

DISTRIBUTED FIBER OPTIC SENSING

for LNG Facilities





Your Trusted Partner in Liquefied Gas Facility Monitoring

AP Sensing is your global Distributed Fiber Optic Sensing (DFOS) solution provider for your **regasification or liquefaction plant**. We provide global sales and service through a **network of local offices and highly qualified partners**. Our product quality and reliability are unsurpassed, which brings you peace of mind and lower cost of ownership.

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 DFOS technologies are known for their **outstanding quality, reliability, and performance**.



Quality



Reliability



Performance



The Perfect Fit for You

Our Expertise

Fiber optic DTS technology is uniquely suited to a variety of monitoring tasks within any facility producing or handling liquefied gases. It is recommended for annular spillage detection in section 13.4 of EN 1473:2007-06. By making use of optical sensing probes, our system is non-corrosive and intrinsically safe. It **accurately measures temperature over large distances** every minute, and is suitable for operation in cryogenic conditions.

AP Sensing understands your challenges and requirements. We are committed to defining well-designed solutions that meet your safety requirements, whether you require ATEX Zone 0 compliance or need to be SIL-2 rated.



Advantages

- Accurate measurements not compromised by corrosive atmospheres or EMI
- Real-time temperature data along the entire passive optical sensor cable
- Long measurement reach, virtually maintenance-free for decades
- Easily installed in difficult access areas
- Instrument can be located in a remote control room for safety compliance



Where to Use Our Solutions for Liquefied Gas Facilities



Monitoring of Cryogenic Liquids

- Pipeline leakage detection and localization
- Cool-down monitoring on the jetty
- Leakage detection in liquefaction and process areas
- Leakage monitoring in tank annulus
- Monitoring of spill containment area



