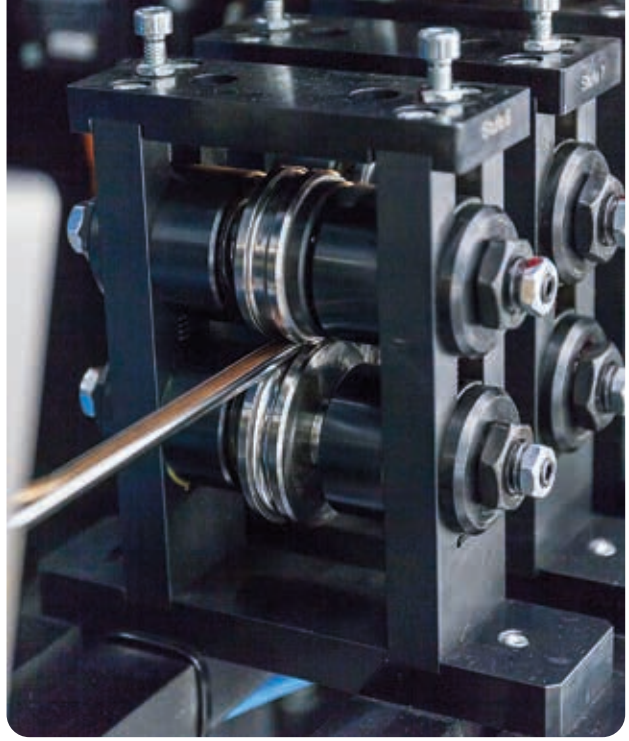
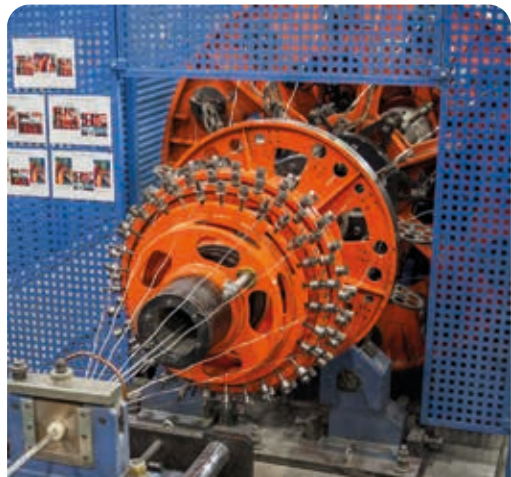
Incab

SPECIALTY CABLES & INFRASTRUCTURE FACILITIES MONITORING

catalogue 2023





About us

Being a communication device, optical fiber gives a great opportunity to monitor different facilities and manage a process technology now.

Combining all of Incab's expertise in fiber optic cables, we have developed a range of sensor cables for a variety of applications.

The optical fiber combines the functions of a distributed sensing element and a data transmission channel. The compact size of the cable opens up a wider range of applications. It enables the acquisition of a wide range of temperature, pressure, acoustic, strain and displacement data.

Fiber optic monitoring systems can be used for remote monitoring of leaks, perimeters, operating conditions, structural health of buildings and structures and fire safety. The operating conditions impose special demands on the cable: it must withstand high temperatures, pressure, humidity, corrosion and vibration.

Incab sensor cables are designed for use in the oil and gas and mining industries, urban infrastructure and utilities, overhead and cable power lines, security installations, fire protection systems.

Incab has been designing, developing and producing cables for telecommunications and energy industries for 14 years. It is one of the largest manufacturers of fiber optic cables in Europe. Incab has the capacity to produce tubes with reduced diameter and optical loose tubes in a variety of metals, alloys and polymers. We offer unique solutions for applications in aggressive environments and are ready to develop customised designs.

Konstantin Kaigorodov
Head of Specialty Cables Export Sales
kaigorodov@incab.ru

Amr Shirazy
Regional Business Development Manager — MENA
a.shirazy@incab.ru

Denis Ostapenko
Deputy Head of the Package Solutions Promotion Department
ostapenko@incab.ru

Working since 2007

15 YEARS

17 342 160
kilometers of fiber

695 050
kilomerers of cable

8 YEARS*

2 500
kilometers of geophysical cable
and the sensor cable

*in production since 2015

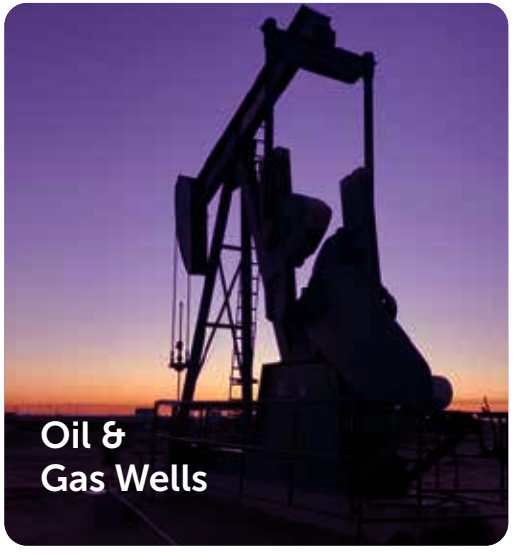
№1

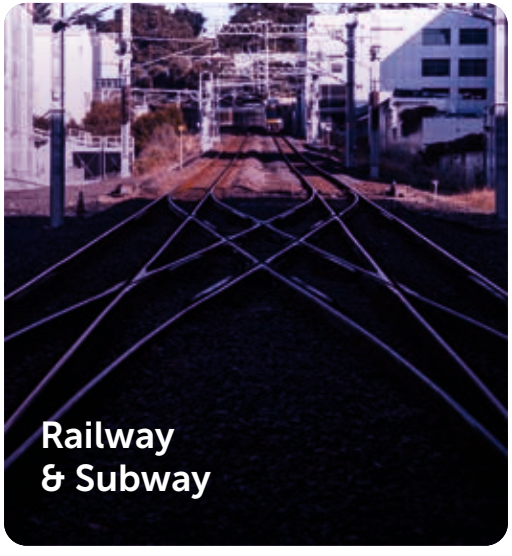
Number 1 plant in Russia and CIS in terms of production volume of fiber optic cable (in 2013–2015 and 2017–2022) and the volume of processed optical fiber (in 2012–2022)
(according to the Association of Electrical Cable Manufacturers)

