



RAILWAY MONITORING

Distributed Fiber Optic Sensing
for Train Tracking and Railway Monitoring



AP Sensing: Your trusted partner for Railway Monitoring

AP Sensing is the fiber optic **Distributed Acoustic Sensing (DAS)**, **Distributed Temperature Sensing (DTS)** and **Distributed Temperature Strain Sensing (DTSS)** solution provider for your railroad infrastructure. For more than a decade, our systems have been successfully deployed across a wide range of markets and regions to **protect critical infrastructure such as road and rail tunnels, metros and train stations.**

We develop our solutions based on the **tradition of Hewlett Packard/Agilent Technologies**, the world leader in optical test and measurement for over 35 years. AP Sensing offers global sales and service through a network of local offices and highly qualified partners. With thousands of installations worldwide, we are recognized for **quality, reliability and performance.**



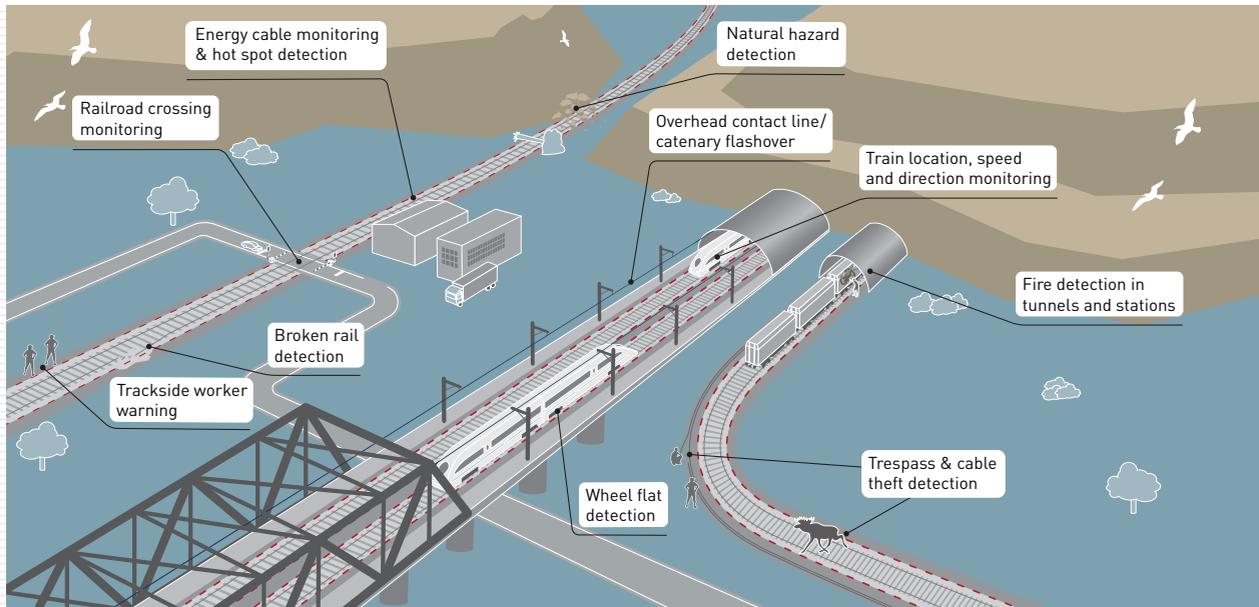
Leading the Way with Passion.

**Our expertise:
Solutions that fit
your needs**

Railway monitoring is increasingly important in today's environment - particularly the capabilities of **train location, track condition monitoring and hazard detection**.

It is important for modern railway operators to ensure safe and efficient operations, accompanied by excellent service. AP Sensing's railway solution has the ability to create a digital twin with the monitoring information provided; enabling **testing, improved performance and reliability, and well-planned maintenance**. Our solution can decrease costs and increase capacity, while improving the overview and monitoring of the track or train.

Our monitoring solutions are based on **Distributed Fiber Optic Sensing (DFOS)**, which is rapidly becoming the detection method of choice. With our solution, existing track-side telecommunication and fiber optic signaling cables can be converted into sensing cables or new, dedicated cables can be installed to protect the railway.



