EOSS

Leading a revolution in monitoring and managing electrical assets.

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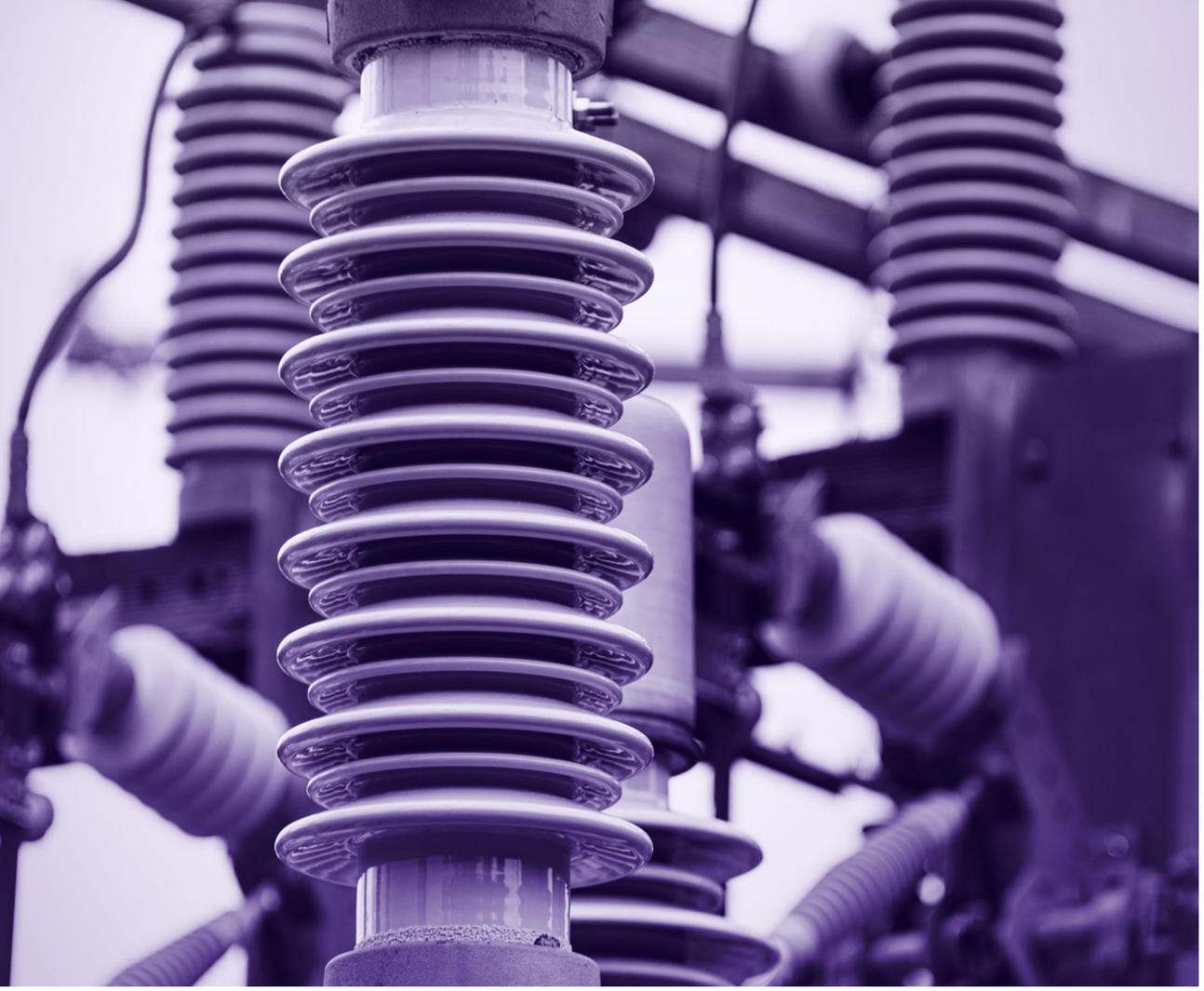


With a constant focus on excellence, we're helping shape a data-driven future.