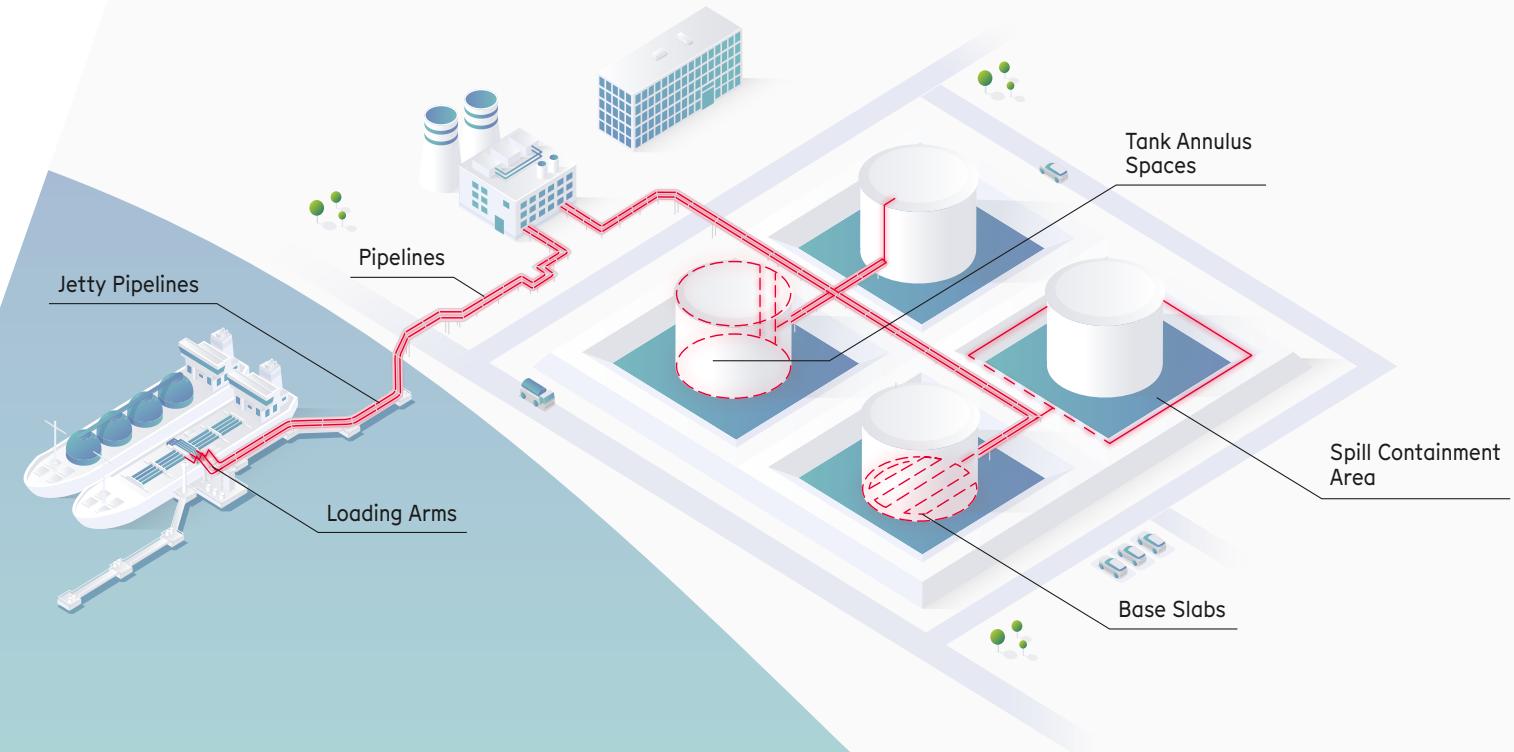
Monitoring of Electrical Equipment

- Base slab monitoring
- Temperature Monitoring and Fire Detection of Transformers



Monitoring of Axillary Pipelines