DFOS advantages

DAS and DTS use fiber optic cables to monitor the entire railway system

Real-time and accurate data acquisition along the entire optical sensor cable

Sensor cable is accessible without track closures

The fiber is completely passive, immune to EMI and non-intrusive

Long measurement range, virtually maintenance-free for decades

DFOS applications

Monitors train location, speed and direction

Track condition monitoring

Natural hazard detection

Third Party Interference (TPI) monitoring - detects vandalism or cable theft

Train integrity and defect monitoring

Overhead contact line/catenary flashover detection

Fire detection in tunnels, stations and cable ducts

Railroad crossing management

Wheel flat and broken rail detection

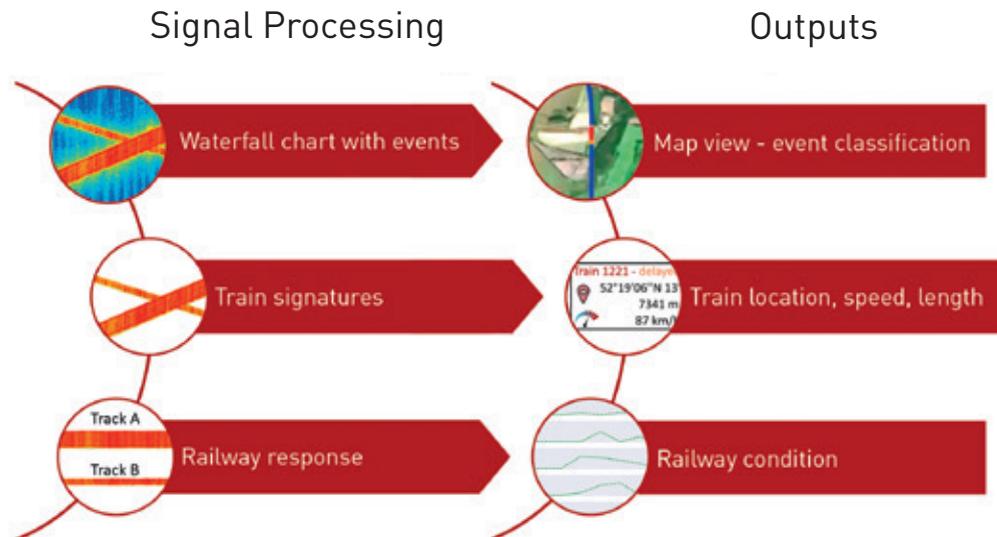
AP Sensing's railway solution

AP Sensing's system can be used **singularly or to supplement complementary sensor technologies for a sensor fusion system**. DAS data can be easily integrated into any centralized rail management or automated traffic management system.

Our solution provides many possibilities to operators such as **increased network capacity, minimized delays, reduced costs and more efficient energy use**. Unscheduled service disruptions are decreased with preventative and predictive maintenance, and increased data provides the ability to improve rail users' access to relevant train information.

"Digitization is the driver for quality, capacity and efficient railway operation for DB Netz AG. Fiber Optic Sensing is an outstanding technology that enables the improvement of infrastructure capabilities at lightspeed compared to other solutions using existing cable infrastructure. AP Sensing is taking FOS-based railway monitoring to the next level with their true phase-based system and the extensive use of AI. We're happy to work in collaboration with AP Sensing's responsive and innovative team, helping us to get projects moving and getting FOS integrated in the daily railway operation."

Max Schubert, DB Netz AG

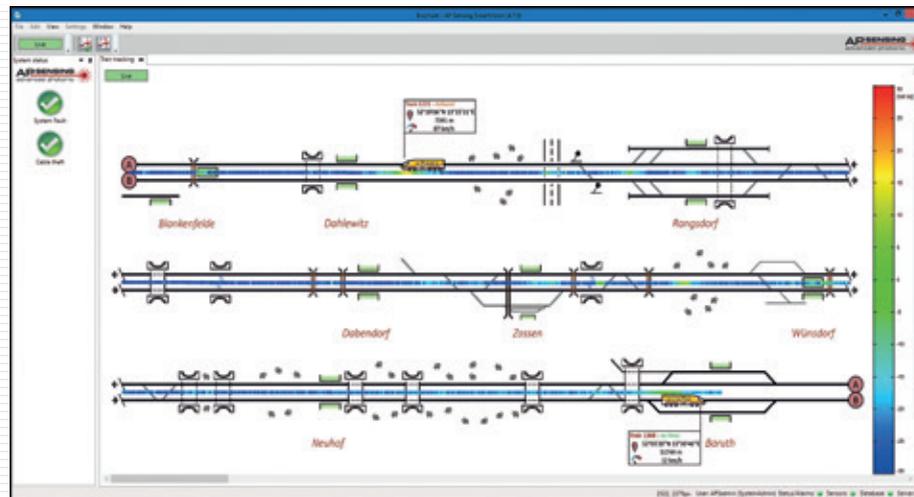


Maximum safety and protection for your rail system

AP Sensing's railway and train monitoring solution is based on two stand-alone technologies (DAS, DTS) that can be used together to provide both asset monitoring and heat/fire protection.

DAS utilizes our unique **2P Squared technology** and precisely detects and locates moving trains, monitoring both train and track conditions. In addition, our technology detects **TPI, overhead lines/ catenary flashovers** and provides the **information needed to monitor railroad crossings**.

DTS detects and locates fires and potential hotspots by **continuously analyzing temperature variations** alongside the track, metro stations and tunnels, or in cable ducts or cable trays. Railway systems can be divided into several zones to ensure different tunings and the application of alarm thresholds. Our systems carry global certifications for fire detection.



