APSENSING.

DISTRIBUTED FIBER OPTIC SENSING

for Rail Infrastructure & Rolling Stock Monitoring

THINKING AHEAD

APSENSING.

Your Trusted Partner

for Railway Monitoring

Railway monitoring has become increasingly vital as networks face growing demands track availability, operational safety, asset reliability, capacity, and infrastructure resilience. AP Sensing's rail solutions address these objectives through advanced **Distributed Acoustic Sensing (DAS)**, **Distributed Temperature Sensing (DTS)**, and **Distributed Temperature Strain Sensing (DTSS)**. AP Sensing was founded on the **heritage of HP (Hewlett-Packard)**, the market leader in fiber optic testing and measurement for over 40 years. With thousands of installations, our Distributed Fiber Optic Sensing (DFOS) technologies are known for their **outstanding quality, reliability, and performance**.

- Quality
- Reliability
- Performance

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Solutions That Fit Your Needs

Our Expertise

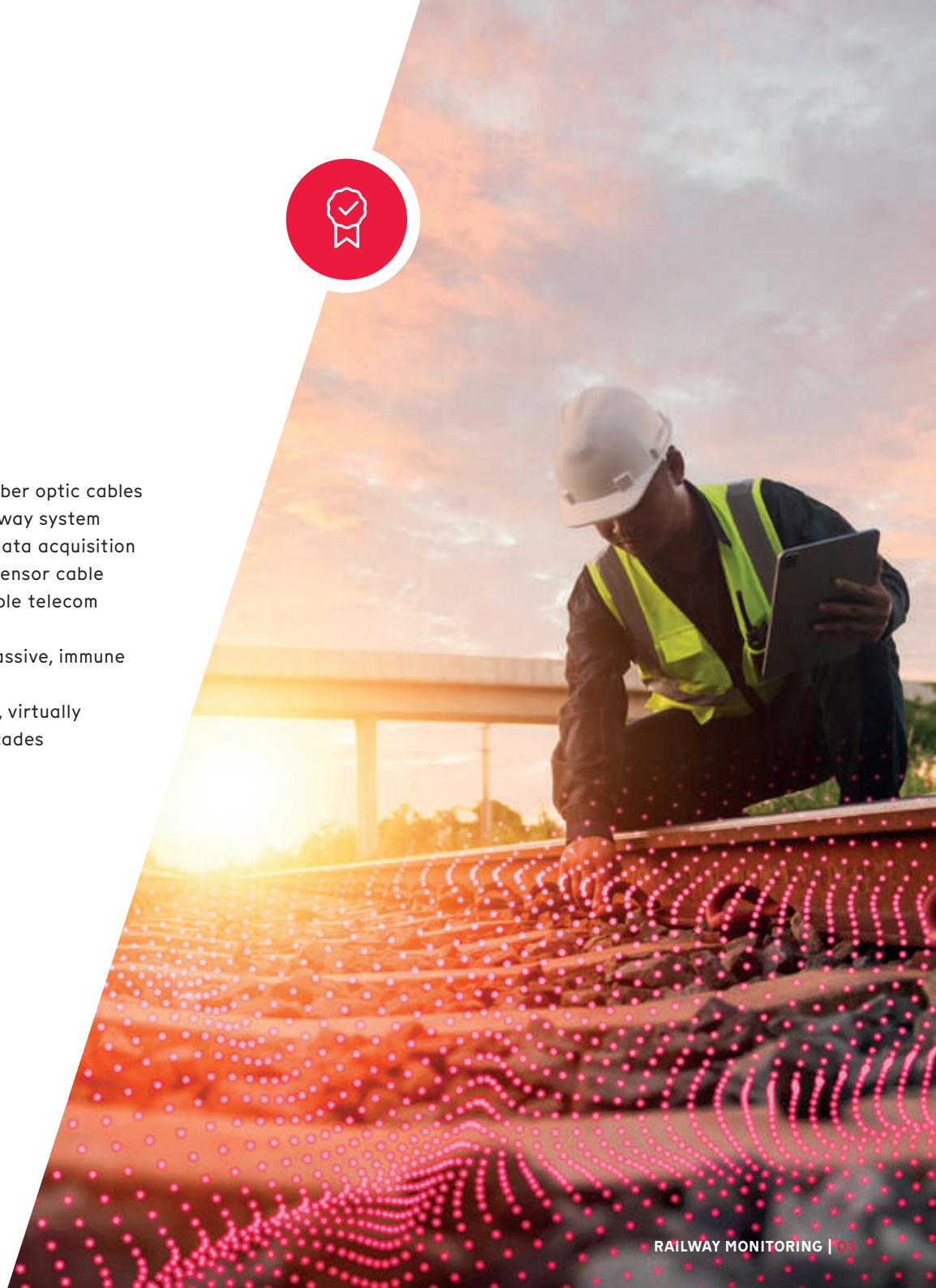
Railway monitoring is increasingly important in today's environment - particularly the capabilities of **continuous train data (speed, direction, length, and load), track condition monitoring and hazard detection.**