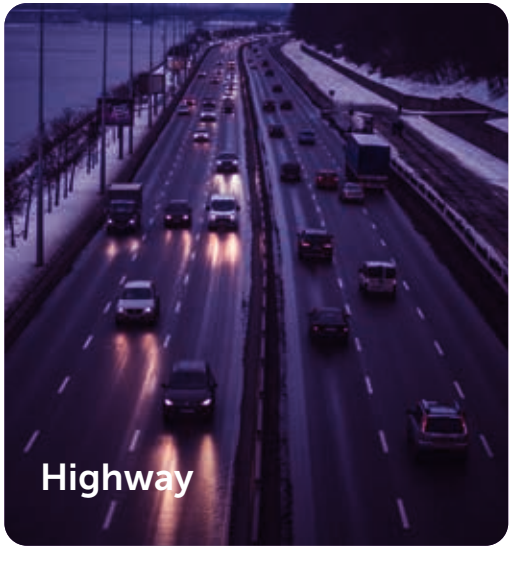
Supply experience

TATNEFT	1189 km	ROSNEFT	86 km
GAZPROM	664 km	GAZPROM NEFT	32 km
LUKOIL	487 km	ROSGEO	8 km
NOVOMET	112 km	ZARUBEZHNEFT	4 km
NOVATEK	109 km		

Application areas







Fiber optic monitoring systems

Features

Intelligent cable: both a cable and a sensor

Optical fiber doesn't need power

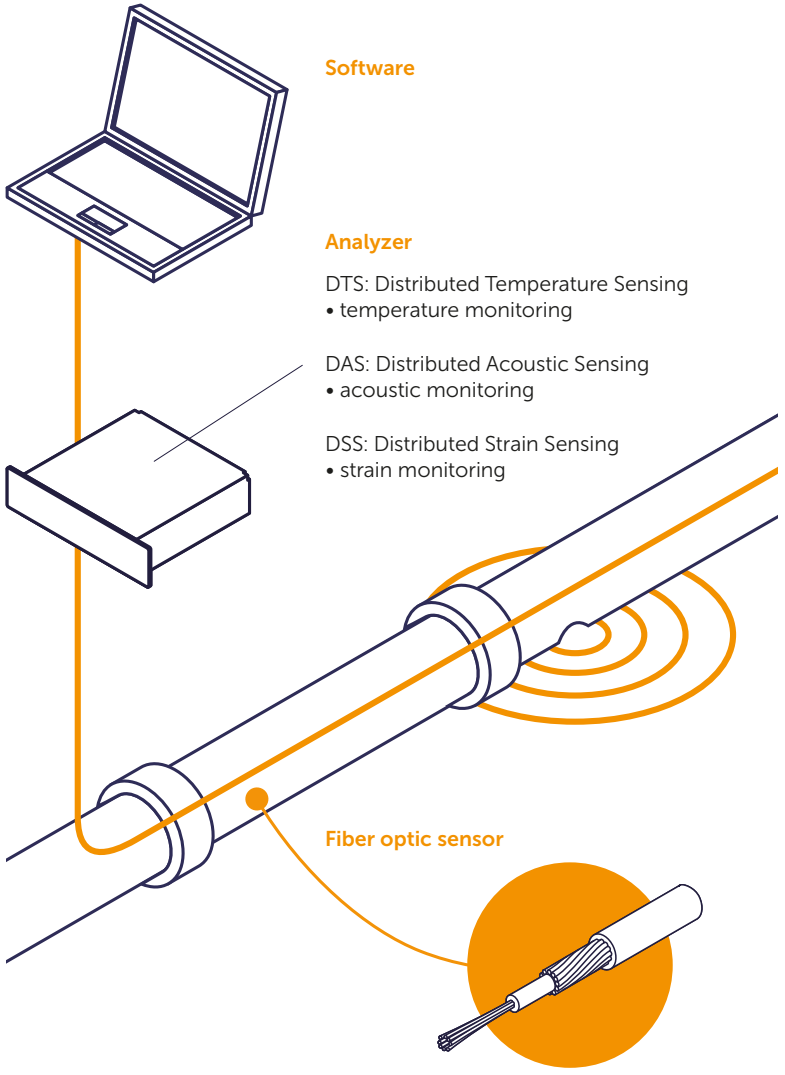
Combination of optical fibers and metallic conductors

Small, lightweight with thread-like geometry

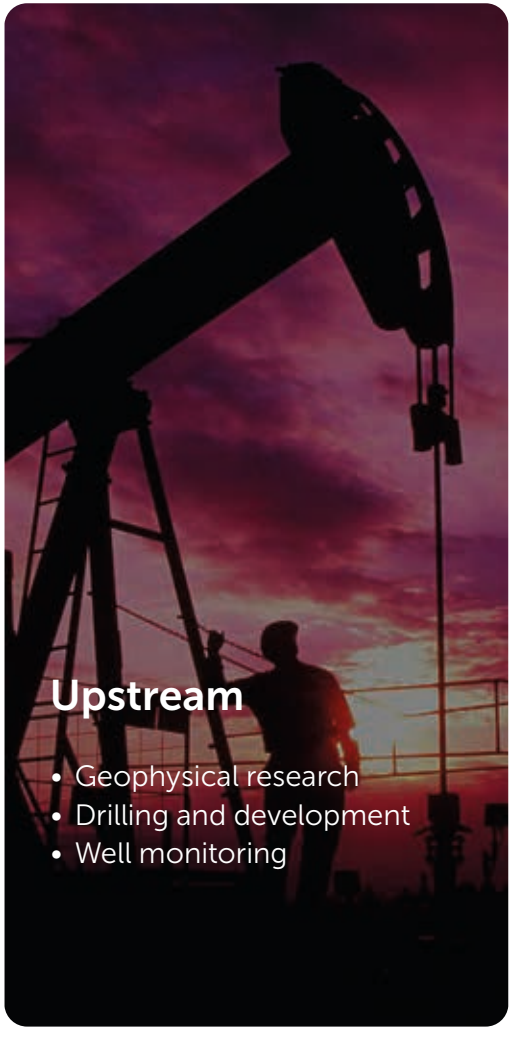
Resistance to electromagnetic influences

