

FIBER OPTIC SENSING TECHNOLOGY

Accurate safety

Temperature

Leakage

Real Time Thermal Rating

Dynamic Cable Rating

Third Party Intrusion

Geotechnical Event

Acoustic/ Vibration

Deformation

The Technology



How does Fiber Optic Sensing Technology Work?

Optical fiber is widely known for its telecommunications applications, but there are other uses. The light beam of the fiber optic is very sensitive and can be altered by molecules stimulated by external changes (such as temperature, vibration and sounds). Once the wavelength of the light is affected our technology can analyze and pinpoint the signal deviation to translate it into a precise alert indicator, even over large distances. We merged the conventional fiber optic cable with state of the art technology to offer precise information and 24/7 monitoring of key data.

Which indicators can be monitored through fiber optic?

Temperature
(DTS, Distributed Temperature Sensing)

A low power laser pulse is sent through the fiber. When any impurity disturbs it our software is capable, of measuring this alteration in temperature, deformation and variation.

The result: countless thermometers with radar precision guarding your assets.

Acoustic/ Vibration

(DAS/DVS, Distributed Acoustic/ Vibration Sensing)

Acoustic and vibration disturbances generate microscopic elongation of the fiber that can be tracked by the laser pulse sent by our interrogator that interprets Rayleigh's scattering phenomenon to identify acoustic frequency signals over large distances. The system detects vibration and captures acoustic energy into the ultrasonic frequency range with excellent locating capabilities (up to 30 miles)

The result: the effect of millions of microphones listening for changes around areas that need to be protected.



