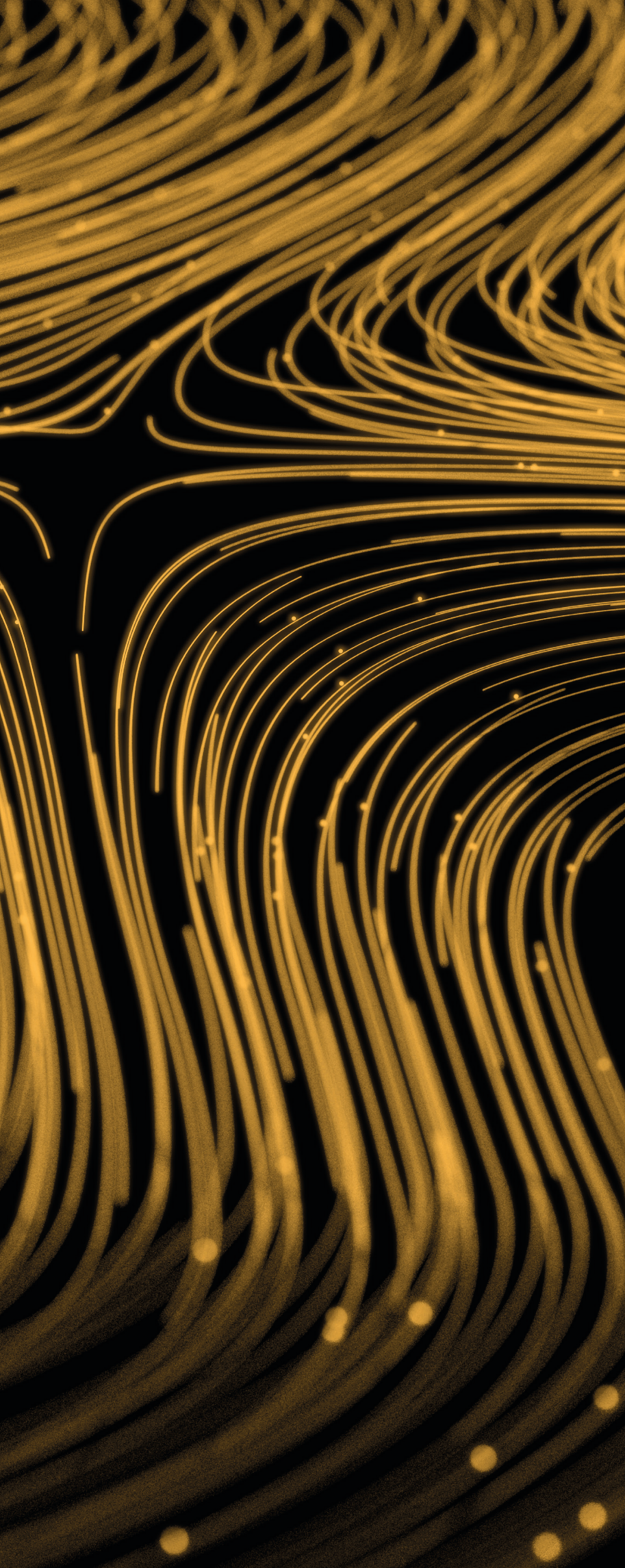




SENSING & MONITORING

OPTRAL

HIGH PERFORMANCE
OPTICAL CABLES

Since 1988, OPTRAL has dedicated itself to the design, manufacture and sale of fibre optic cables.

