



REAL TIME DISTRIBUTED MONITORING OF OVERHEAD POWERLINES

WORLD WIDE CONTEXT

The integration of renewable energy into the grid is essential to meet the increasing energy demand, also driven by datacenters ensuring greater flexibility. Developing new wind and photovoltaic plants is crucial, but the non-programmable and variable nature of renewable production poses challenges. Enhancing grid flexibility and optimizing transmission lines are necessary to maximize transport capacity and minimize curtailment due to local congestion, ensuring a more efficient and resilient energy system.



CURRENT SITUATION

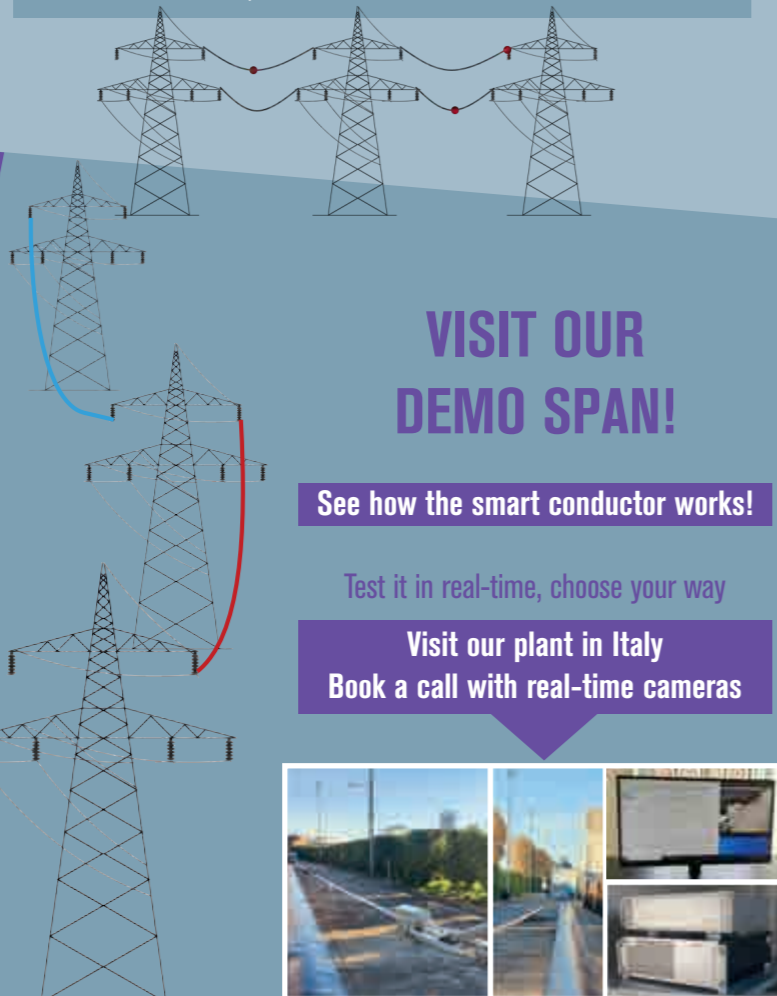
Enhancing grid flexibility and transmission capacity involves advanced technologies, though **some have limitations**. DLR increases ampacity using weather forecasts but faces variability. Point by point sensors installed on the conductor or on the line measure only the conditions in one specific point and they require periodic maintenance. **Improving these methods is vital** for grid performance and it is the goal of Smart Conductor.

Solution	Disadvantages
STR	Static Thermal Rating is too cautious because it assumes: maximum solar radiation and almost no wind.
DLR	DLR improves ampacity using weather forecasts but is limited by temperature uncertainty and lack of precise measurements.
Point-by-point Sensors	Discrete measurement estimate conductor temperature indirectly with conductor and tower sensors, prone to wind variability and need frequent battery changes.

OUR GOALS

- Increase system reliability and efficiency
- Predictive analysis of the line
- Distributed measuring and control of the line
- Increase data transmission systems

A REAL TIME DISTRIBUTED MONITORING SYSTEM!



VISIT OUR DEMO SPAN!

See how the smart conductor works!