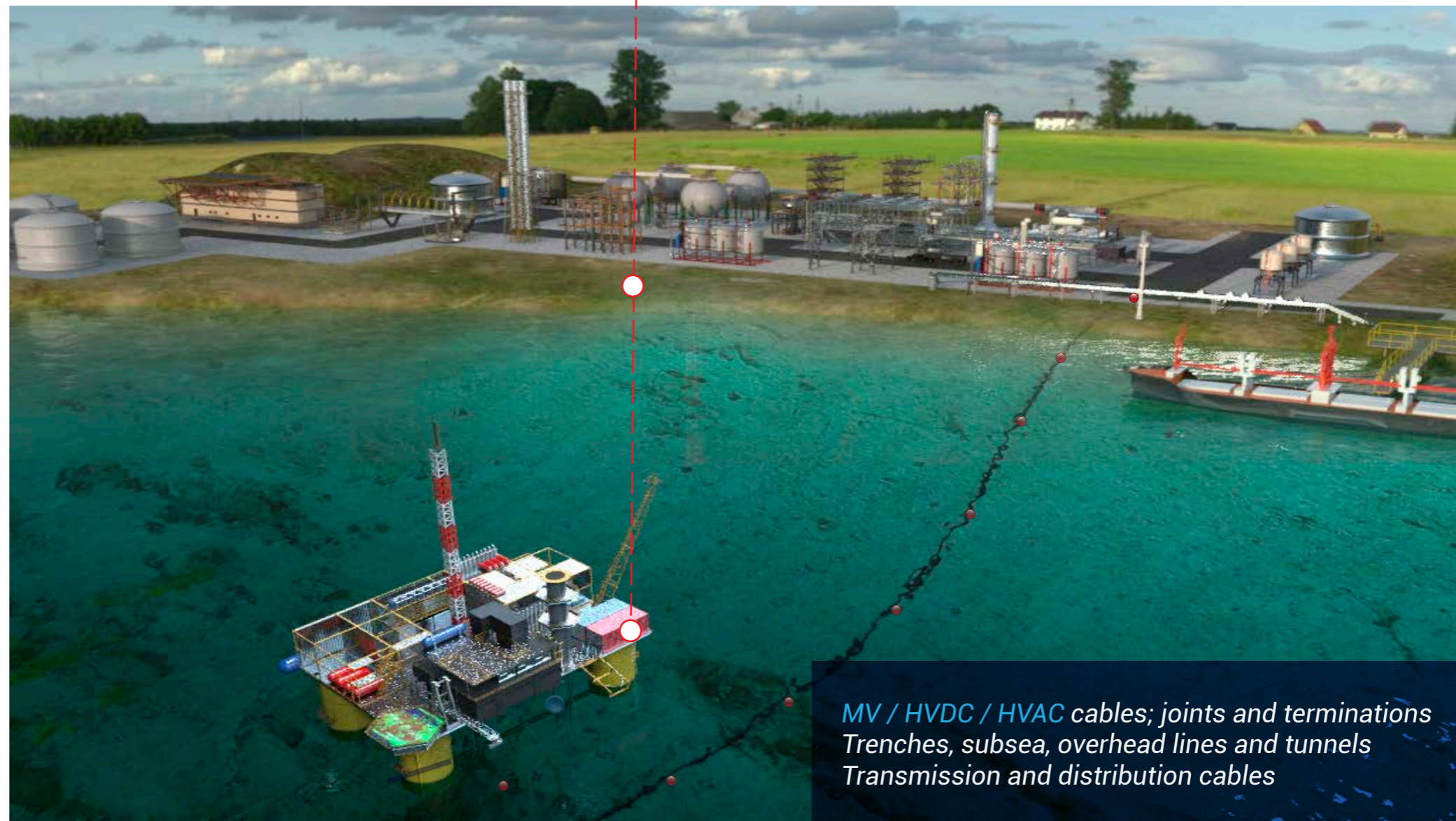
Power Cable

Monitoring applications

○ Distributed Temperature Sensing (DTS) allows for continuous monitoring to be conducted along the cable, thus guaranteeing maximum operation of the system and providing optimum results

Features

- Temperature monitoring over very long distances without compromising performance.
- High spatial resolution to capture incipient condition changes.
- Detection and localization of events with a range of alarm options.
- Dynamic strain monitoring for overstressed cable section detection.
- Enables potential reduction in the cross sectional area of the conductors.
- Real time thermal rating monitoring.



*MV / HVDC / HVAC cables; joints and terminations
Trenches, subsea, overhead lines and tunnels
Transmission and distribution cables*