As the energy transition accelerates, energy-intensive industries are being pushed to rethink how they operate. Established players are under pressure to move faster and use data more effectively to manage major changes.

EOSS is at the forefront of this shift - pioneering solutions in asset monitoring that combine cutting-edge technologies with unrivalled industrial expertise. We help our partners protect and optimize their assets, supporting long-term success in an increasingly complex world.

EOSS

Since 2012, EOSS has been driving innovation across the energy and oil industries. By integrating advanced electronics into electrical assets, we deliver in-depth insights into asset condition.

Our technologies help customers increase uptime, extend asset lifespan, and enhance safety - all while reducing maintenance costs and operational risks.

The need for a predictive approach

The electrical power generated by any type of power plant is transmitted and distributed to the centers of consumption (urban areas, industrial parks, etc.) by way of infrastructure specifically designed and built to ensure the continuity of supply.

Previously, transmission and distribution operators used to rely on ordinary, extraordinary and - in some cases - preventative maintenance to achieve this, but over time it has proved to be inadequate.

The benefits of fault prediction

Fault prediction benefits generators, transmitters and users of electricity by enabling planned service interruptions for crucial maintenance and repair. This also ensures the in-stock availability of required spare parts.

In power distribution, fault prediction and planned power supply outages help preserve infrastructure profitability in instances where losses are reported by the minute when out of service (e.g. industrial plants).

Additionally, it helps to avoid serious physical damage to infrastructure in high and extra-high voltage networks, reducing inconvenience and keeping any financial impact to a minimum.

Ultimately, a predictive approach has been identified as the only effective way to protect the service continuity of electrical infrastructure, be it power transmission or distribution. Predictions must be made based on a large volume of data collected in relation to the operation of the infrastructure itself.

Fault planning helps ensure:

Continuity of power supply

Planning of service interruptions

Reduced inconvenience and financial impact

In the case of an extra-high voltage interconnector (500 kV, 2 GW of power) losses due to non-supplied power can be over €700,000 per day.

Which parameters should be monitored?

Enabling a predictive approach in large electrical systems of extra-high, high-and medium-voltage data refers to: partial discharges, load and screen currents, temperatures, pressures, and acoustic events.

The adoption of an integrated monitoring system has proven effective in allowing operators to make timely interventions to repair malfunctioning transmission systems and cable connections, preventing potentially disastrous events.

Partial discharges

Partial discharges are intrinsic phenomena that may occur within the insulation material (dialectric) of cables and their accessories and may, in the long run, damage materials to the extent there is a failure of the whole cable system.