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 **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 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.

Advantages

- DAS, DTS and DTSS use fiber optic cables to monitor the entire railway system
- Real-time and accurate data acquisition along the entire optical sensor cable
- Sensor cable uses available telecom cables as sensor
- The fiber is completely passive, immune to EMI and non-intrusive
- Long measurement range, virtually maintenance-free for decades



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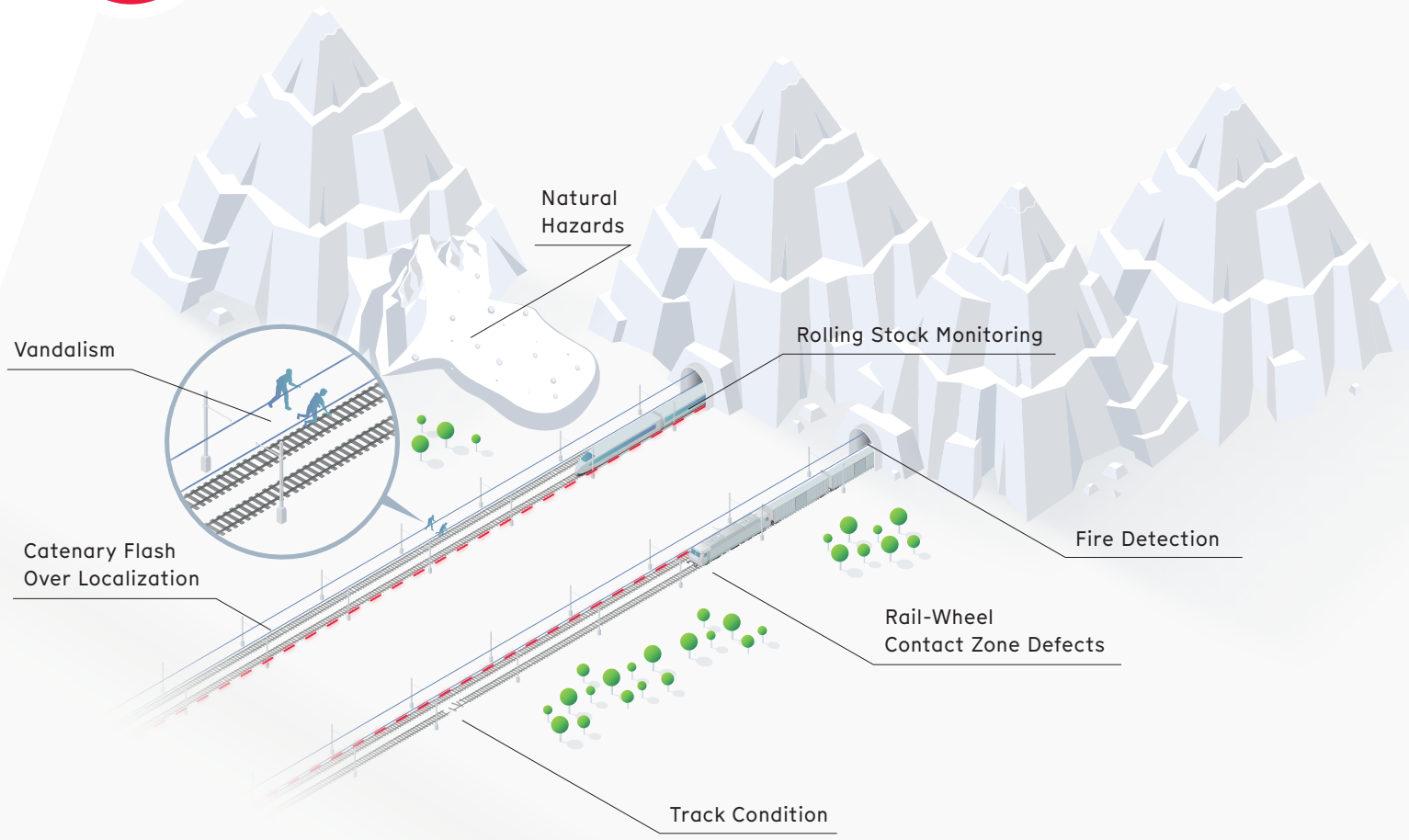
Where to Use Our Solutions