Distributed continuous sensing element

Multi-sensing capabilities



Solutions for Oil & Gas



Upstream

- Geophysical research
- Drilling and development
- Well monitoring

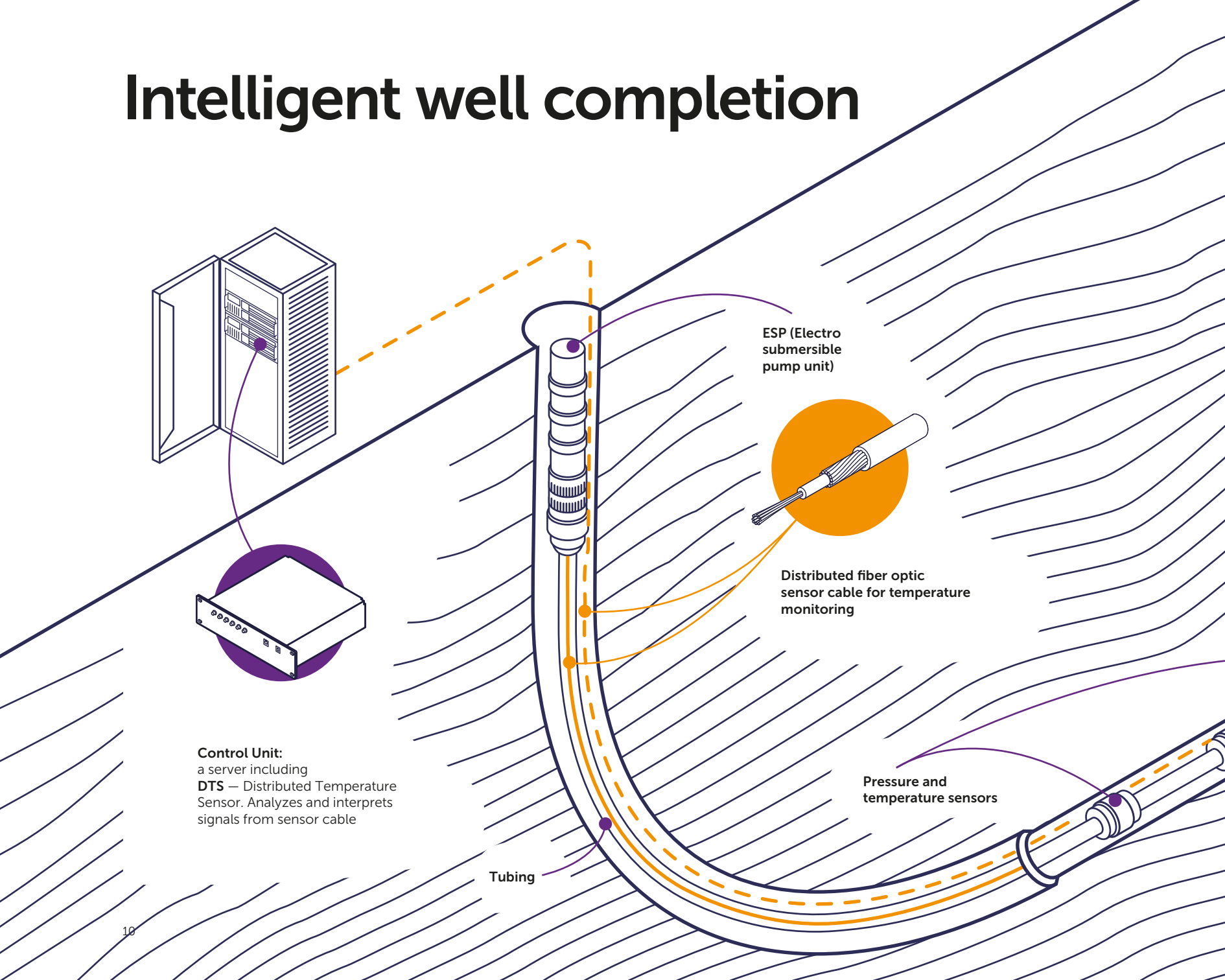
Midstream

- Transportation system
- Liquefied gas terminals
- Storage facilities

Downstream

- Purification
- Petrochemicals
- Distribution

Intelligent well completion



Advantages:

- Combination of optical and electronic sensors in one system
- A wide range of measured parameters (point sensors of pressure, humidity, fluid composition)
- Downholes and formations health assessment in continuous mode
- Remote control allowing to optimize operating modes
- High speed of data acquisition and data accuracy
- Control over the implementation of procedures for oil and gas production intensification
- Monitoring of remote objects and objects in harsh environment

Results:

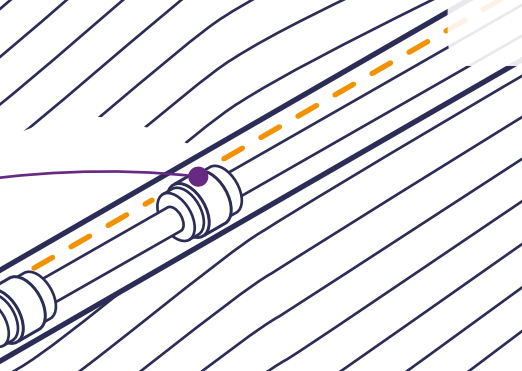
Reduction of maintenance expenses

Reduction of forced downtime of technical facilities

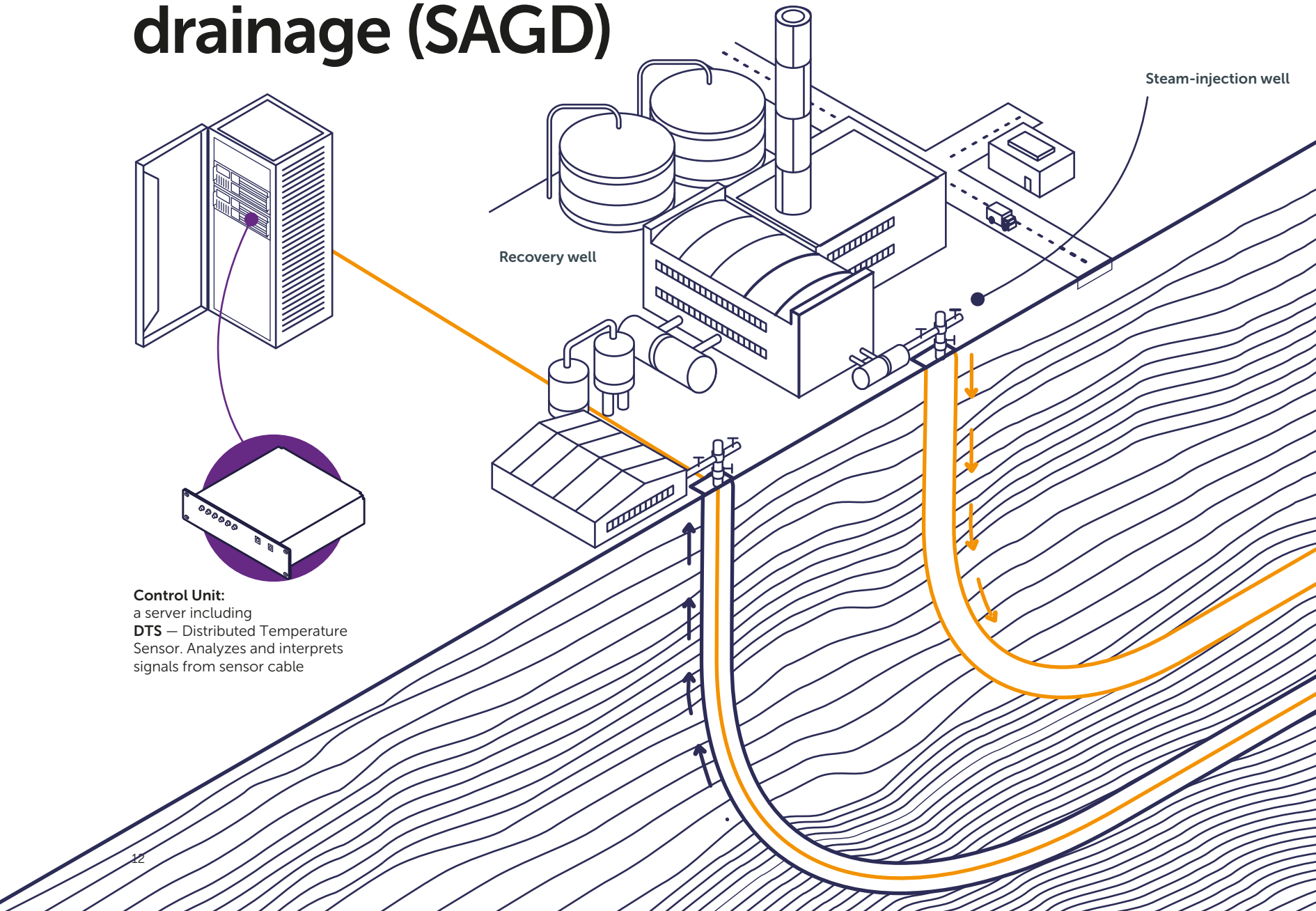
Reduction of emergency reaction time

Optimization of equipment operation

Decrease in produced water volume



Steam-assisted gravity drainage (SAGD)



Control Unit:
a server including
DTS — Distributed Temperature Sensor. Analyzes and interprets signals from sensor cable

Features:

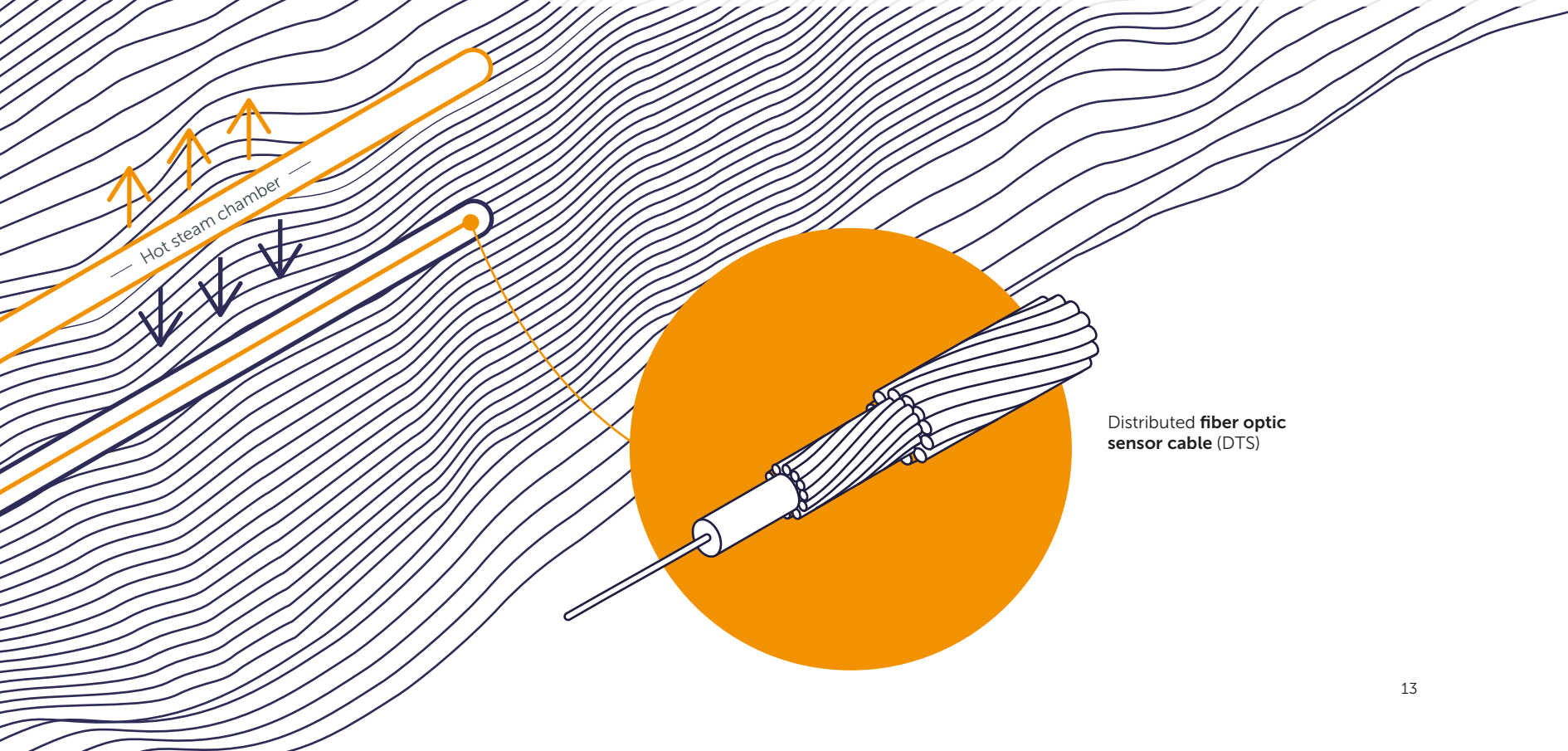
- Continuous control of steam injection process
- Temperature control of the fluid for steam control
- Increased oil recovery rate of producing formations

Results:

Maximum oil recovery volumes

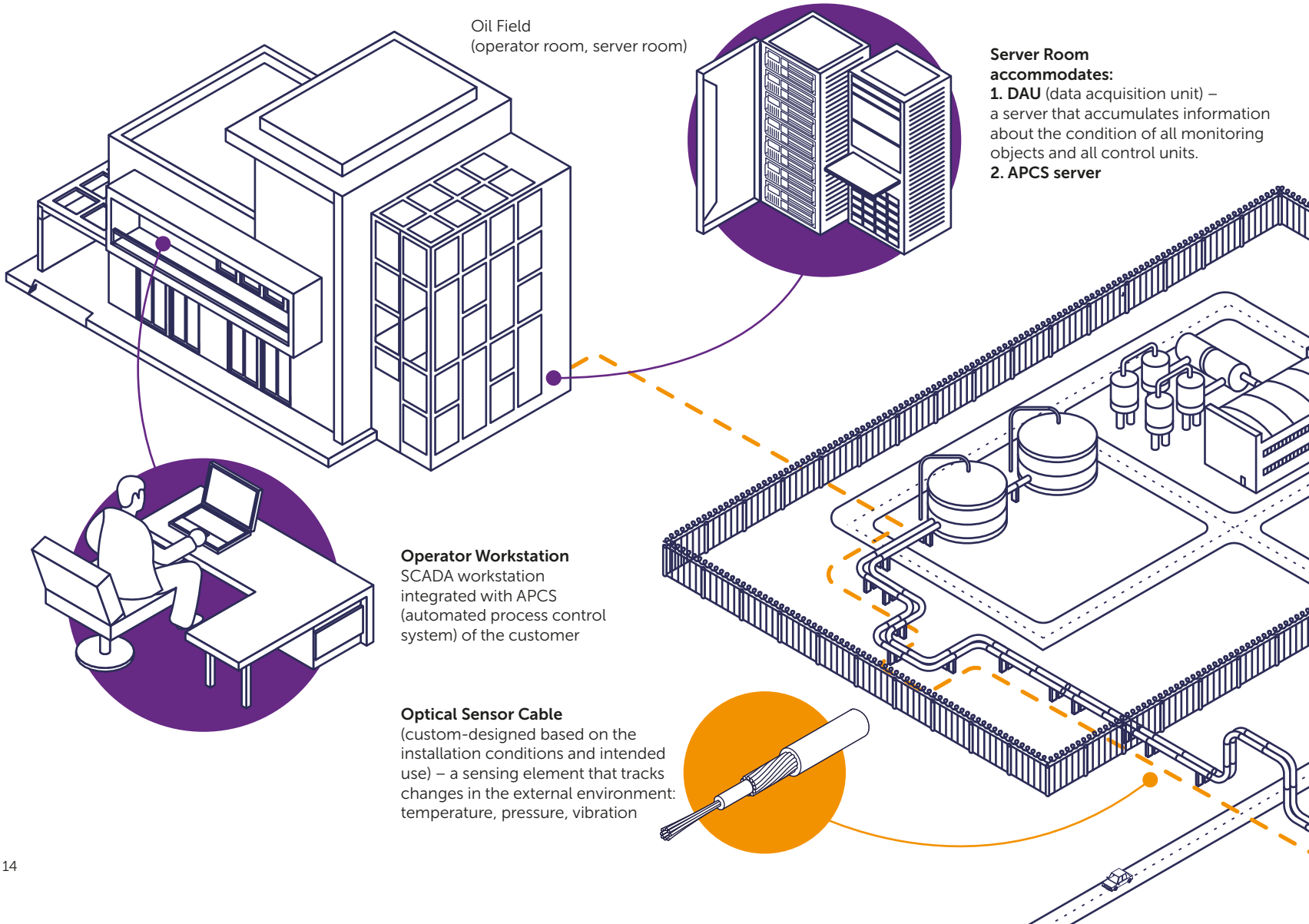
Optimal total steam-to-oil ratio

Reduction of steam generation costs



Distributed **fiber optic sensor cable** (DTS)

Pipeline integrity monitoring



Features:

• Gas leak detection:
– spatial accuracy up to ±10 m
– min. detectable leak: 25 bar, 2 mm

• Oil/methanol/gas condensate/ water leak detection:
– spatial accuracy up to ±10 m
– min. detectable leak: 2 bar, 4 l/min.
– detection time < 0.5 min

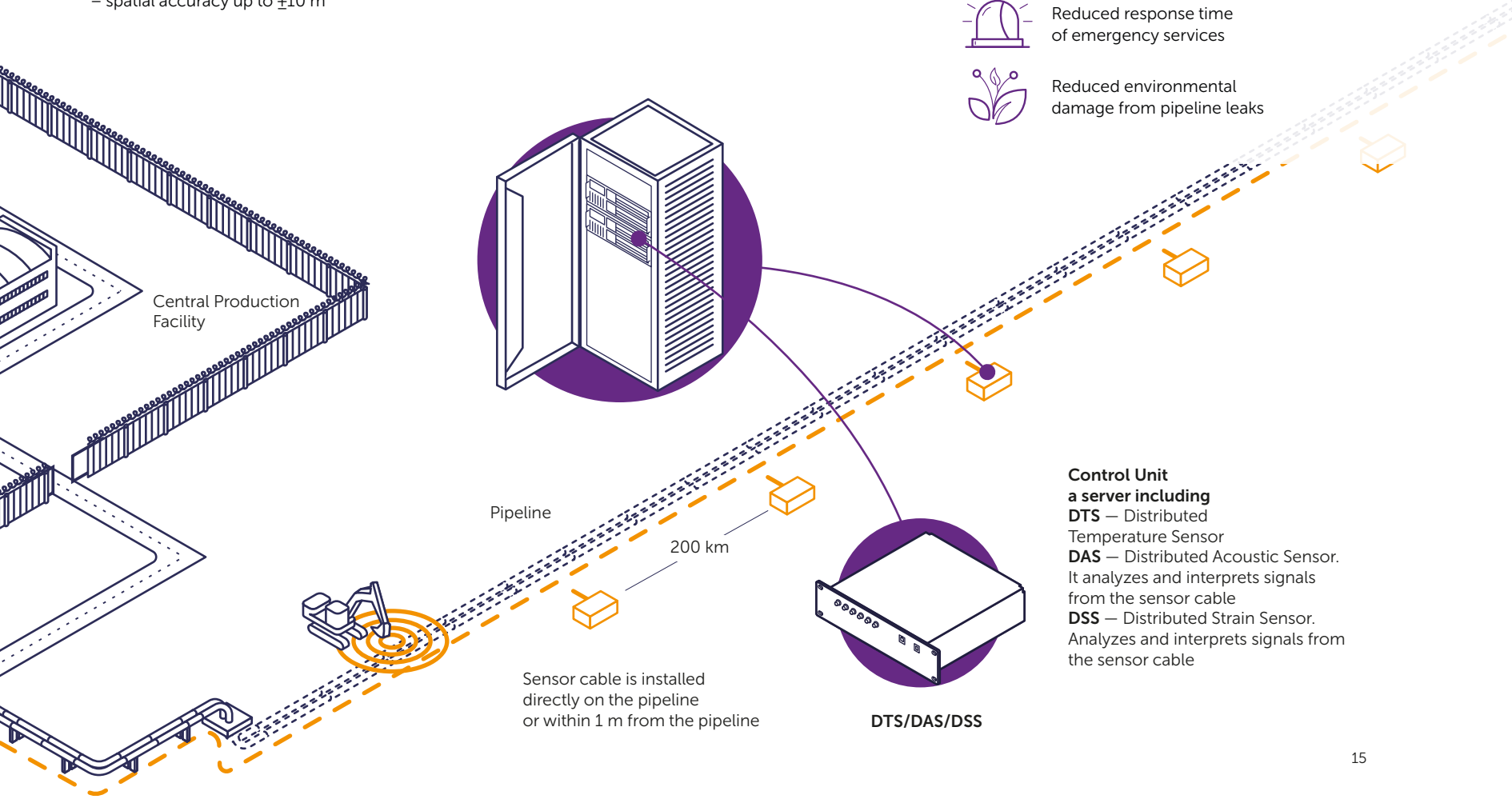
• Location of pipeline cleaning and inspection pigs:
– spatial accuracy up to ±10 m