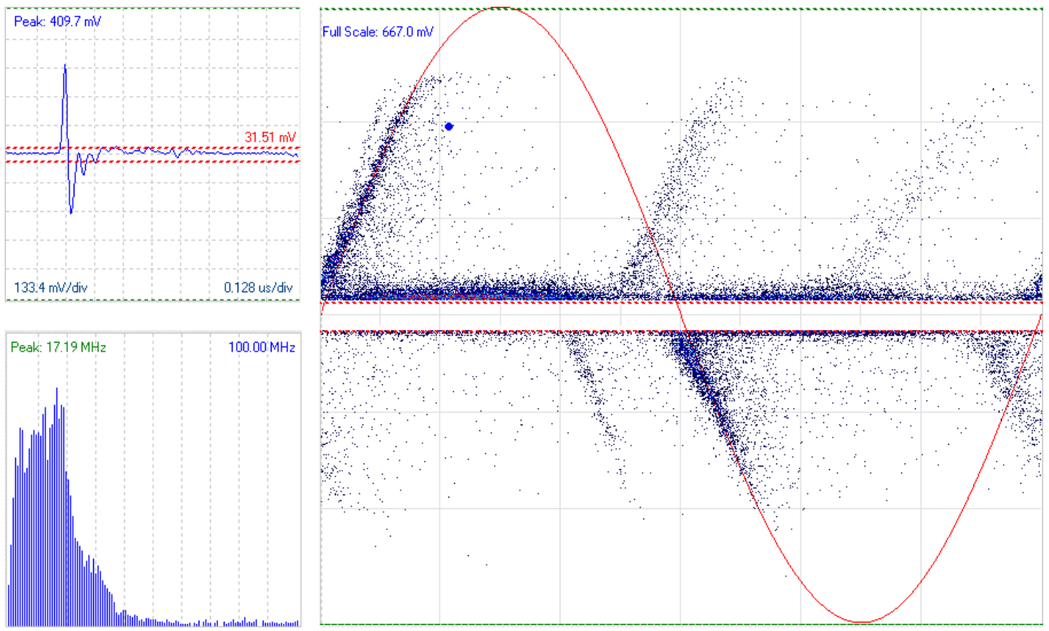
Load currents

Load currents are a key parameter that identifies the current actually carried by a cable. Real-time knowledge of its exact value allows an understanding of whether the cable is performing properly, most crucially within the technical limits of the system's design.

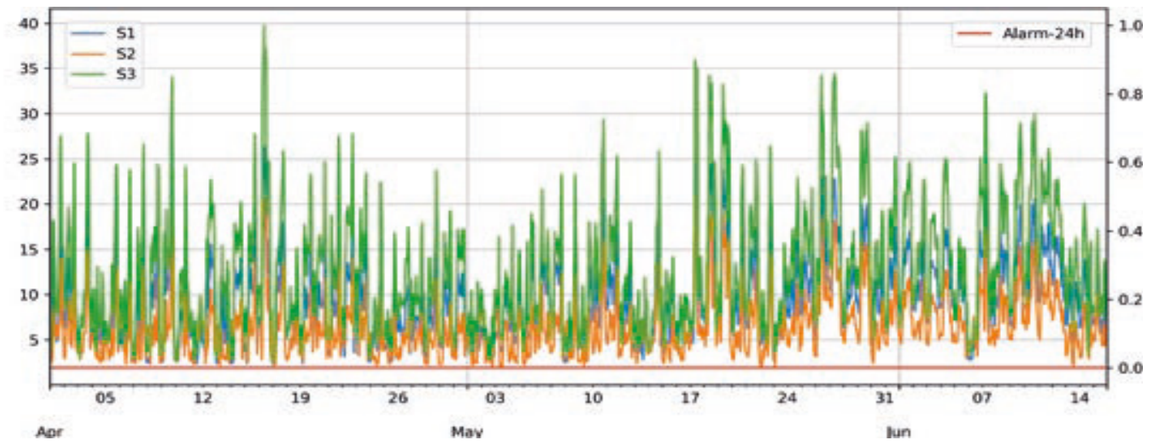
Screen currents

Screen currents are a side effect of the electricity transmitted by a cable system and, regardless of the system's configuration, they tend to be kept at the lowest level possible. This is because the effect of these currents on a cable's metallic screen limits the cable's current-carrying capacity. Keeping these currents under control allows the cable to carry the maximum current.

Acquisition of partial discharge with EOSS in a medium-voltage transformer



Screen currents trending in an extra-high voltage (380 kV) underground cable (three-phase AC system) with single-point bonding configuration



Note: The straight red line indicates the status of the alarms (0 = none)