Multifunctionality in One

Applications

- Train position, speed, direction, length, and load
- Rail–wheel contact zone defects, incl. wheel flats, rail fractures, and rail breaks
- Track condition monitoring
- Overhead contact line/catenary flashover localization
- Third party intrusion, incl. cable theft, vandalism detection, and asset monitoring, such as construction work monitoring
- Natural hazard detection, incl. landslide and rockfall detection
- Structural health monitoring, such as railway bridges, tunnels, and elevated tracks
- Fire detection
- Below Ballast Scan (BBS)



Monitoring Methods

Reliable Solutions

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.

Ai-Enabled Fiber Optic Sensing for Railway Monitoring
from Raw Data to Safety-Critical Decisions in Real Time

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»Digitization is the driver for quality, capacity and efficient railway operation for DB Netz AG. AP Sensing is taking Fiber Optic Sensing-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 rail infrastructure and rolling stock monitoring solution is based on three stand-alone technologies (DAS, DTS, DTSS) that can be used together to provide both asset monitoring, structural health, and heat/fire detection.

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 improve safety at railway 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.

DTSS measures strain to **detect and locate structural health issues** alongside dams, bridges or mountains.

Instrument Features

DAS:

- Accurate detection and location of moving trains
- TPI monitoring and detection
- Asset monitoring of tracks and moving stocks
- Real-time algorithms and 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)

DTSS:

- Continuous strain monitoring along the fiber optic cable
- Increased static and transient strain along structures like bridges
- Monitoring range of 80 km
- Positional accuracy of 2 m

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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, DTSS, 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. A modern client-server architecture allows installation on virtualized IT networks and offers a comprehensive range of protocols for interfacing with rail management systems.

SmartVision Features

- Integrated management solution
- Asset visualization for complete infrastructure overview 24/7
- Reporting and analysis capabilities
- Alarm management
- Central database
- Easy integration into control and management systems

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Your Complete Solution Provider

Your Best Choice

AP Sensing is your long-term partner for rail infrastructure and rolling stock 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 multidisciplinary, highly skilled and passionate engineers and field support who combine their experience and expertise to deliver on our commitments.