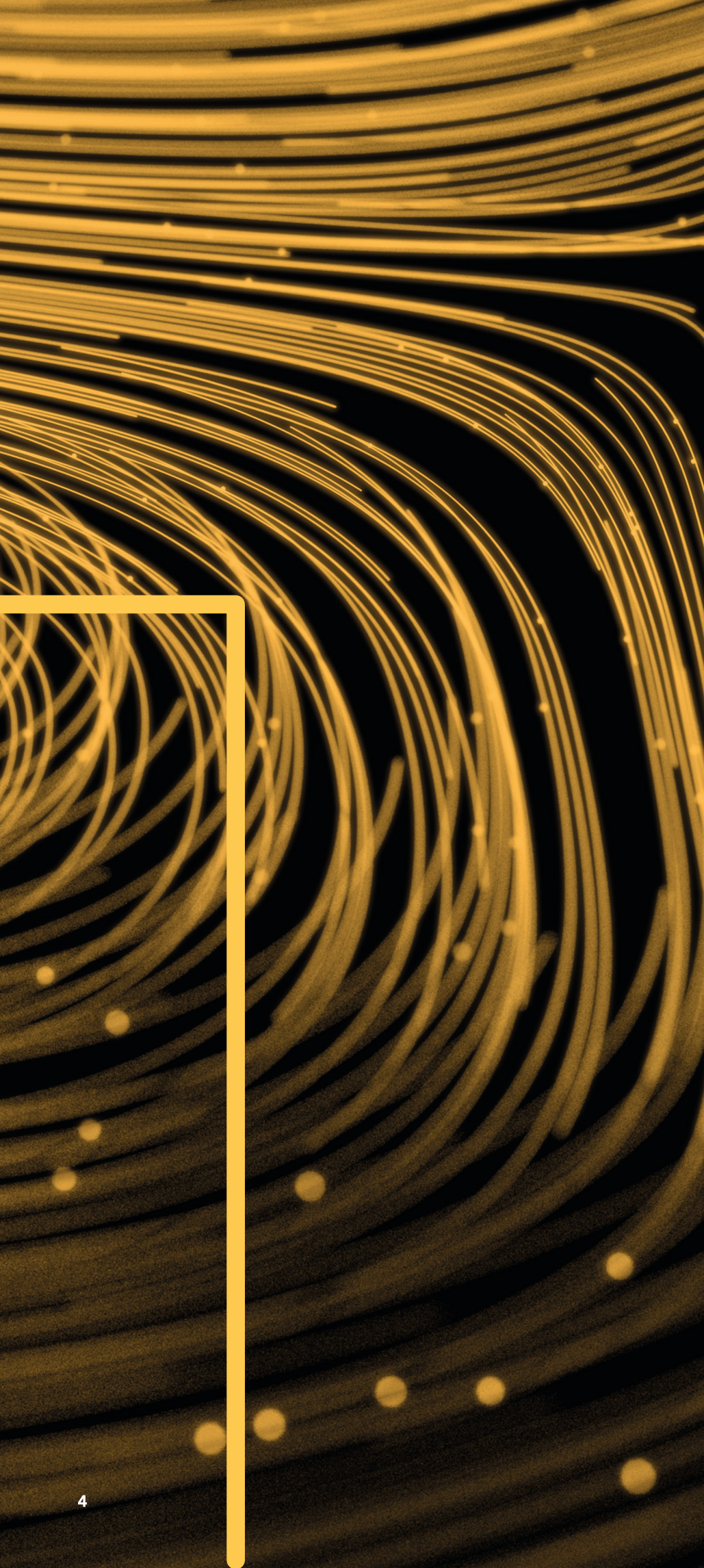


As specialists in fibre optic cables, OPTRAL is evolving towards innovative product lines, with its creation of OPTRAL SOLUTIONS, a set of sensing and monitoring solutions that detect events of interest via fibre optic cables; capable of capturing magnitudes such as temperature, pressure, vibration or tension.

These solutions can be applied in a large number of situations or markets, such as security and surveillance systems, infrastructure analysis, fault control in telecommunications networks, and fire and leak detection systems among many others.

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This is the solution that detects and monitors faults or events in multiple markets through variables such as temperature, acoustics, vibrations, stress or strain depending on the installation conditions and type of application.

The system consists of:

- 1. OPTRAL Fibre Optic sensor cable.**
- 2. Interrogator equipment** for collecting the data detected by the sensor cable.
- 3. OMONITOR Software Platform** to display and monitor the detected events.

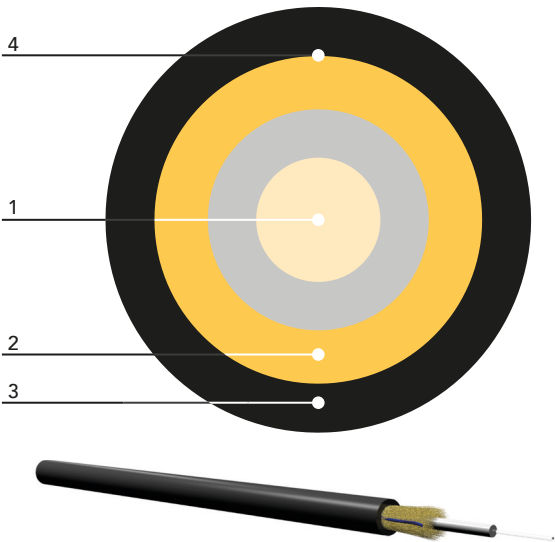
01

Fibre Optic Sensor Cable



DVS (Vibration Sensor Cable)

Armoured Dielectric Sensor Cable (1 OF)



- 1. Optical Fibre (Adjusted)
- 2. Reinforcing elements
- 3. Outer cover
- 4. Ripcord

Applications

Outdoors
Vibration Sensing
Harsh environment

Features

Compact
Rigid
Resilient
Small diameter



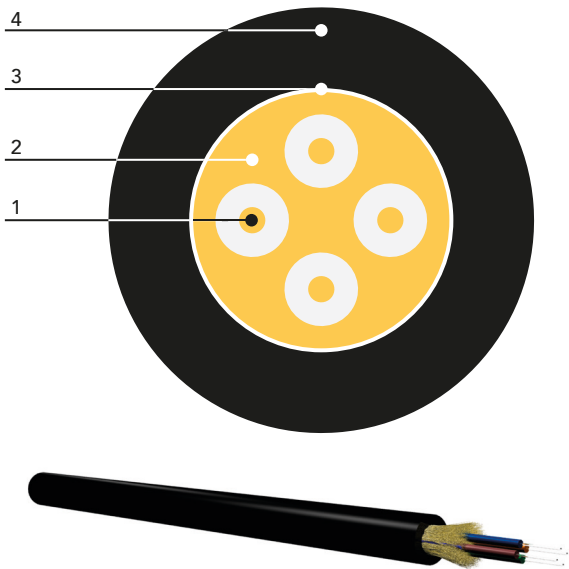
MOISTURE
PROTECTION



UV RESISTANCE

G-FOSC (OF Sensor Cable)

Dielectric Sensor Cable (Over 8 OF)



- 1. Optical Fibre (Adjusted)
- 2. Reinforcing elements
- 3. Ripcord
- 4. Outer cover

Applications

Outdoors
Sensing applications

Features

Dielectric
Compact
Flexible
Small diameter



MOISTURE PROTECTION



UV RESISTANCE



FREE OF HALOGENS



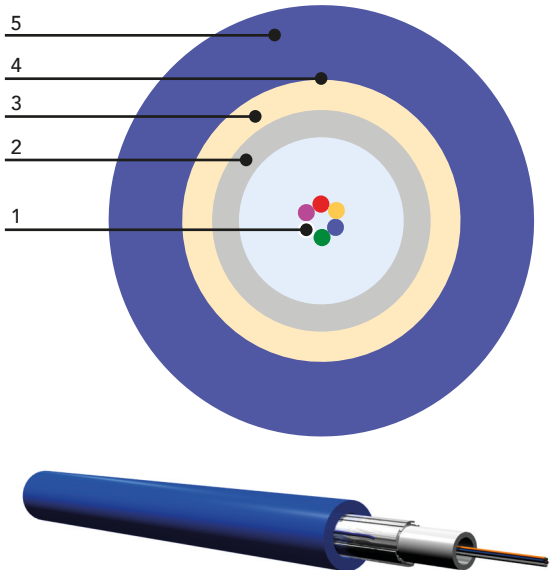
COMPLETELY DIELECTRIC



HIGH FLEXIBILITY

DLS (Leak Sensor Cable)

