization of all circuits in one overview**. Temperature graphs and hotspot tables are always available and accessible. SmartVision also offers **reporting and analysis capabilities, a central database and alarm management features**. During the **SAT (system acceptance test)**, test alarms were generated by placing thermoresistors in both of the circuits. **All criteria for all tests were met successfully**.



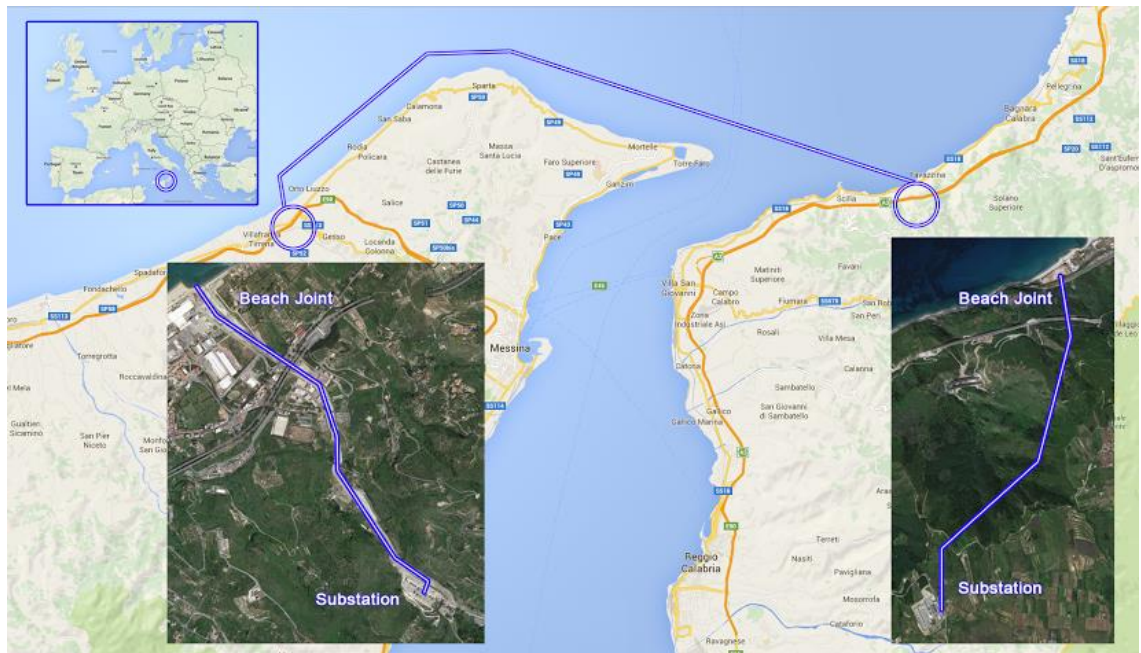
SmartVision overview screen

Results of temperature traces showing different setup sections, e.g., Control Room, Buried Sections, Trench and Terminations.



SmartVision temperature trace

The combination of overland and subsea routes, the total length of the installation and the rugged terrain on both sides of the straits made for a **technically challenging project**.



Map view Villafranca - Scilla

AP Sensing provided **operator trainings for trouble-shooting, in Italian**, for the two groups of operators. Since the project was completed, all systems have been up and running with **no reported problems**. **Additional cable-routing projects are planned** in Italy to keep up with the ever-growing demands for more energy. **A valuable infrastructure remains monitored and protected.**



High voltage power cables