Temperature

Acoustic

Temperature and Strain

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Our Mission

To Ensure Your Success

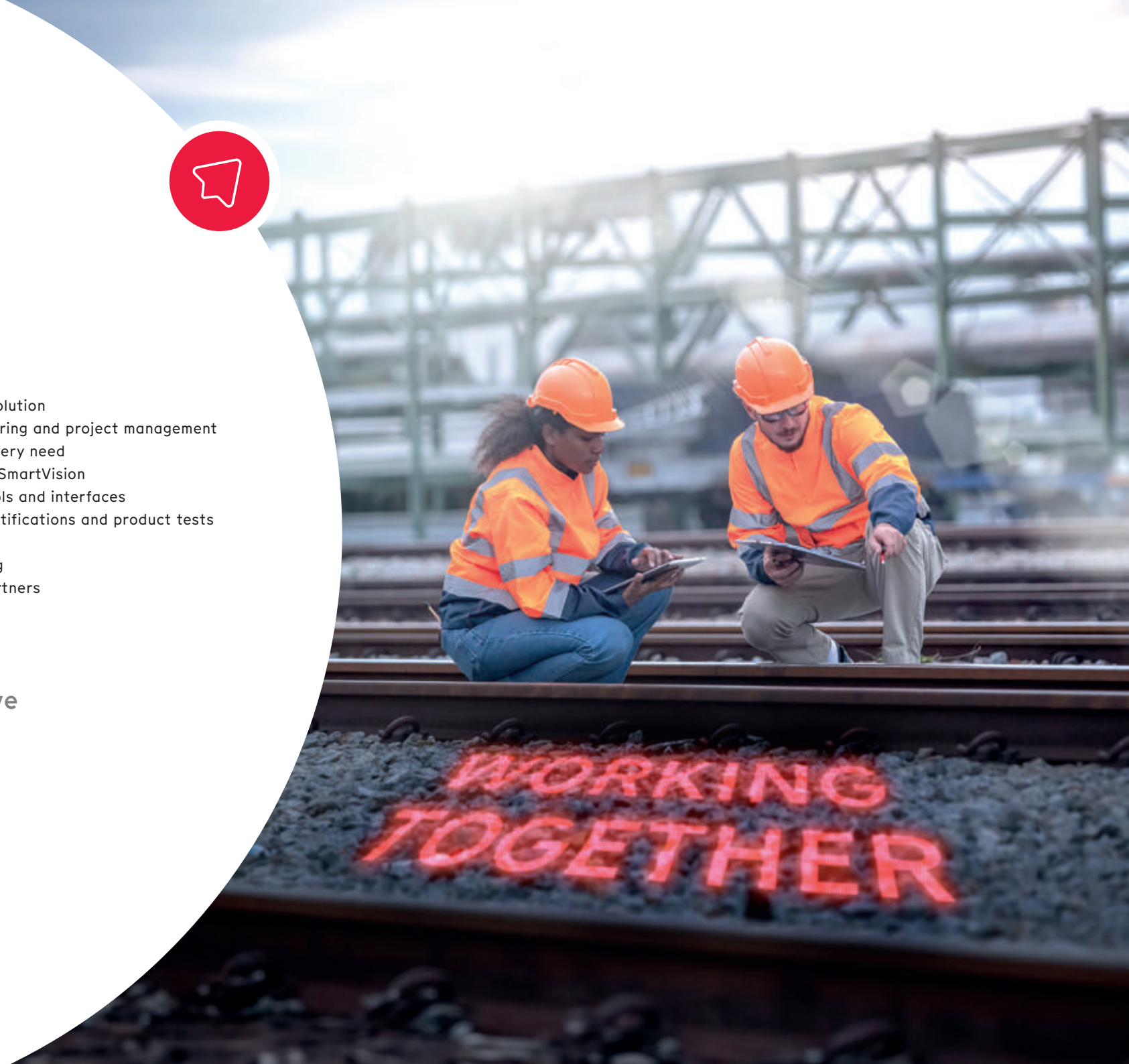
Why Choose AP Sensing?

- Industry-leading DFOS technology and solution
- Experienced, dedicated team for engineering and project management
- Range of certified sensor cables to fit every need
- Intelligent alarm management software: SmartVision
- Easy integration through flexible protocols and interfaces
- Industry's most comprehensive list of certifications and product tests
- Highest quality and longest product life
- World-class service, support and training
- Global presence with expert regional partners

Supportive

Global

Competent



THINKING AHEAD

AP Sensing

Who We Are

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

We are committed to delivering **well-designed, comprehensive, solutions** to our customers. Our global team of **highly qualified employees and regional partners** is passionate in supporting our customers.

Our motto '**Thinking Ahead**' expresses **our passion and willingness** to be prepared for **excellent project execution and smooth operation**.

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 with relevant security standards** and ensures environmental and employee safety.

APSENSING.

- The industry's most complete set of **tests & certifications**
- Innovative & comprehensive **solutions**
- **Key enabler** to protect lives & the environment
- Notable **responsibility** & sustainable **approach**
- **Agile approach** to customers' needs
- **Extensive expertise** in DFOS
- Dedicated & **passionate employees**

THINKING AHEAD

- **HP** (Hewlett-Packard) **heritage**
- Numerous **successful projects** worldwide
- Intelligent **alarm management software & AI**
- **Global leader** with regional partners
- **Highest quality** & longest product life
- **Asset protection** in the most challenging environments

VdS · cULus LISTED · FM APPROVED · SIL · Ex · ISO 9001 · ISO 45001 · ISO 14001 · ISO 27001 · made in Germany · Passion for Plants. For every unit sold, AP Sensing plants 100 trees.

Partner

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