Dielectric Sensor Cable (Over 12 OF)



- 1. Optical Fibres
- 2. Loose tube
- 3. Reinforcing elements
- 4. Ripcord
- 5. Outer cover

Applications

Outdoors
Temperature sensor
Raman Detection
Acoustic detection

Features

Dielectric
Rigid
Compact
Flexible
Small diameter
Rodent proof



MOISTURE PROTECTION



UV RESISTANCE



FREE OF HALOGENS



COMPLETELY DIELECTRIC



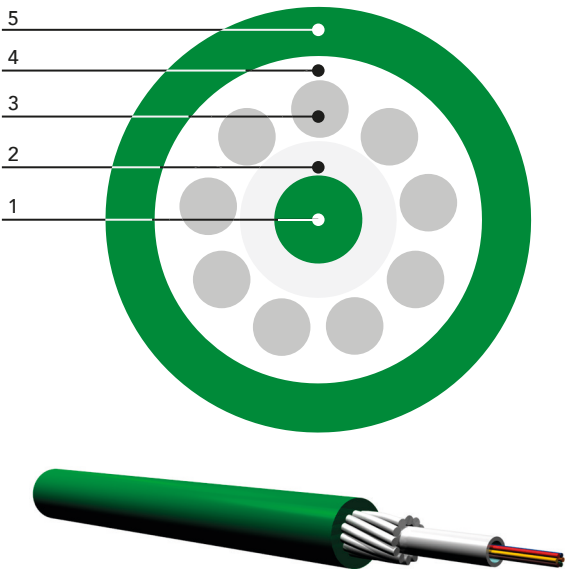
RODENT PROTECTION



DISTRIBUTED TEMPERATURE SENSOR

DAS (Acoustic Sensor Cable)

Dielectric Armoured Sensor Cable (1 OF)



- 1. Optical Fibres
- 2. Loose tube
- 3. Reinforcing elements
- 4. Ripcord
- 5. Outer cover

Applications

Outdoors
Acoustic sensor
Harsh environment

Features

Dielectric
Rigid
Compact
Small diameter
Excellent resistance to rodents



MOISTURE PROTECTION



UV RESISTANCE



FREE OF HALOGENS



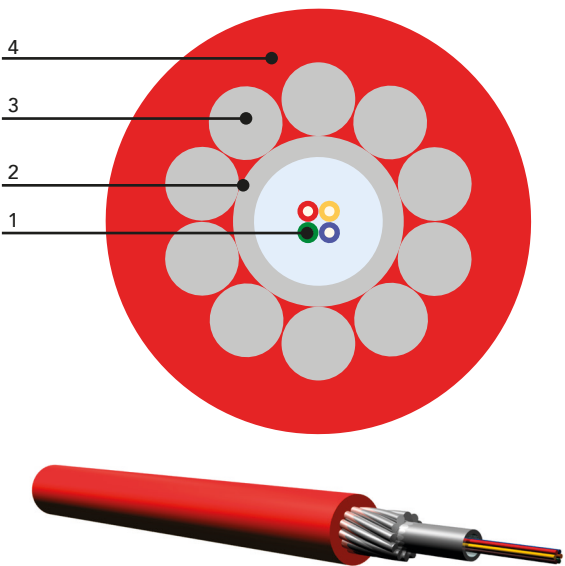
RODENT PROTECTION



COMPLETELY DIELECTRIC

DTS (Temperature Sensor Cable)

Metallic Armoured Sensor Cable (Over 12 OF)



- 1. Optical Fibres
- 2. Stainless steel tube (gel-filled)
- 3. Metal reinforcement
- 4. Outer cover

Applications

Universal (Indoor/Outdoor)
Temperature sensor
Raman Detection
Harsh environment

Features

Compact
Rigid
Resilient
Small diameter
Waterproof
Excellent resistance to rodents



