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DISTRIBUTED FIBER OPTIC SENSING

for Data Center Systems & Critical Infrastructure

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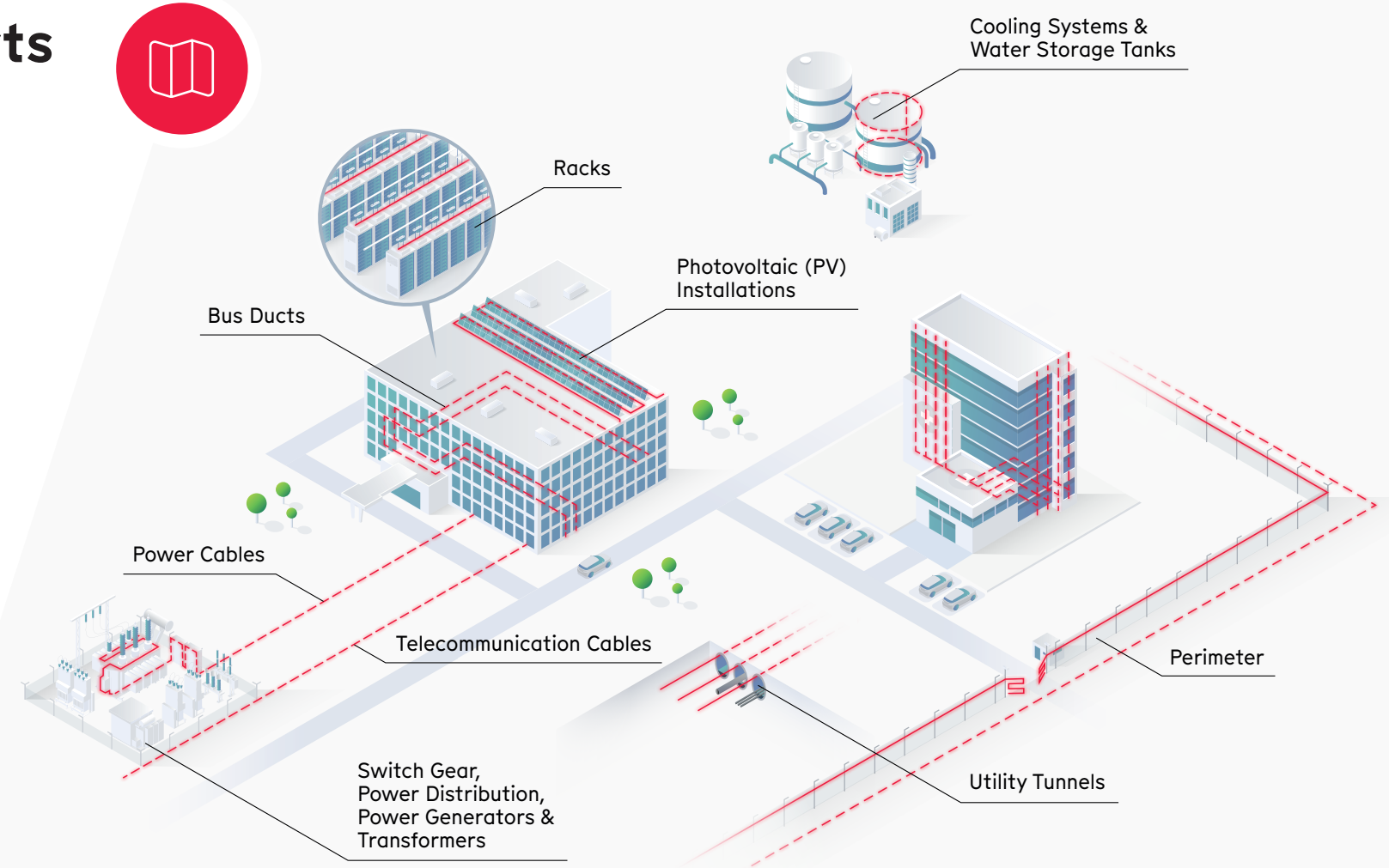
Long-Time Experts

for Data Center Monitoring

Modern data centers face complex challenges and simultaneously demand 24/7 monitoring of site infrastructure.

AP Sensing's Distributed Fiber Optic Sensing (DFOS) offers both preventative and predictive maintenance using a single, affordable system for monitoring multiple assets.

The benefits of DFOS include increased efficiency, reduced costs, and prevention of failures which would be detected too late or missed entirely by periodic inspections.



Perimeter Monitoring

for Intelligent Intrusion Detection

A security breach can cause operational downtime and damage a data center's reputation. Fiber optic sensing technology enhances perimeter protection by monitoring long-range assets such as fencelines and buried telecommunications cables.

Distributed Acoustic Sensing (DAS) detects third party intrusion (TPI) in near real time. A single system can monitor both the perimeter and other critical data center assets. DAS identifies activity such as climbing, walking, or vehicle movement in restricted areas, delivering actionable insights during or even before an intrusion occurs. This real-time situational awareness strengthens physical security and helps prevent service disruption.

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Telecommunication Cables

Continuous Monitoring for Critical Links

Telecom cables are often difficult to locate due to fiber rehoming or inprecise/incorrect build plans. Additionally, damage to fibers between data centers can cause service outages and major disruptions to data flow. DFOS revolutionizes the detection of third party intrusion (TPI) activities and localization of telecom cables along any infrastructure (streets, railways, tunnels). Using our proprietary Asset Explorer technology, build plans can be easily updated and issues along the cable are rapidly detected and pinpointed. This leads to reduced likelihood of cable cut outages, faster response times and reduced outage periods.