• Monitoring of valves and equipment operation

• Location of blockages on slurry pipelines and failure of conveyor belt rollers:
– spatial accuracy up to ±10 m

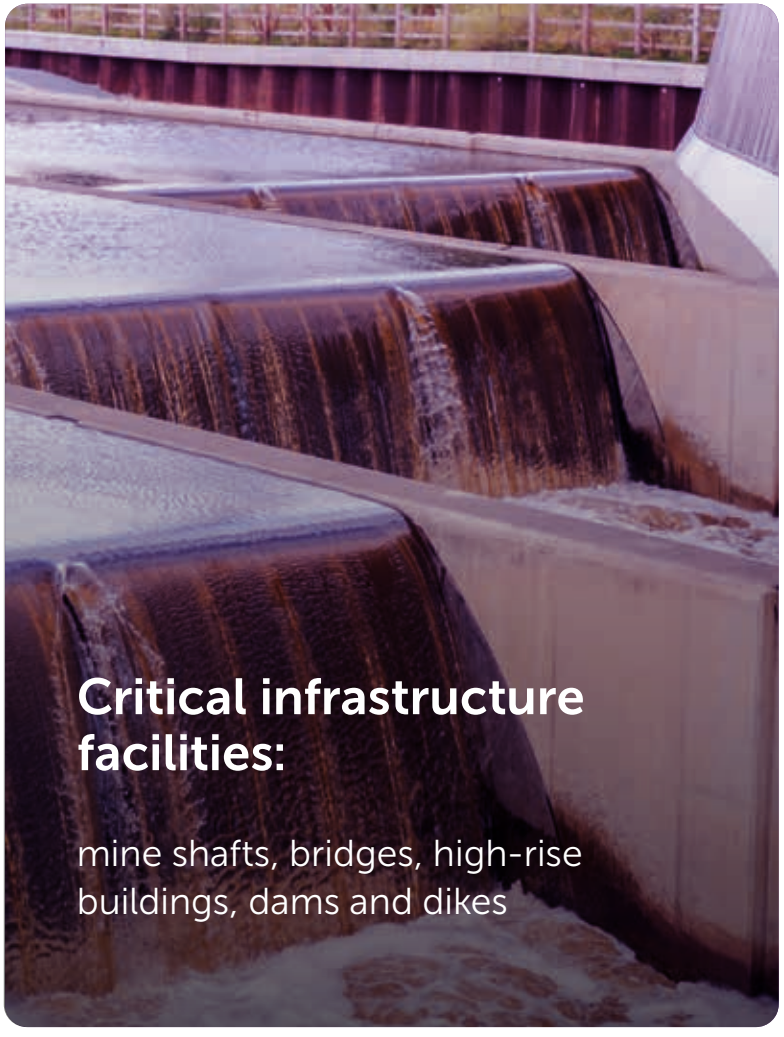
Results:

- Leak detection and activity control on the main pipeline
- Reduced maintenance costs
- Minimization of downtime
- Reduced response time of emergency services
- Reduced environmental damage from pipeline leaks



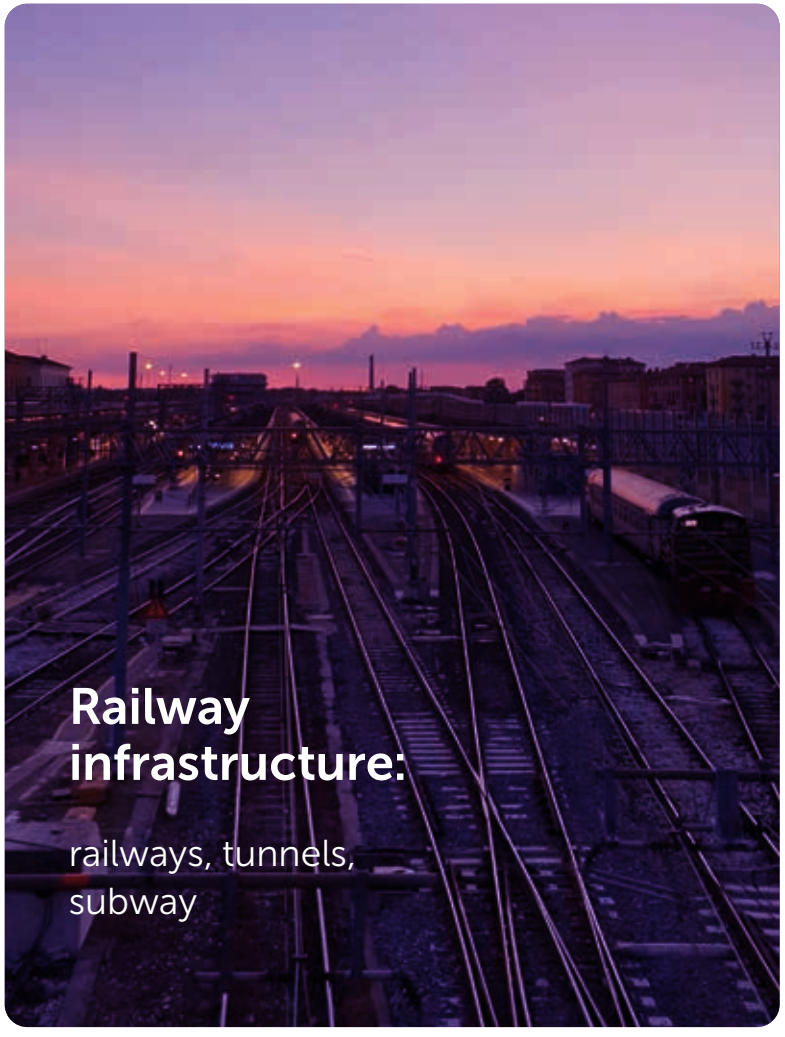
Control Unit a server including
DTS — Distributed Temperature Sensor
DAS — Distributed Acoustic Sensor. It analyzes and interprets signals from the sensor cable
DSS — Distributed Strain Sensor. Analyzes and interprets signals from the sensor cable

