APSENSING.

Monitoring of Overhead Lines

The Challenge

Overhead power lines are the backbone of electricity transmission and distribution. This technology, proven over 150 years, still offers many advantages over modern cable systems. Overhead lines are cost-effective, easy to maintain, have a longer lifespan, and are more environmentally friendly to install.

Due to their design, overhead power lines are also exposed to significant weather conditions that can jeopardize their operation and limit transmission capacity. Strong winds, ice and snow loads, lightning strikes, and strong temperature fluctuations make them prone to failure and, under adverse conditions, can cause prolonged power outages.

Falling power lines also increase the risk of forest fires and pose a significant safety hazard. As part of critical infrastructure, overhead power lines are also vulnerable to targeted sabotage attacks.

Besides reliability, the transmission capacity of an overhead power line is of increasing importance. The demand for energy is driven by the energy transition, digitalization and artificial intelligence, and requires not only the construction of new lines but also the release of existing capacities through smart technologies.

The Innovation

AP Sensing's innovation addresses all these problems with an easy-to-install, cost-effective, and low-maintenance solution based on AP Sensing's state-of-the art DAS technology . An optical fiber embedded in the ground wire (OPGW) is transformed into a series of microphones that continuously record vibration data along the overhead power line route – up to 2 x 100 km. Signal processing and analysis enable the real-time detection and precise localization of a wide range of phenomena, such as lightning strikes or incidents caused by sabotage. The wind speed, which essentially determines the transmission capacity, is also calculated from the measurement data and fed into a well-proven dynamic line rating engine. This can result in up to 40% more usable capacity by using AP Sensing's OPGW-based DLR solution.*

DAS instrument

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The Solution

The core of the solution is a state-of-the-art, phase-based DAS system with long range and precise measurement accuracy. Due to its high sensitivity, particularly in the low-frequency spectrum, our machine-learning algorithms can detect and locate events with high accuracy. These include galloping, icing, short circuits, wildfires, third-party intrusions, etc. By calculating the wind speed at each individual span, the connected DLR system can provide even more precise and reliable information about line capacity. Our OPGW-based DLR solution* relies on Ampacimon's advanced technology that can make real-time adjustments to the line's capacity, ensuring optimal performance under varying conditions and can unleash additional capacity up to 40%.

The Benefit

Our solution provides operators with a new level of operational reliability, dynamic performance monitoring, and adaptive transmission capacity. All data is generated in real time and provided with precise location information.

This enables operators to react quickly and effectively, addressing problems early and preventing serious incidents. Historical data can be used for preventative maintenance, optimizing maintenance intervals and ensuring the continuous operation of the overhead line.

*POWERED BY Ampacimon

The Process

Terminated OPGW fiber connected to DAS instrument » Continuous, real-time acquisition of vibration data across the entire line span » Real-time wind speed extraction derived from vibration data, aggregated at conductor level » DAS-enabled dynamic line rating (DLR) calculation and forecasting » Seamless integration into SCADA, EMS, or third-party platforms

Why AP Sensing?

- Industry-leading monitoring solution comprising DTS, DAS, RTTR and DoB that offers excellent performance.
- Industrial quality supported by a complete set type tests and certifications in compliance with internationally recognized standards.
- Project management, commissioning, and post-sales service; world-class support for project planning, design and installation.
- Network of regional partners and experts, and proven deployment in all regions of the world.
- AP Sensing's commitment for the power industry for almost 20 years resulted in many successful projects and proven deployment in all regions of the world.

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Passion for Plants.
For every unit sold, AP Sensing plants 100 trees.

Watch our Application Video
https://youtu.be/j52-Zq6ByP0

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