Test it in real-time, choose your way

Visit our plant in Italy
Book a call with real-time cameras

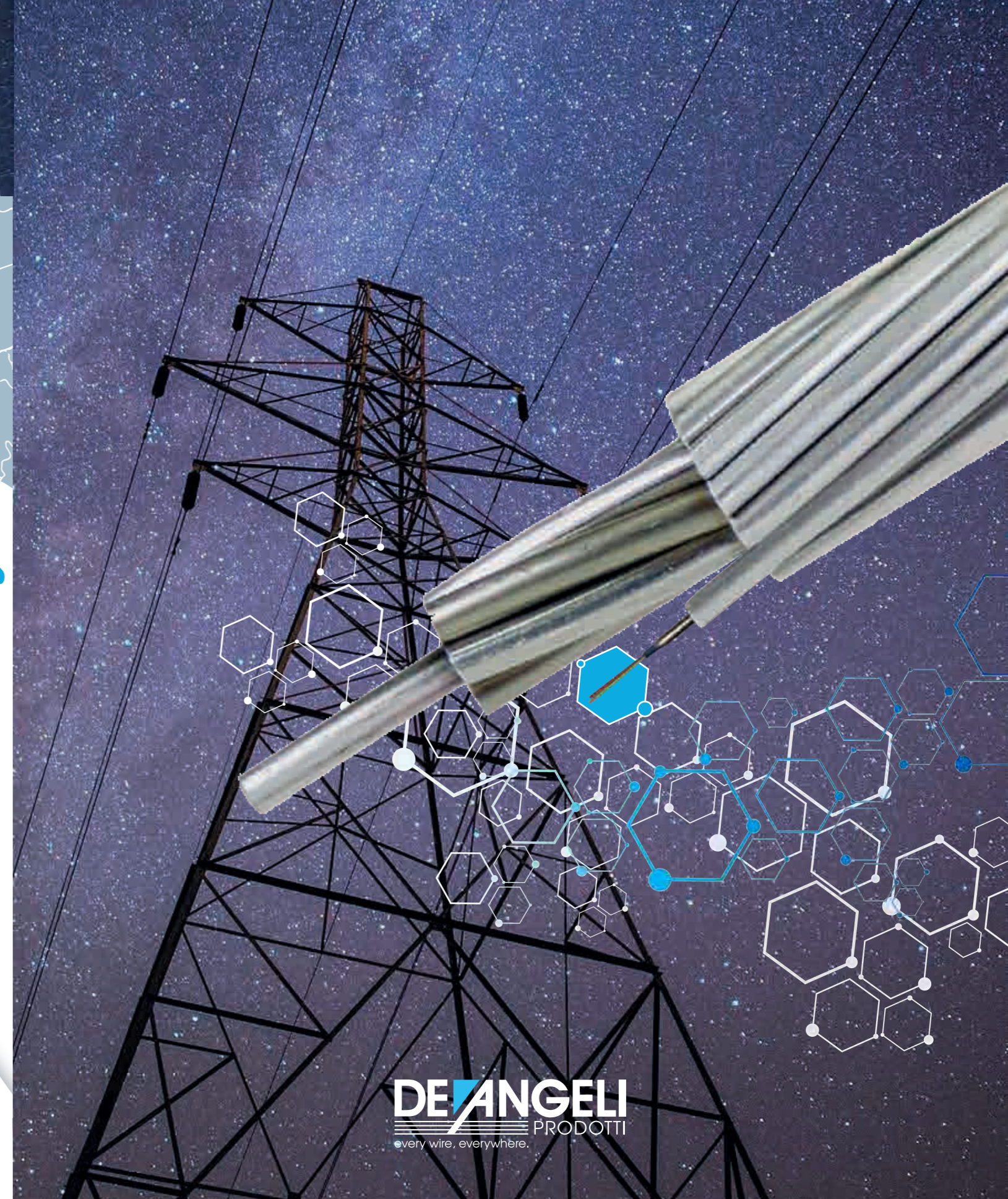


DE ANGELI PRODOTTI

every wire, everywhere.

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WE DEVELOP AND MANUFACTURE ADVANCED CONDUCTORS TO SUPPORT ENERGY TRANSITION

OUR VISION LEADS US

De Angeli Prodotti is at the forefront of a **GREEN REVOLUTION** to save the Planet. **ENERGY TRANSITION** helps **DECARBONIZATION**, requested **WORLDWIDE** to mitigate **CLIMATE CHANGE**, involves substantial investments in **RENEWABLE ENERGY**, and poses the challenge of **ELECTRIC MOBILITY**. **CONNECTION** of **MULTIPLE INTERMITTENT ENERGY SOURCES** requires a **MORE INTEGRATED, SECURE** and **FLEXIBLE POWER GRID**. **DIGITALIZATION** is an enabling and pervasive technology. All above while in **DEVELOPING COUNTRIES**, a **GROWING SHARE OF POPULATION** has access to **ELECTRICITY!**



ROLE OF OVERHEAD LINES

An important role is played by **overhead conductors**, for which we spend the maximum effort in **research and collaboration** with our customers, to be able to supply customized and **high quality products**. Their significance cannot be overstated as we transition towards more sustainable energy practices. To ensure the seamless integration of renewable energy sources and the optimization of **energy distribution networks**, we devote substantial resources to research and we strive to develop and supply **tailored products** that meet the evolving needs of the energy sector.