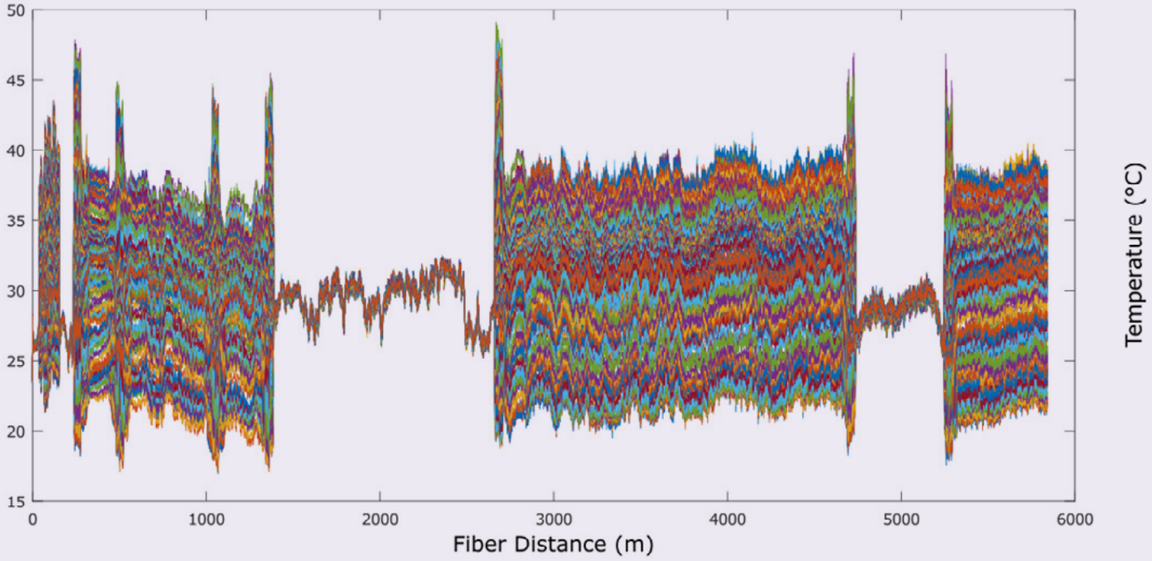
Temperature

In an electrical system, temperature is indicative of the ability to dissipate heat generated by the current flow in a cable. The maximum rating of a cable is closely linked to the cable's ability to dissipate heat.

An abnormal localised temperature increase is, therefore, a symptom that the cable, at the point where the abnormal temperature increase has been detected, is not able to carry the maximum current.

DTS temperature chart showing measurements taken every 10 mins over a time period of 24 hrs on a hybrid cable system, comprising underground and overhead sections

Note: The underground cable sections can be easily identified by the reduced variation in temperature vs the overhead line ones



Pressure

Pressure in an electrical system is measured to ensure the levels of various insulating fluids or gasses are correct. When insufficient insulating materials are present this can trigger failures so it is important that pressures in network components such as oil-immersed transformer terminals, gas-insulated switchgear (GIS) and transition joints are verified.

Acoustic events

In recent years, technology that allows the monitoring of acoustic events in the vicinity of a cable has increased in popularity. The technology applies to high-voltage underground or submarine cables containing optical fiber and allows detection of a range of acoustic events from less serious (earthmoving, trains, passage of ships) to more dangerous (excavators, anchors or fishing).

Innovative solutions for real challenges

EOSS Permanent System

The EOSS Permanent System is an integrated solution that gathers data from devices that monitor the health of an electrical system via its key parameters (e.g. GRIDS, D-LOG, DTS and DAS). Collected data is stored on a private cloud platform, which is updated and available in real time. Proprietary algorithms generate warning alerts in the case of abnormal conditions.

PRY-CAM

When fixed monitoring is not feasible, periodic spot measurements for partial discharge detection offer a practical and efficient alternative. This approach provides a fast and cost-effective way to gain valuable insights into the condition of cable insulation and the quality of accessory installations — supporting informed asset management decisions and enhancing system reliability.

For this type of service, EOSS provides PRY-CAM. The mobile wireless device allows the automatic acquisition, measurement and classification of pulse signals generated by partial discharge phenomena that can occur in the insulation materials of high- and medium-voltage cables, accessories, and in electrical components such as transformers, motors and converters.

EOSS Permanent System

PRY-CAM

Conclusions

The electrical power industry is undergoing a major shift in how it manages electricity. Across all voltage classes, there's growing adoption of a new approach centered on systems data collection and cloud-based, real-time data accessibility - a trend reflected in strong growth forecasts for the monitoring systems market over the next five years.

As power systems become more complex, waiting for faults to occur, or a warning alert to be received, is no longer an option. Today, faults must be anticipated, not simply detected.

With its monitoring technology, EOSS has turned this new approach into a complete suite of products and services that are effecting a real revolution in monitoring and managing electrical assets for customers increasingly embracing the Internet of Things.

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