MOISTURE PROTECTION



UV RESISTANCE



FREE OF HALOGENS



WATERPROOF



DISTRIBUTED TEMPERATURE SENSOR



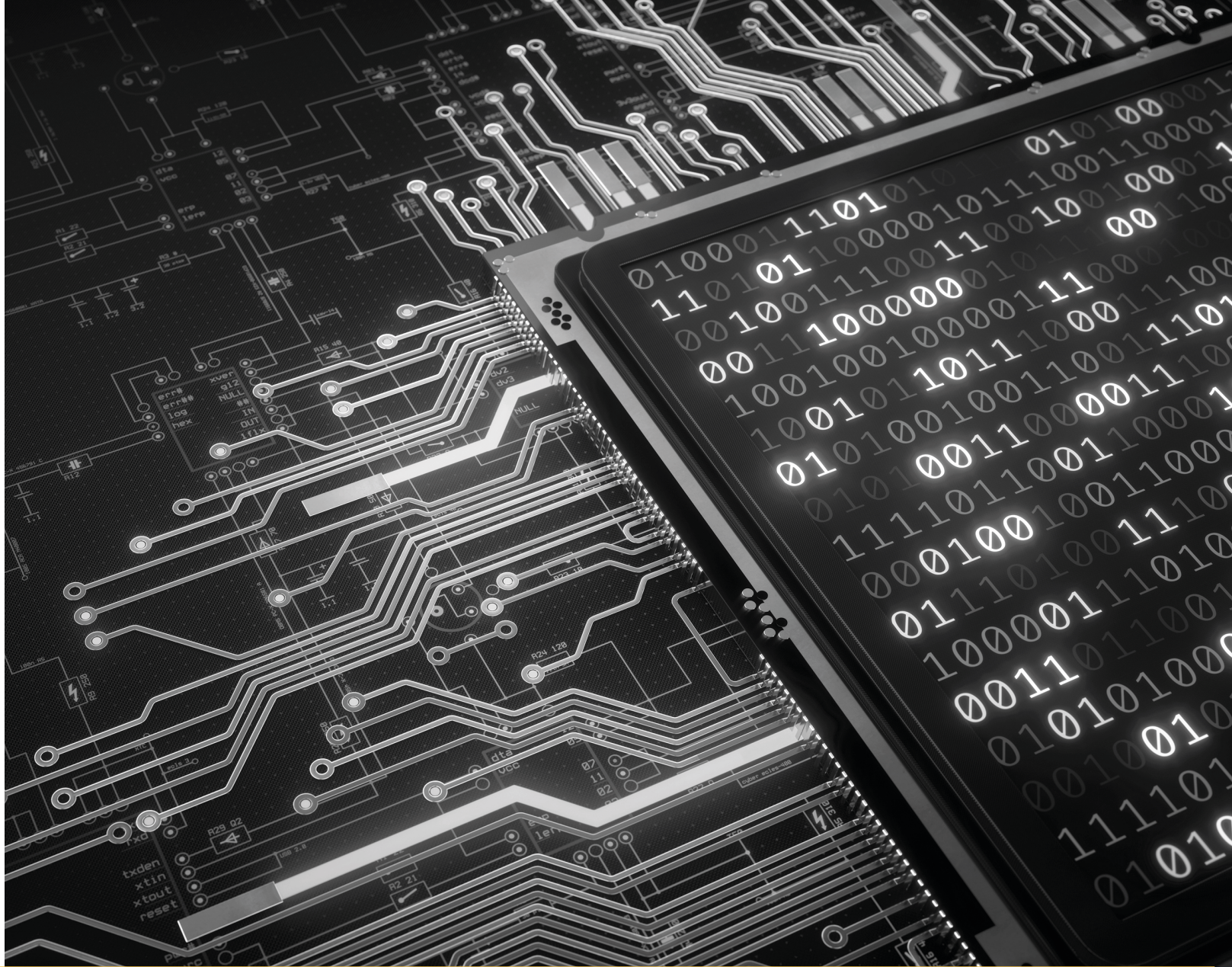
RODENT PROTECTION

02

Interrogator Equipment

Interrogator Equipment collects data detected by the sensor cable and is designed to operate with the appropriate technology for the type of measurement to be carried out and for each specific application.

OSENSOR has 4 different types of interrogator equipment using 4 different technologies (DTS, DAS, DSS, FBG).