- Water outfall pipelines
- Gas pipelines

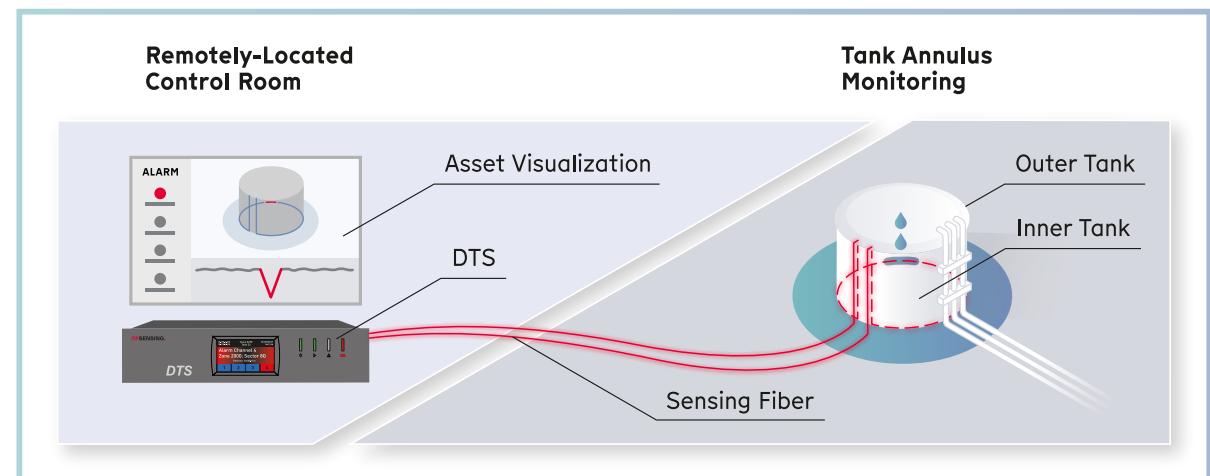
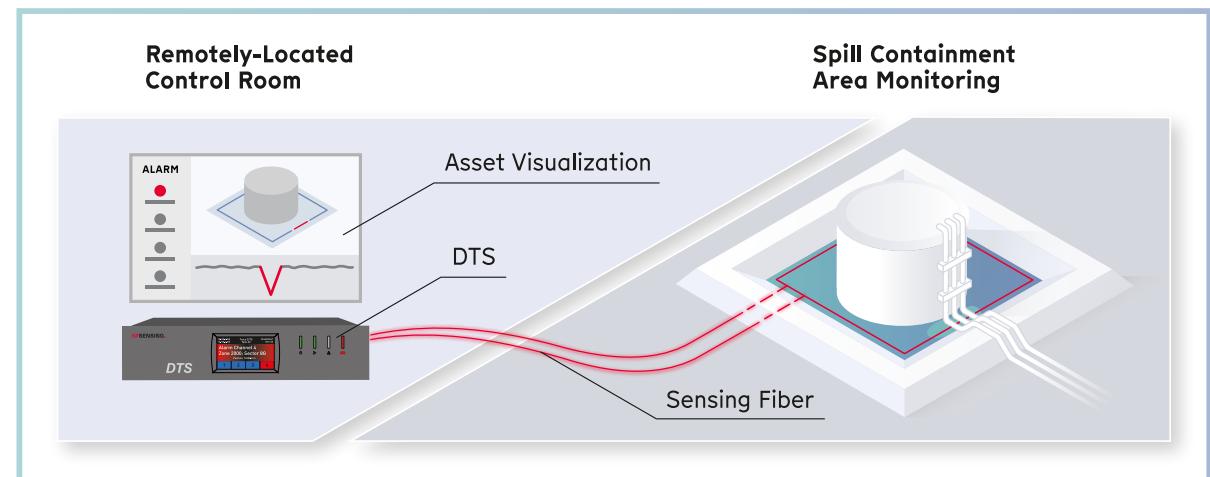
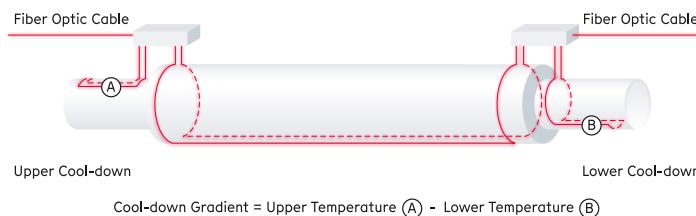