CONTINUOUS INVESTMENTS IN QUALITY AND INNOVATION



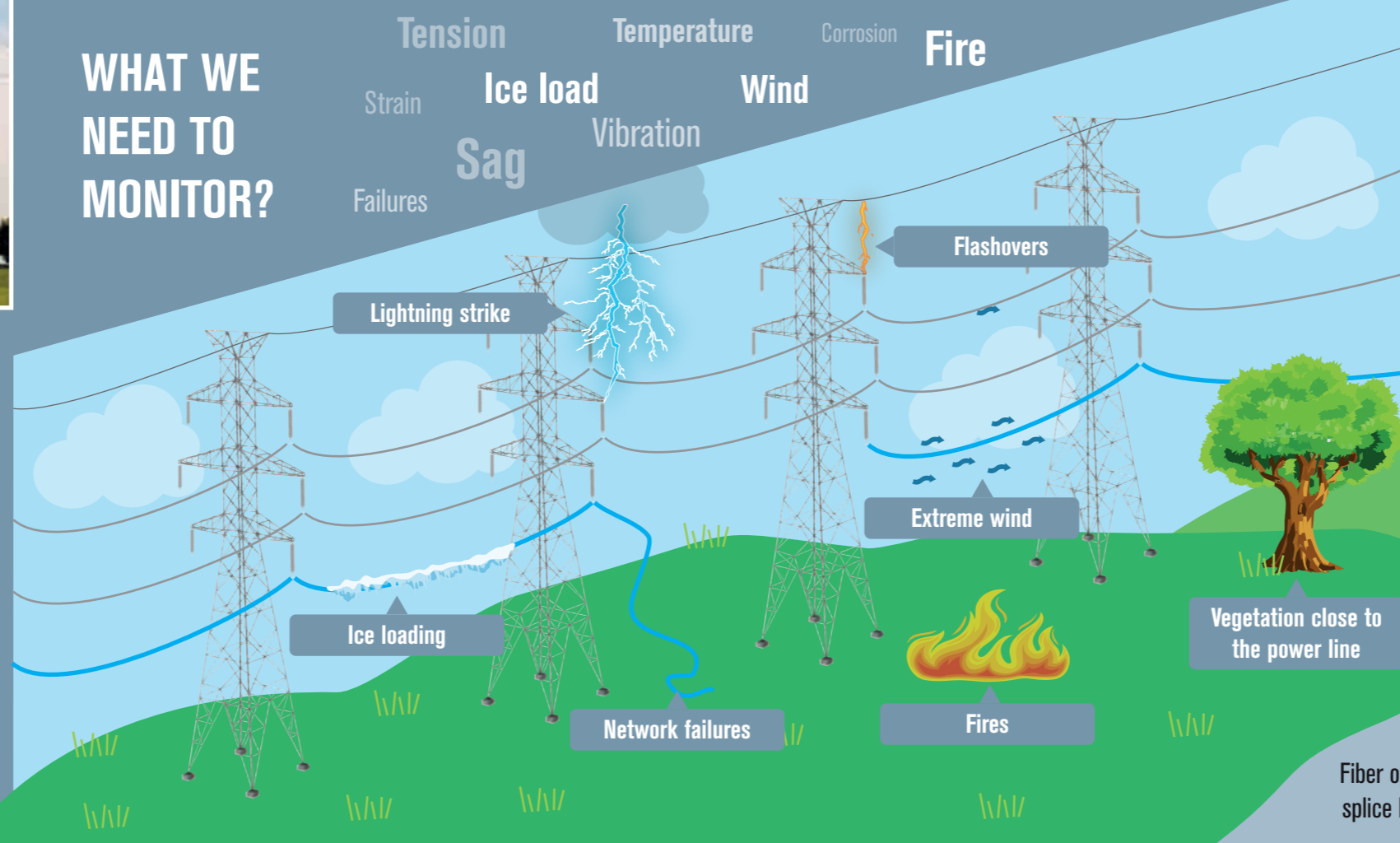
Our recent investments reflect a strong commitment to innovation and quality. The addition of a **planetary stranding machine** enables the production of high-performance conductors with precise control over structure and tension, ideal for **advanced OHL applications**. Alongside, the new **FIMT (Fiber in Metal Tube)** line integrates fiber optics directly into the conductors, allowing real-time monitoring and smart grid capabilities. These technologies position us at the forefront of the **smart conductor market**, ready to meet the demands of modern energy infrastructure.