DTS

Distributed
Temperature Sensing



DAS

Distributed Acoustic
Sensing



DSS

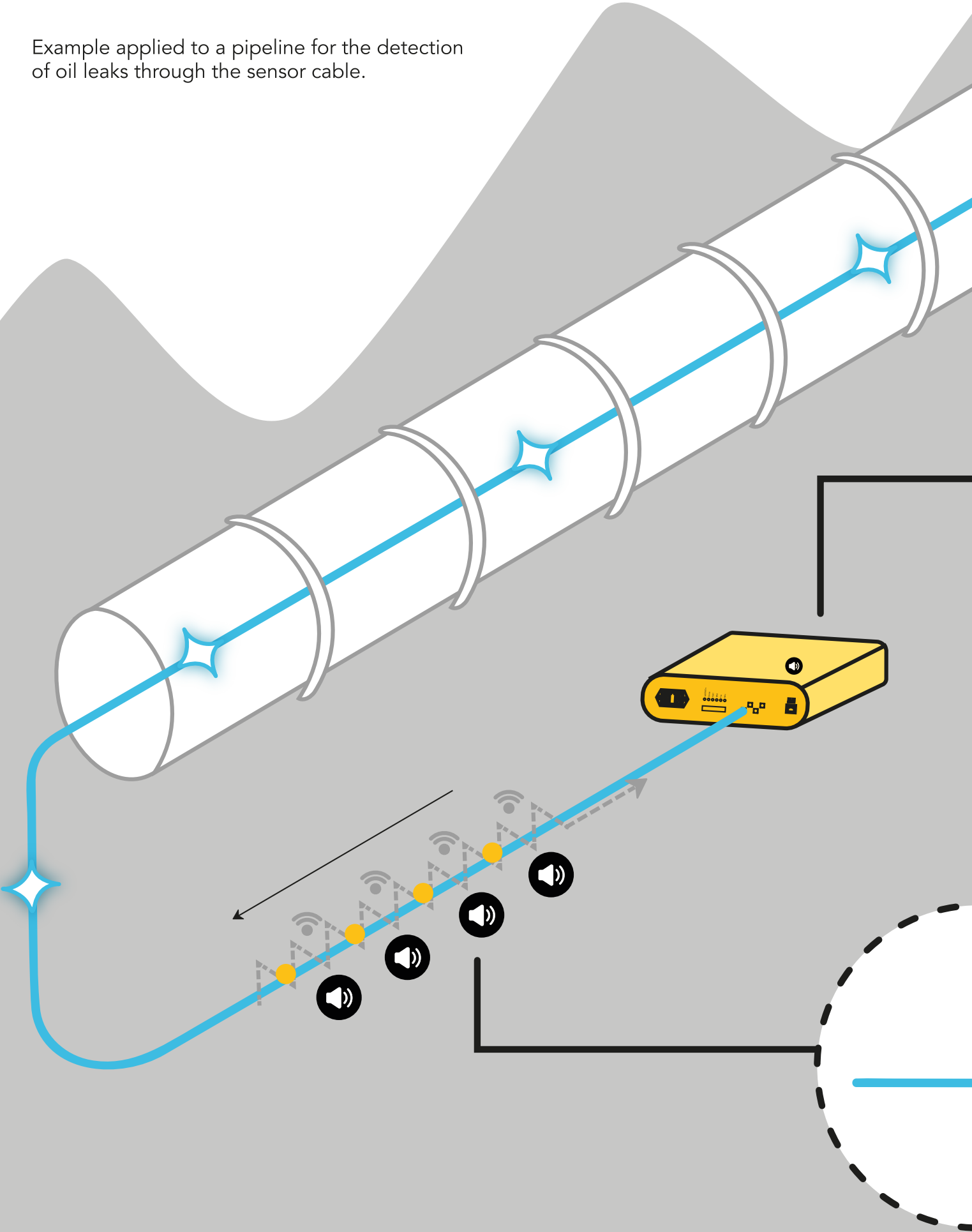
Distributed Strain
Sensing

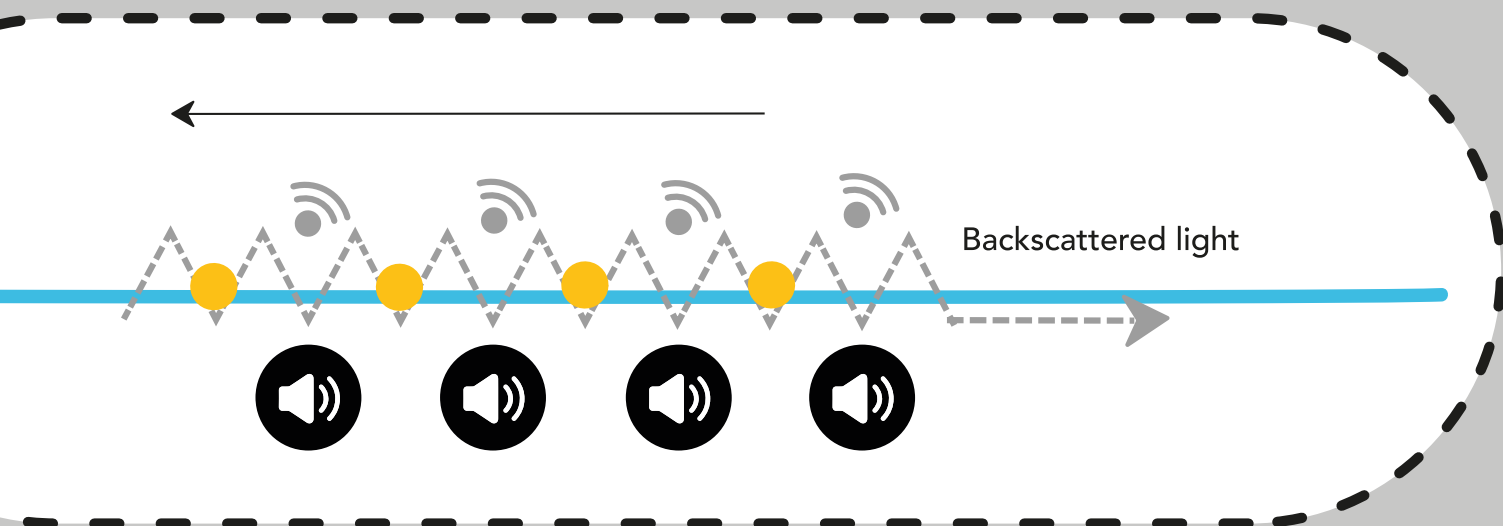
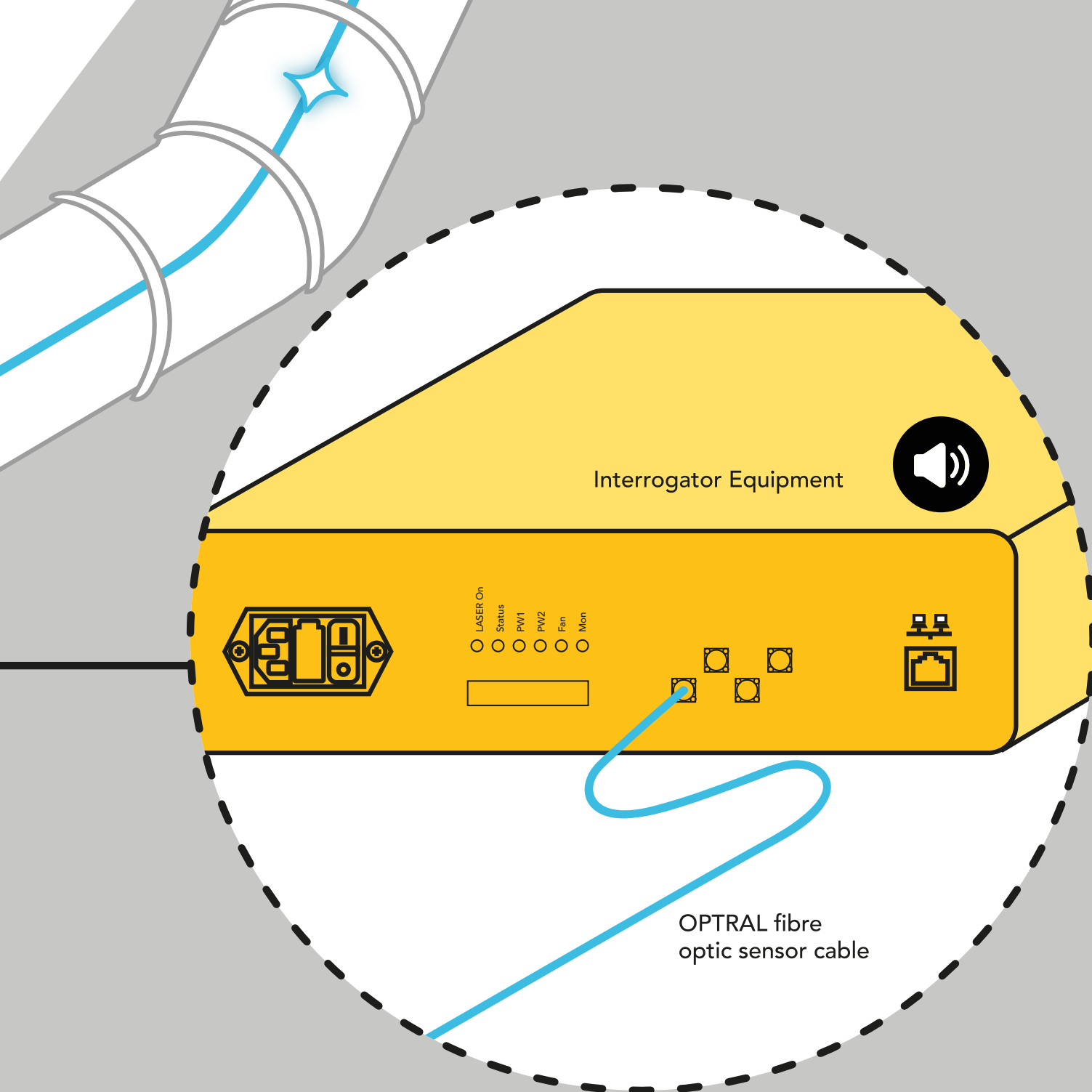


FBG

Fibre Bragg Grating

Example applied to a pipeline for the detection of oil leaks through the sensor cable.