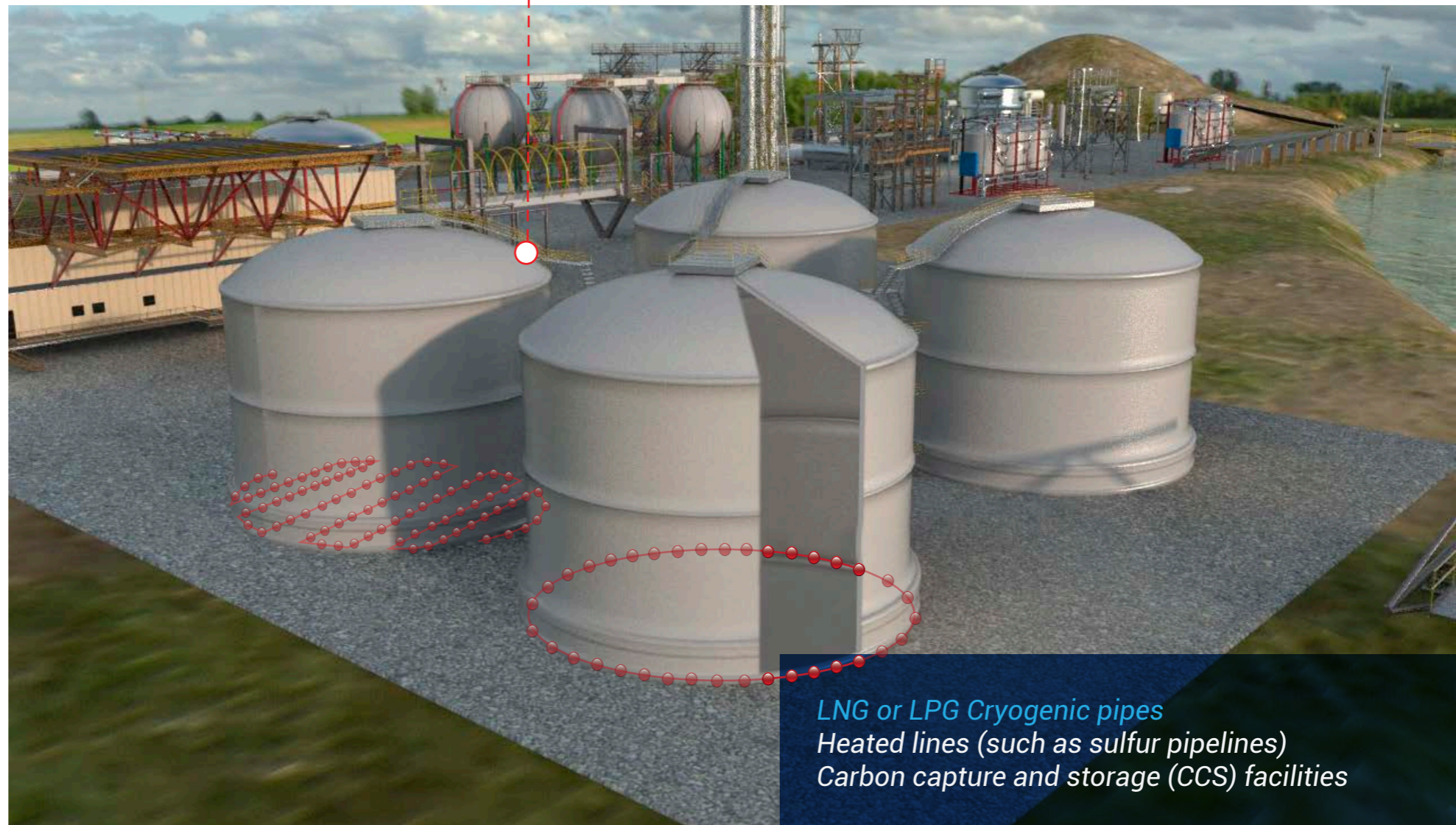
LNG Tanks & Gasoline Tanks

Monitoring applications

LNG tanks and gasoline tanks facilities can be monitored for temperature range to keep the gas in a liquid state. Fiber optic sensing technology can also determine any leaks in the tank area.

Features

- Identifies and radially locates leaks in the internal tank.
- Long measurement reach with all electrical hardware in a remote control room.
- Real-time feedback to the pad heating system by zones.
- Temperature data can also be used to minimize the power consumed by the heating system.
- Alarms and system warnings can be set for both abnormally high and low temperature readings.



LNG or LPG Cryogenic pipes
Heated lines (such as sulfur pipelines)
Carbon capture and storage (CCS) facilities

Conveyor Belts

Monitoring applications

Monitoring temperature variations in different types of infrastructures such as tunnels, subways and conveyor belts is key for their optimum performance.

In the case of conveyor belts, the system can monitor the temperature of the pulleys and for any significant events where friction could lead to fire damage.

Features

- Monitors all conveyor belt bearings.
- Monitors over long distances along the entire conveyor belt.
- Reduces corrective maintenance.
- Determines hot spots that can generate a possible failure.
- Alarms and system warnings can be set for both abnormally high and low temperature readings.



Infrastructure, tunnels, subways and conveyor belts.



Pipeline and TPI

Monitoring applications



Distributed Temperature Sensing (DTS) technology is suitable for monitoring pipelines and features the measurement of temperature variation to detect gas and pinpoint failures.

Distributed Acoustic Sensing (DAS) technology monitors for movement and Third Party Intrusion (TPI) on the pipeline, and detects any leaks and pinpoints failures