Monitoring of Cryogenic Liquids

Reliable Solutions

The DTS system locates leaks in the internal tank. The sensor fiber is deployed in the annulus **between the two tank walls** during tank construction. If a leak occurs, cold or cryogenic fluids come in contact with the sensing fiber lying in the annulus space. Due to the low temperature of the fluid, the DTS system rapidly identifies even very small leaks.

Liquefied gas is also quickly detected by routing DTS sensor cable **around the perimeter of the spill containment areas**. When leaking material reaches the containment areas, the temperature decreases, triggering an alarm. The system reports the precise alarm location.



»The SIL-2 (Safety Integrity Level) rating and ATEX Zone 0 certificate that AP Sensing has achieved gives us the confidence that their solution is going to work as planned, day in and day out, in high-risk environments. Operators sleep better at night knowing that the assets are protected and security standards are met.«

Dr. Stephan Grosswig, GESO





Monitoring of Electrical Equipment

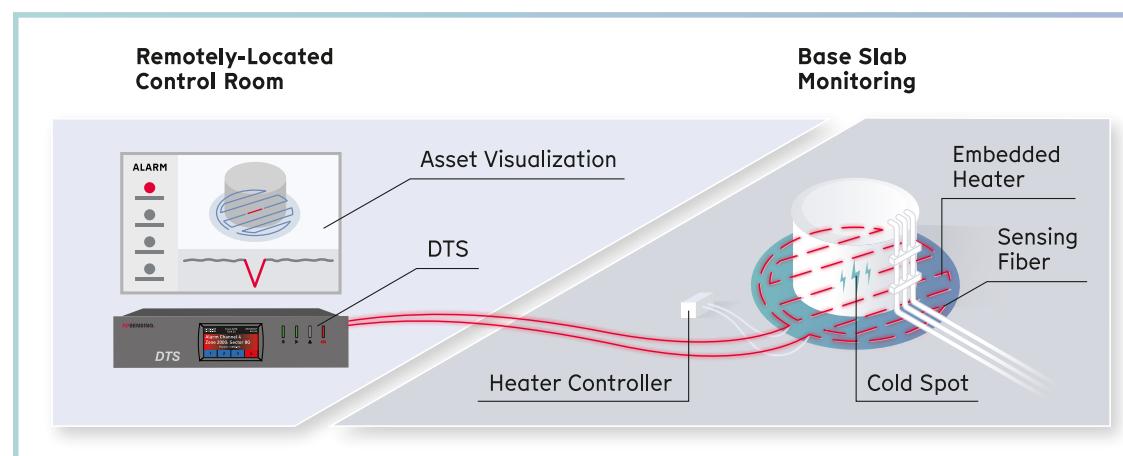
for Your LNG Facility

Base Slab Temperature Control Monitoring

The DTS monitors the entire pad area and heating system in real time, down to one-half meter spatial resolution. The sensor cable is deployed in the heating element conduit within the pad, and provides temperature data every half meter along its path. In addition to the monitoring functionality, the temperature data also minimizes the power consumption. By identifying hot and cold spots, heating efficiency is improved.

Electrical Equipment Temperature Monitoring & Fire Detection

AP Sensing DTS provides the performance required to monitor the temperature of transformers and other electrical equipment of the modern electrically-driven LNG trains. Fire Detection technology using DTS which is widely used in other critical applications is also used to enhance the security of LNG installations.



Bank of Transformers and cooling systems

Ease of Integration and Site Overview

Through Excellent Data Presentation & Management

AP Sensing's DTS solution can be fully integrated into the site monitoring and control system. This becomes important when the DTS is located some distance away from the main control room, for example, an ATEX wall-mounted device located near a tank, or a rack-based system in the jetty control room. Our integrated asset visualization software, SmartVision, gives your operators the complete plant overview, 24/7.

It's no accident that we have the industry's lowest failure rate. Apart from over 40 years of HP's optical test leadership, we are passionate about continuously improving our DTS solutions to help you meet your day-to-day challenges.



SmartVision Features

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





Your Reliable Solution Provider

Your Best Choice

AP Sensing is your long-term partner. **We listen to your challenges and strive to provide the best solution for your application.** Our complete offering fits your LNG terminal and pipeline monitoring demands and protects your valuable assets.

AP Sensing's support philosophy does not end with the commissioning – it goes far beyond. Our experienced support and engineering team can help you with the **design, installation, and project management.** This includes not only onsite service but also hotline support, maintenance, and training.

Whatever is needed – our team of experts is happy to assist you.

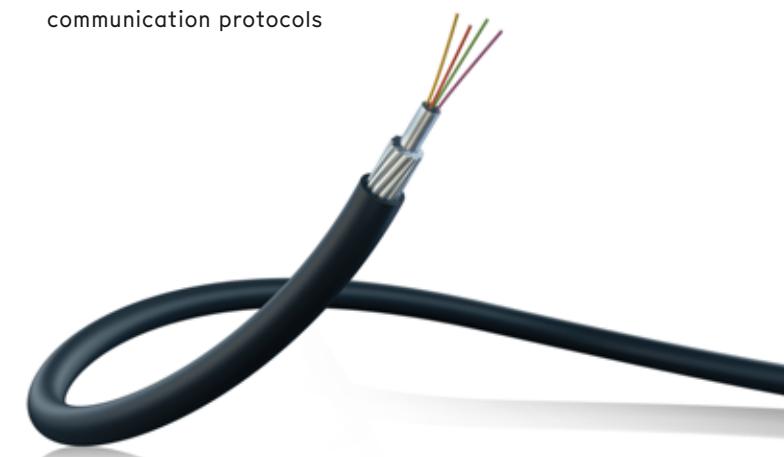


Temperature



Instrument Features

- ATEX certification down to Zone 0
- SIL-2 assessed by TÜV recognized consultants
- Proven field reliability with industry's lowest maintenance and warranty costs
- Highest reliability throughout the entire operating temperature range
- Lowest laser output power – inherently safe in case of fiber breaks
- Wide range of industry standard communication protocols