Monitoring Software

03

OMONITOR is OPTRAL's software platform for managing, displaying and monitoring the events or faults detected. The platform resides in a PC where all the databases are located: inventory, geolocation in GIS (Geographic Information System), real time status, registered alarms, users, etc.

It is designed with web technology and can be accessed from numerous browsers.

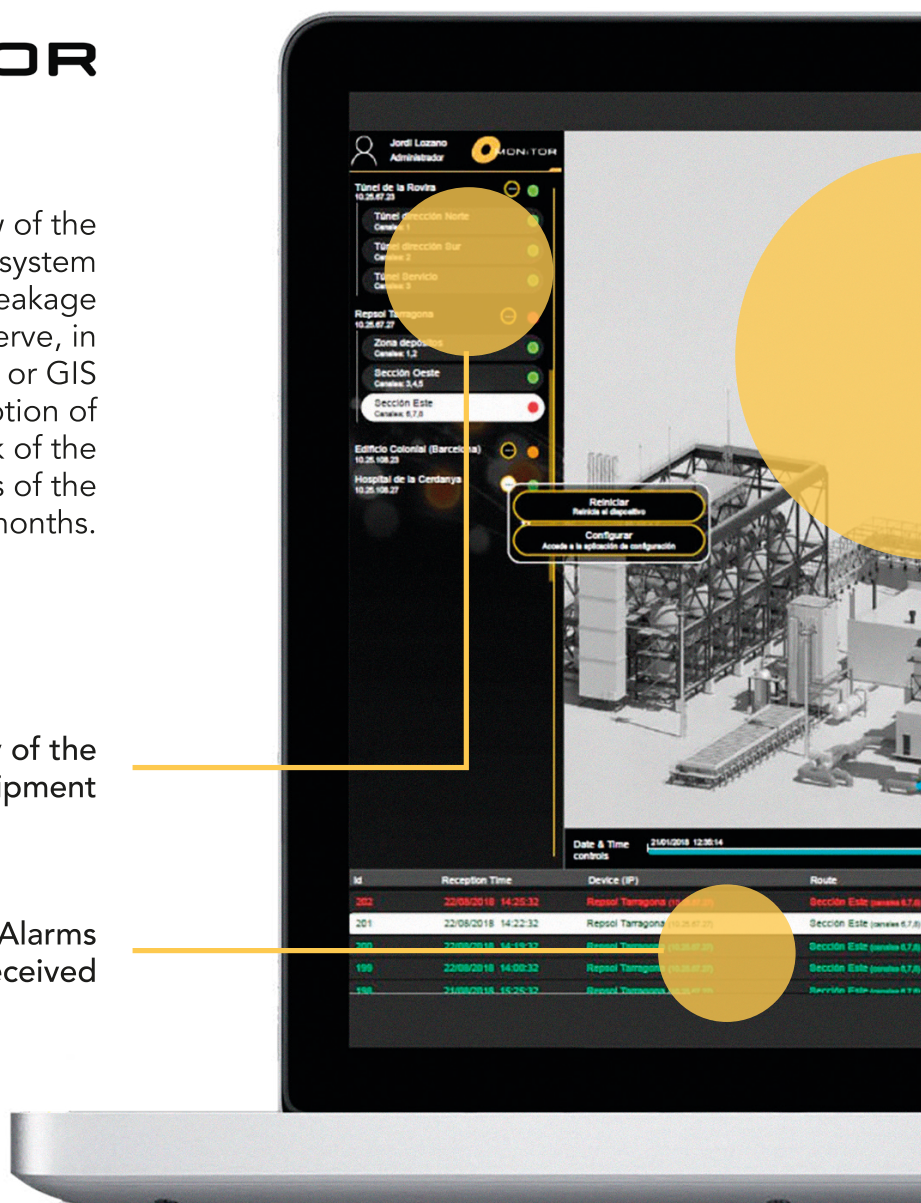




Example of the main view of the management and monitoring system for an application of potential leakage in a steam pipe. We can observe, in real time, a schematic diagram or GIS using a colour code, the reception of alarms and the offline playback of the historical temperature records of the last six months.