Features

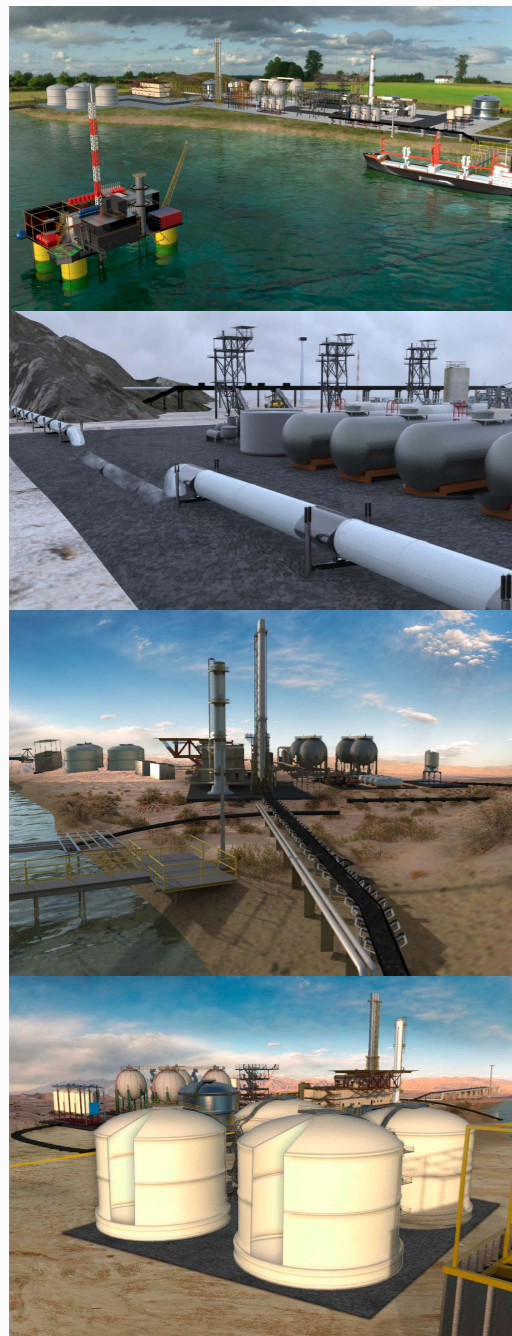
- Temperature monitoring over very long distances without compromising performance.
- Identifies leaks down to the exact location of the incidents, even in hazardous environments.
- No unmonitored areas.
- Up to 50 feet of movement detection.
- Leaks are precisely located and any failures of your heat tracing system can be detected quickly.



Gas and Liquid Pipelines
Buried pipelines to guard against Third Party Intrusions and accidents

System Safety Equation

ASSETS



FIBER OPTIC SENSING

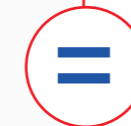
Hardware and monomode fiber optic cable



- Monitoring Software
- Alert Classification
- Alert Generation

○ **DTS**
Distributed
Temperature Sensing

○ **DAS**
Distributed
Acoustic Sensing



CHALLENGES ADDRESSED

Thermal Change Detection
Alert with location

Deformation
Alert with location

Third Party Intrusion
Alert with location

Geotechnical Event
Alert with location
Historic event evolution

The Advantages

- Optical fiber as the sensing element to **monitor several parameters.**
- **Uninterrupted monitoring** is essential to manage risks and maintenance of large structures.
- Is immune to **Electromagnetic Interferences (EMI).**
- Requires **very little maintenance.**
- Resistant to **harsh environments.**
- Has **no "dead zones"** for measurement registry.
- Is **easy to install** and integrate with other systems (SCADA).
- Distributed sensing over **large distances.**
- Provides **reliable and accurate measurements.**



Who We Are

A team of professionals with vision of the future and action oriented.

We are passionate about designing solutions that respond to the needs of customers.

Where We Are

With offices in Latin America, the United States, Australia & Spain, Ekabel has consolidated its rapid expansion and has participated in numerous important projects.

What We Do

Based on expert knowledge, we design and integrate energy systems, telecommunications and automation to optimize results for our customer and protect their most value assets.





Our Philosophy

360 Integration

When it comes to energy systems and connectivity networks, we've got you covered.

Our ability to integrate several products in a single proposal is the backbone of our service.

Borderless Logistics

Streamlined delivery is part of our signature service in order to meet client needs.

Brain HUB

Our team of top level engineers from around the world, with heavy expertise in the industries we serve, provides our clients expert advice on most challenging projects.

Global Service Team
Experts devoted to help you.

Technology Transfers
Specific training sessions in latest topics.

Flexibility

Our geographic expansion allows us to offer competitive advantages on both small and large projects.

Global reach with local support.



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