SmartVision Train Network Visualization

Instrument features

DAS:

Accurate detection and location of moving trains

TPI monitoring and detection

Asset monitoring of tracks and moving stocks

Real-time algorithms & AI technology

Monitoring range of 100 km per controller

Positional accuracy < 10 m

DTS:

Continuous temperature monitoring along the fiber optic cable

Heat/fire detection and location in cable ducts, cable trays, metros and train stations

Monitoring range up to 20 km per controller

Positional accuracy < 2 m

10 s measurement time

Full set of certifications (UL, ULC, SIL2, IQNet, ILAC-MRA)

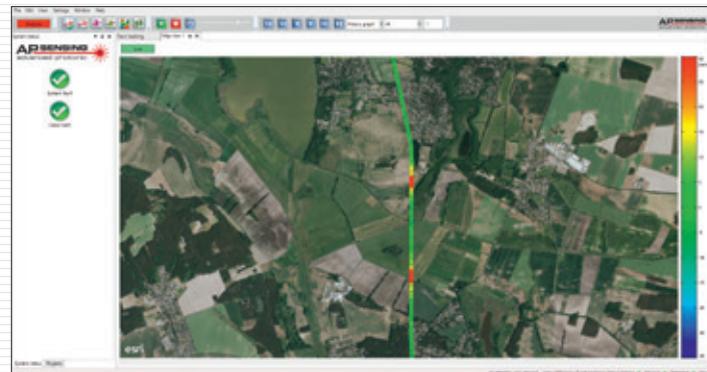
Reducing response time through excellent data presentation & management

AP Sensing's SmartVision management suite shows the location, velocity and direction of your trains at a glance, controlled by an easy-to-use graphic interface. It seamlessly integrates multiple sensor systems like DAS, DTS and CCTV into a single platform. Superior visualization reduces the time needed to reach informed decisions and further reduces response times by providing accurate locations.

SmartVision provides a clear overview with an integrated map, rail network map, waterfall diagrams, and several analysis functions. Layouts are mapped and color-coded to show instantaneous changes in acoustic energy. Sections of the infrastructure can be individually defined for flexible alarm levels and types. Defined information is interfaced into higher level train management systems, enabling easy integration. A modern client-server architecture allows installation on virtualized IT networks and offers a comprehensive range of protocols for interfacing with rail management systems.

"Knowing the technology and market, it is evident to me that AP Sensing is the forerunner in distributed optical sensing. Their solutions reflect a combination of experience and creativity. Experience comes from their HP/Agilent heritage, the leader in test and measurement equipment, with decades of experience in developing and manufacturing extremely reliable and high-quality products. The creativity comes from their passion and commitment to solving real customer problems."

David Orr, Protex Systems



Live tracking of two trains in Berlin

SmartVision features

- Integrated management solution
- Asset visualization for complete infrastructure
- Reporting and analysis capabilities
- Alarm management
- Central database
- Easy integration into control and management systems

Your complete solution provider

AP Sensing is your long-term partner for railway monitoring. We listen to your challenges and strive to provide the best distributed fiber optic sensing solution for your project. Our complete offering fits your railway monitoring demands and protects your valuable assets.

AP Sensing provides a complete package that includes: system design built around proven components, customized software function and graphics as required, project management and engineering, installation and commissioning plus through-life support.

Our international project teams consist of multi-disciplinary, highly skilled and passionate engineers and field support who combine their experience and expertise to deliver on our commitments.

Why choose AP Sensing?

Best measurement performance due to unique technologies such as code correlation and 2P Squared technology

No drift & no recalibration; low maintenance costs thanks to features like patented single-receiver design

Large investments in innovation and product development guarantee high quality and a long product life

Market's most complete set of test reports and certifications

Support for project planning, design, installation, and commissioning

Solid project management and execution

A worldwide network of regional partners and experts



Temperature



Acoustic



Temperature and Strain

Our mission is to ensure your success

Drawing on our HP/Agilent heritage in optical testing, we have established ourselves as **the leading solution provider for Distributed Fiber Optic Sensing (DFOS)**.

We remain committed to delivering **well-designed, comprehensive solutions** to our customers.

We have worldwide offices **with highly qualified and motivated employees, and a network of expert regional partners**.

At AP Sensing we recognize that we can only be successful when our customers and partners are successful. Therefore, we take a **respectful and proactive role** in all our commitments.

With the industry's most complete set of tests and certifications, **AP Sensing helps you comply to relevant security standards** and ensures environmental and employee safety.

Contact us for more information!

info@apsensing.com
www.apsensing.com



 **Passion for Plants.**

For every unit sold, AP Sensing plants 100 trees.

Product specification and descriptions in this document subject to change without notice and are not binding to AP Sensing.

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