Inventory of the equipment

Alarms Received

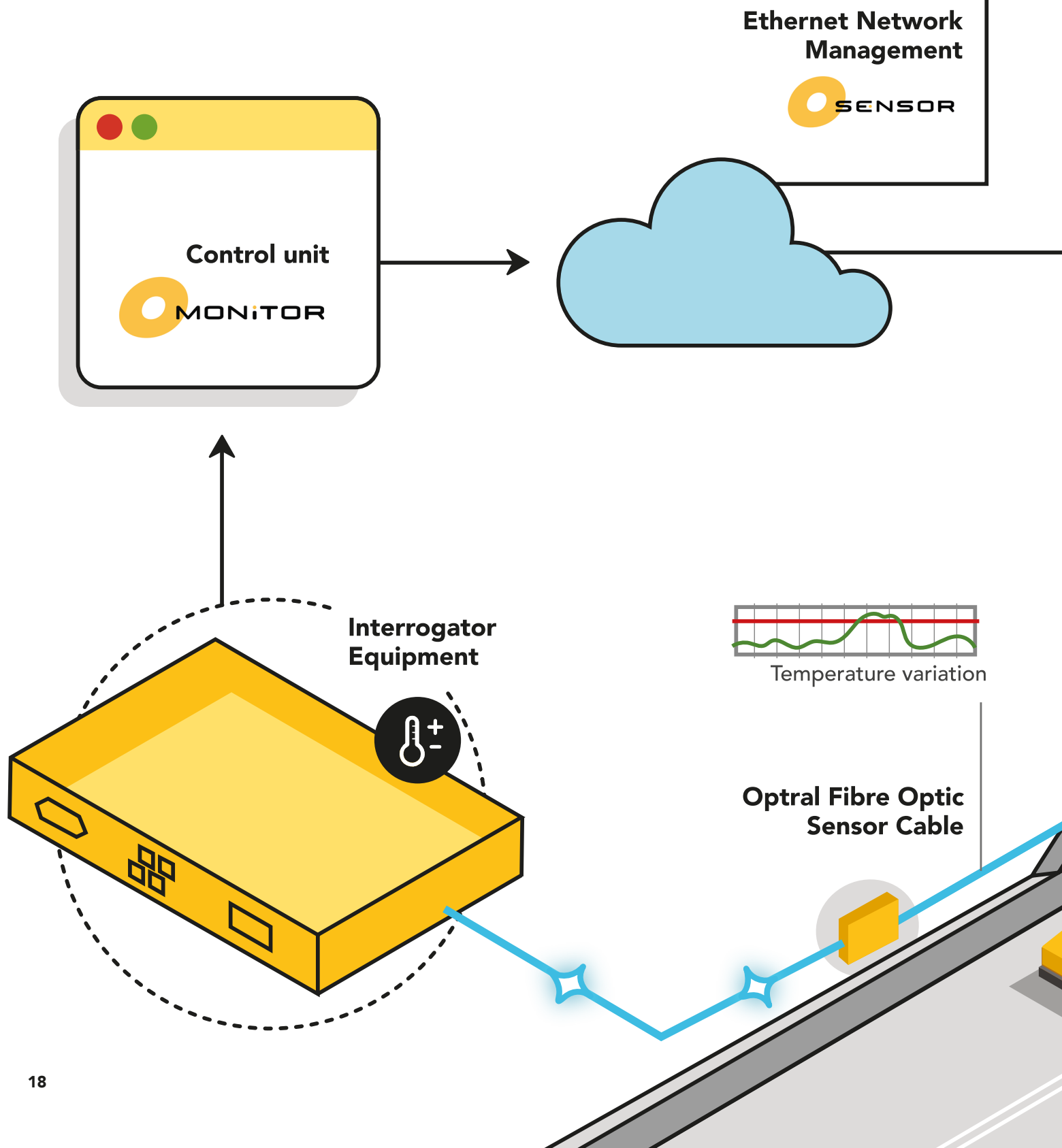


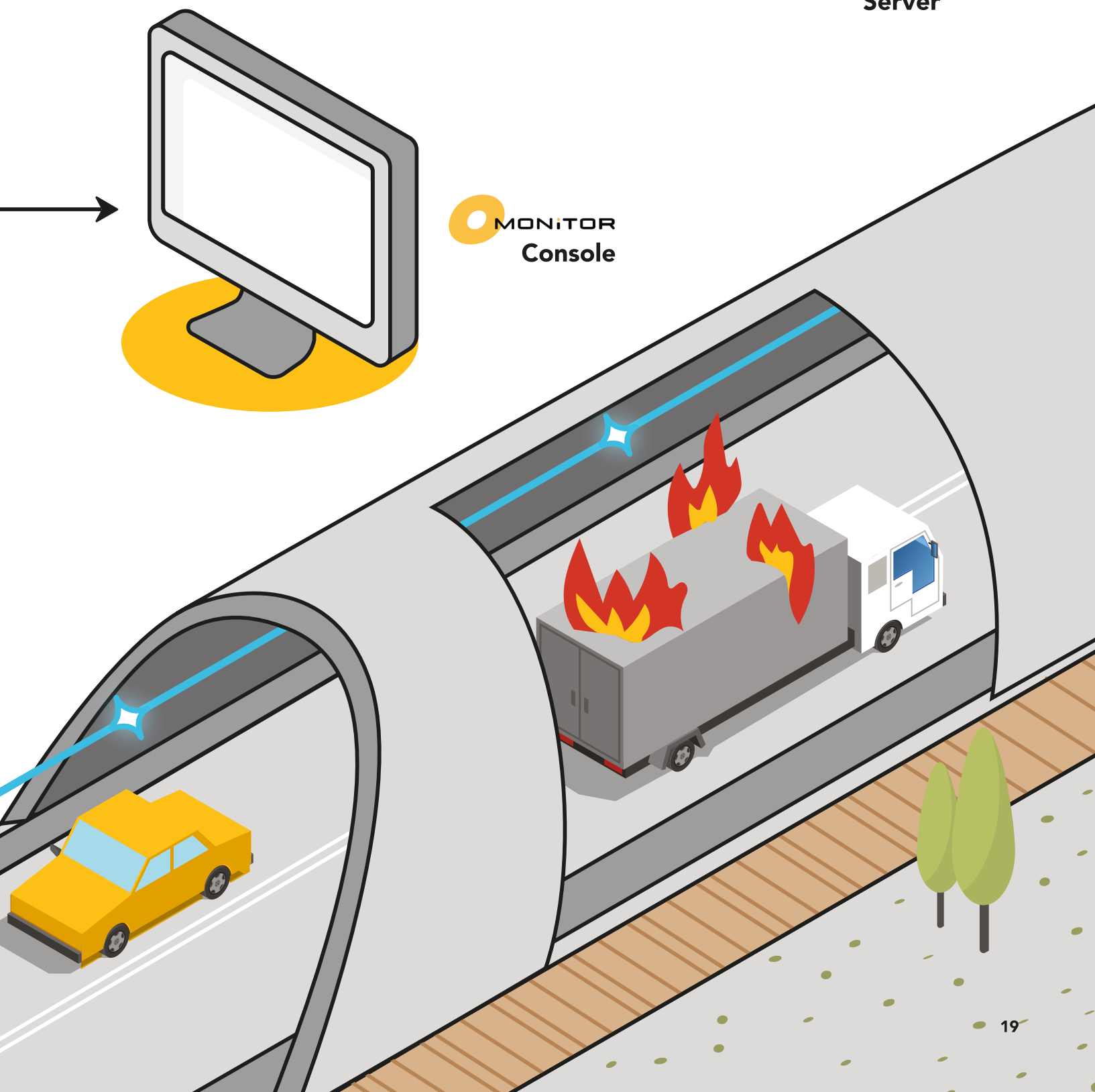
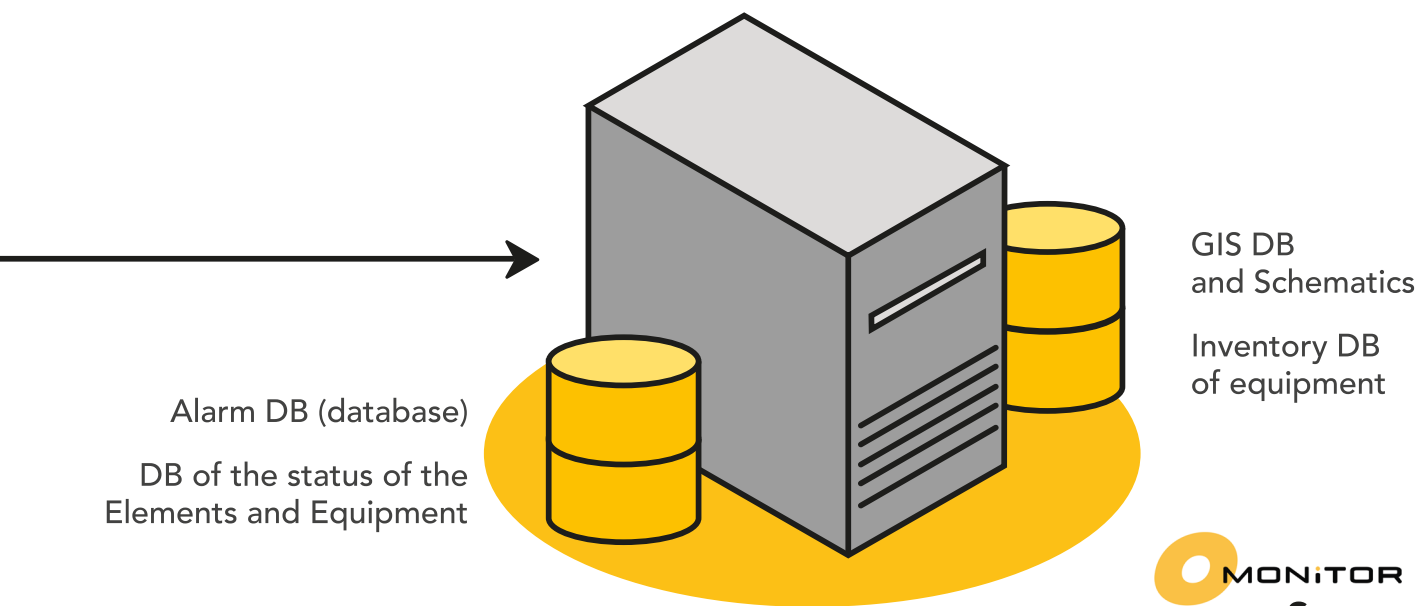
Technical Features