SMART CONDUCTOR: REAL-TIME APPLICABILITY

- DLR (Dynamic Line Rating):** thanks to the integrated optical fibers, the Smart Conductor measures in real-time the **temperature and strain** along the entire line, allowing for the optimization of forecasting models and thus the transport capacity (ampacity).
- Increase ampacity:** through the continuous monitoring of temperature via **Distributed Temperature Sensing (DTS)** along the entire Smart Conductor, it is possible to eliminate precautionary safety limits and achieve a significant **increase in current capacity**.
- Ice loading:** the Smart Conductor monitors in real-time the strain along the line via **Distribute Strain Sensing (DSS)**, enabling **precise control** of the ice load and sag.
- Wildfires:** with the DTS system along the entire Smart Conductor, prevention and immediate **detection of wildfires** are possible.
- Galloping:** the Smart Conductor is able to measure **vibrations and acoustic waves** along the entire line via **Distributed Acoustic System (DAS)**, allowing for the detection of phenomena such as galloping.
- Maintenance:** through acoustic and vibration monitoring the Smart Conductor can precisely detect the **position of potential breaks (DAS)** and through the DTS it can detect the **hot spots**, allowing for preventive maintenance and reducing intervention times and costs.



WHAT WE NEED TO MONITOR?

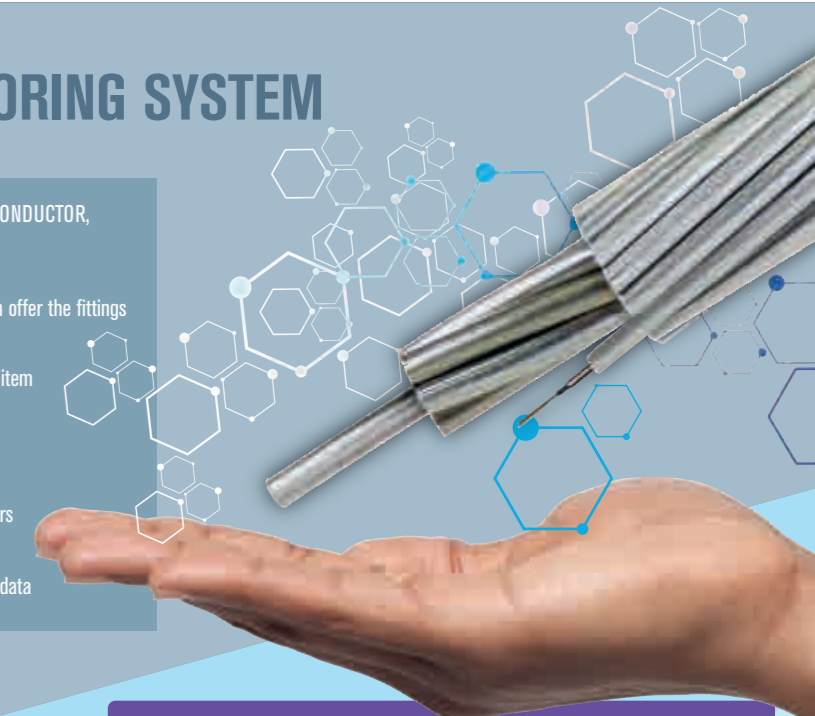


ADVANCED INTERROGATION OF OPTICAL FIBERS DELIVERS REAL-TIME CONTINUOUS LINE MONITORING

WE OFFER A COMPLETE MONITORING SYSTEM

Taylor made	The R&D department can design CUSTOMIZED CONDUCTOR , suitable for the various needs of the customers
Fittings	Together with the supply of the conductor we can offer the fittings
Installation manual	Made by our engineers and customized for every item
Training in classroom	We provide training before the installation
Support on field	You receive a complete support from our engineers
Data	Assistance for interrogation and interpretation of data

Our conductor design can be **fully customized** in collaboration with our R&D team to **perfectly match** your needs. Flexible solutions, tailored to your unique requirements.



- DTS: Distributed Temperature Sensing**
Measures the temperature all along the line
- DSS: Distributed Strain Sensing**
Measures the strain all along the line
- DAS: Distributed Acoustic Sensing**
Measures acoustic wavering and vibrations all along the line

FITTINGS

Fittings are similar to standard ACSR fittings. We are developing **compression, preformed and wedge fittings**