Cryogenic fiber optic cable



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



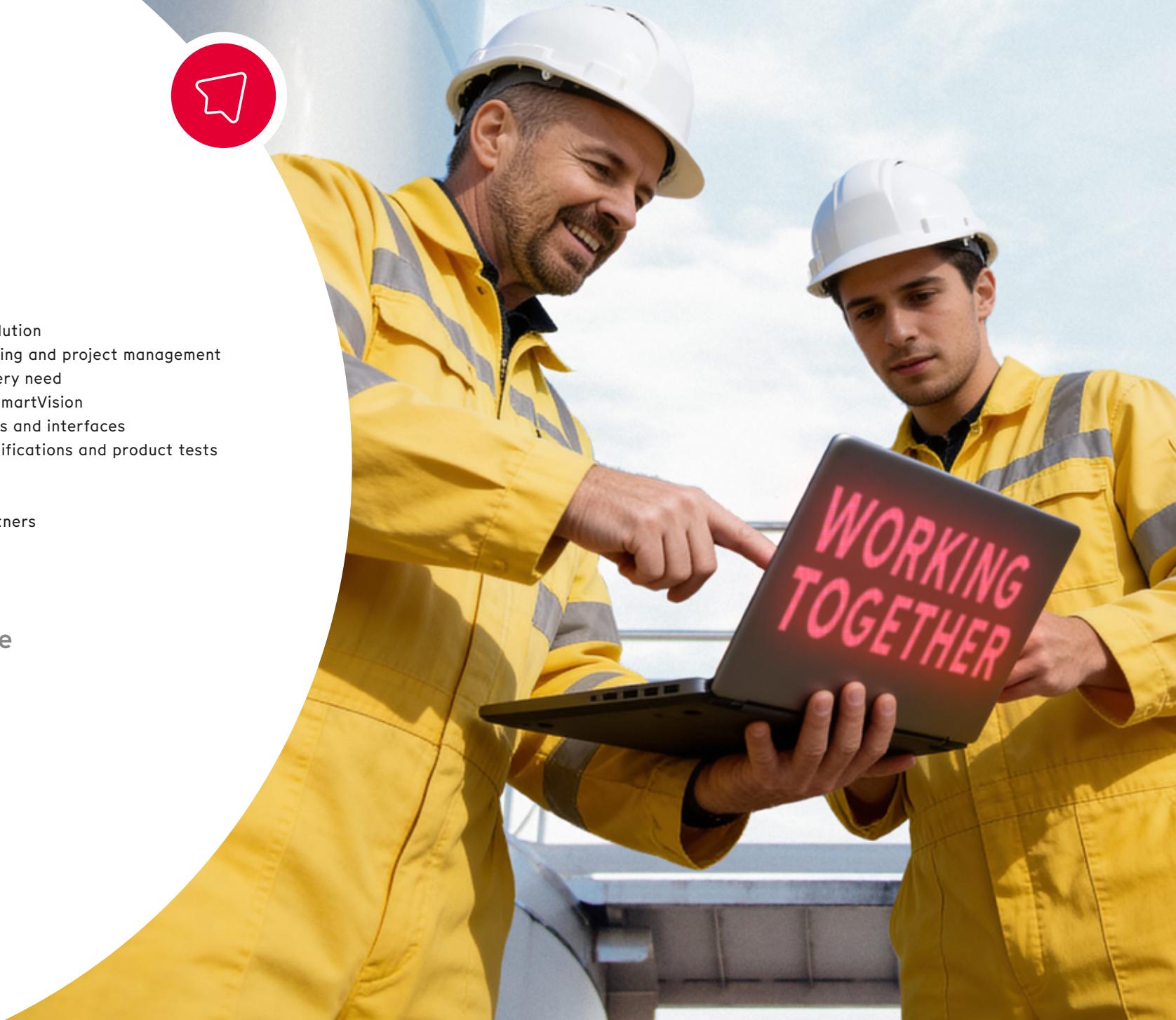
Supportive



Global



Competent



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.





THINKING AHEAD



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