- Real-time monitoring and management of interrogator equipment and fibre optic sensor cables.
- User management.
- Monitoring and logging of events and alarms.
- Trace recording: reflectometry, temperature, stress.

System Architecture

Example of the OSENSOR solution applied in a tunnel for fire detection.





Advantages





There are competitive advantages inherent in the use of optical fibre as a sensor and also in the technology itself and the concept of distributed sensing.

- Ideal in applications where the specific point of the event is unknown.
- Drastically reduces operational costs relating to conventional multipoint detection systems (operators, energy consumption, management of spare parts, obsolescence of components, etc.).
- Investment costs are amortised due to the preventive detection of events: leaks, falling rocks, the collapse of a bridge, overloading of an electricity line, increase in temperature of a mine, etc.
- Immune to noise and electromagnetic interference.
- Covers a large dynamic range in terms of large geographical distances.
- As this is a dielectric sensor, it is ideal for ensuring safety in environments where sparking may occur.

01 Oil & Gas



Detection of leaks in piping

 DTS

Pressurised gas

- Ammonia
- Chlorine
- LNG
- Steam

 DAS

Oil

02 Infrastructures



Structural condition

 DAS

Road traffic density control

 DAS

Control of railway infrastructures

  DAS, DSS

Pipeline Leak Detection

  FBG, DSS

Monitoring, detection and control of vibrations and deformations in

- Viaducts
- Dams
- Nuclear power plants
- Wind farms
- Buildings
- Ship hull, airframes, etc.

Fire detection

 DTS

Industrial plants

Tunnels

Structures and Buildings

Markets

03 Safety



DTS

Fire detection system



DAS

Monitoring of large perimeters of up to 50 km: fence, wall, underground



DAS

Border protection



FBG

Detection of presence or intrusion in very large areas with low spatial resolution

04 Energy



Power transmission lines



DTS, FBG

Detection of electrical overloads



DTS

Intelligent Power Grid Monitoring (Smart Grid)



DTS

Energy monitoring



DTS, FBG

Monitoring of excessive heating

Renewable energies



FBG

Intrusion detection on photovoltaic plants

Monitoring of vibrations and deformations in wind farms

05 Industry



Monitoring of industrial processes



Control of wine and beer fermentation



Cold chain control



Ammonia leak detection



Manufacturing control



DTS, FBG

Heat source detection

06 Data Centre



DTS

Temperature control of servers

07 Mining



DTS

Temperature control in galleries for personnel safety



DTS

Monitoring of conveyor belt bearings

08 Logistics and distribution



DTS

Temperature control in automated warehouses



DTS

Temperature control in pharmaceutical warehouses





HIGH PERFORMANCE
OPTICAL CABLES

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