With a single, one-sided DAS unit and a detection toolkit, your technician can spot cables without cutting into the asphalt, even locating nonmetallic and dielectric cables. A mobile app provides a direct feedback loop in the field, eliminating the use of a second technician for observation of the OTDR. After opening the manhole or street for repair work, the cable can be identified with Asset Explorer again. There is no need to bend the cable, triggering a loss on the OTDR. In the case of rail tracks, no track closures are required to locate the cable.

Distributed Acoustic Sensing (DAS)

DAS provides benefits such as:

- Turns fiber routes into a continuous acoustic sensor with thousands of sensing points.
- Provides continuous third party intrusion (TPI) monitoring.
- Powered by 3P Vector Technology, monitoring up to 2 × 100 km from a single platform.
- Embedded AI detects, classifies, and locates events while filtering environmental noise and nuisance signals.
- Detects unauthorized fiber tapping to protect sensitive data.
- Built on AP.TrustedCore with an integrity-focused OS for tamper-resistant and compliance-ready operation.
- Enables non-intrusive deployment with no active field components and seamless integration into security infrastructure.
- Engineered for long-term operation with resistance to electromagnetic interference.

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Bus Duct Temperature Monitoring

Predictive Insights for Safe Operation

Continuous bus duct temperature monitoring (CBTM) for bus ways, bus ducts and bus bars provides 24/7 measurement, alarming, reporting and recording of the bus bar temperature. Measurement data is used to predict future performance for safe, long-term operation.

This method eliminates the need for using thermography surveying and fully monitors both visible and hidden bus ducts. It provides real-time, nonstop monitoring to extend the original manufacturer's certification of IEC 61439-6 and Temperature Rise (TR) testing.

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Rack Temperature Monitoring

Precise Overheating Detection

For modern high-density data center facilities, temperature is rarely static from rack to rack. Hotspots, resulting from airflow deficiencies and other disruptive conditions, can result in the risk of critical equipment overheating.

Continuous rack temperature monitoring (CRTM) delivers real-time insights to minimize equipment downtime, prevent costly repairs, and detect early signs of overheating for proactive maintenance.

The location of overheating or a fire can be precisely detected and pinpointed, and the operator is able to reduce or eliminate manpower associated with testing and inspection costs.

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Switch Gear, Power Distribution

Sudden overheating in switchgear and power distribution systems, such as switchboards, motor controls, and busbars, can cause thermal runaway, insulation damage, or equipment failure due to undetected overloads, imbalances, or faulty connections. Distributed Fiber Optic Sensing (DFOS) enables continuous, real-time temperature monitoring across infrastructure, while the CGTM solution provides precise thermal visibility for transformers, generators, solar systems, and backup batteries. This allows operators to detect anomalies early, enable predictive maintenance, reduce outages and costs, and maintain system reliability.

Power Generators & Transformers

DFOS data allows safe operation at high loads and critical times, without risking asset failure. Failure results in severe damage to the transformer, generator or back-up battery, unscheduled site downtime, high repair costs, and loss of revenue. Continuous generator and transformer monitoring (CGTM) enables measurement of the system temperature in real time for early detection of hotspots, as well as individual device temperature monitoring for detection and reporting of potential problems. DFOS enables predictive maintenance upon immediate detection of a potential problem before it becomes a big issue.

Cooling Systems & Water Storage Tanks

Ensuring Operational Efficiency Across Cooling Assets

To reduce energy costs, data center operators often rely on thermal storage tanks as part of their cooling strategy. HVAC systems, storage vessels, and drainage tanks benefit from continuous temperature monitoring to ensure stable operation. Pipework can also be monitored for early leak detection, helping prevent unplanned outages and system failures.

This solution supports both environmental compliance and operational reliability, delivering around-the-clock thermal data and highlighting temperature deviations in real time. Multiple on-site assets can be monitored through the same system.

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Distributed Temperature Sensing (DTS)

DTS provides benefits such as:

- 24/7 real-time asset monitoring, delivering thousands of measurement points of temperature data
- Large coverage over several kilometers with only a single, inert and dielectric fiber optic cable
- Early detection of hotspots, fires or temperature abnormalities indicating faults or other issues
- Highly reliable systems with a +35 year MTBF
- Freely configurable alarm parameter sets and zones enabling pre- and main alarms
- Greater equipment reliability
- Improved cost effectiveness
- Immune to EMI/RFI and dust, dirt and corrosion
- 3D location mapping and location accuracy down to one meter
- Operates in temperatures up to 750 °C for two hours according to IEC 60331-25
- Industry's most complete set of tests and certifications (VdS EN 54-22, UL 521/ULC S530, FM 3210, ATEX/IECEx)

SmartVision

Centralized Asset Visualization and Alarm Management

SmartVision software can be paired with DTS or DAS to monitor any asset, providing:

- Schematic asset visualization for quick orientation and instant status updates
- Critical zone and alarm status information, which flows directly from system instruments
- Seamless integration into your existing management platform; direct communication over ethernet (TCP/IP) using standard protocols
- Various protocol interfaces (Modbus TCP, IEC 60870-5-104, IEC 61850, DNP3) that transmit the results directly to your management system
- Easily accessible temperature graphs and recorded data stored in a central databasis for analysis, reporting and export

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