Solutions for structural health monitoring



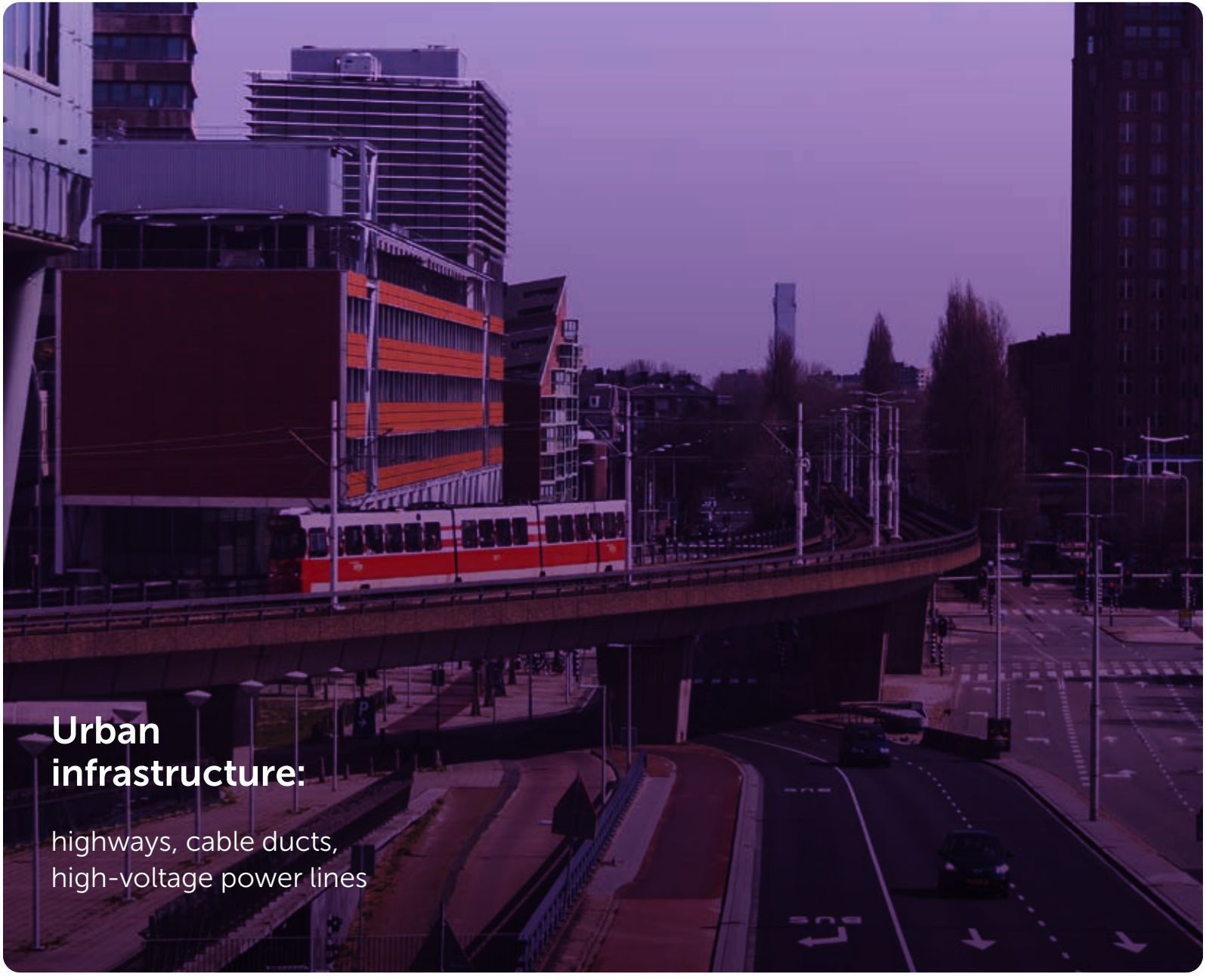
Critical infrastructure facilities:

mine shafts, bridges, high-rise buildings, dams and dikes



Railway infrastructure:

railways, tunnels, subway


Urban
infrastructure:
highways, cable ducts,
high-voltage power lines

Perimeter monitoring

Results:

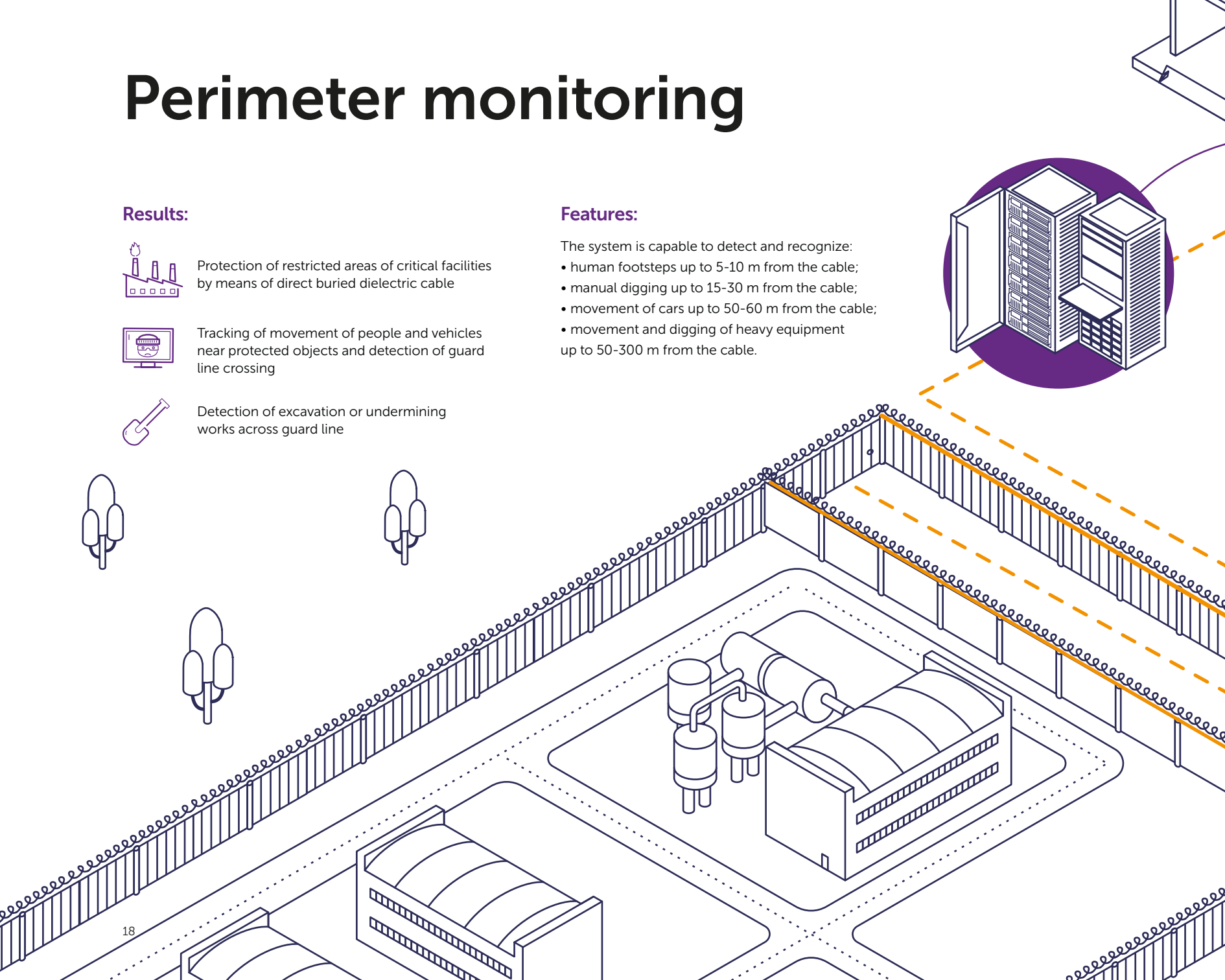
Protection of restricted areas of critical facilities by means of direct buried dielectric cable

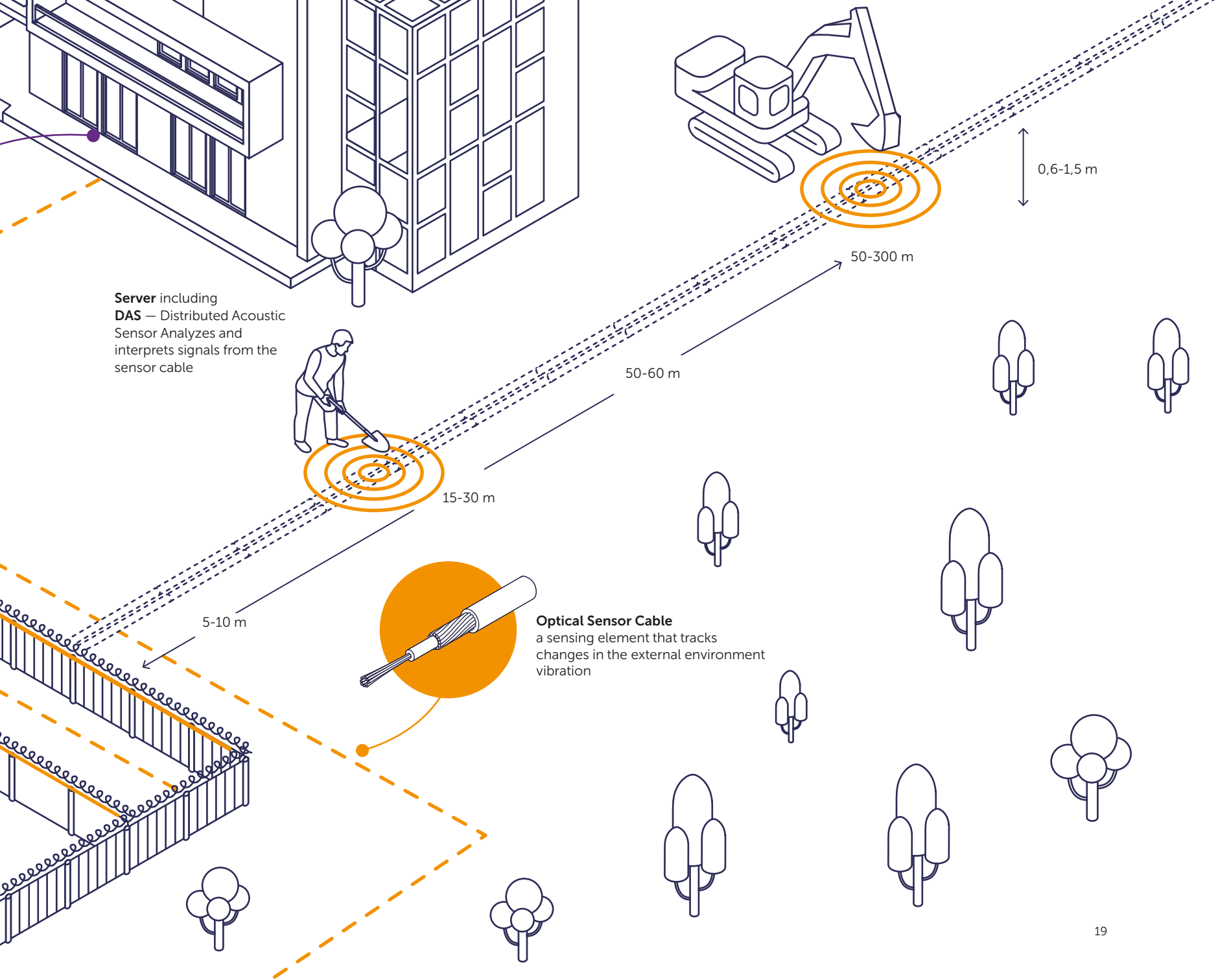
Tracking of movement of people and vehicles near protected objects and detection of guard line crossing

Detection of excavation or undermining works across guard line

Features:

The system is capable to detect and recognize:
- human footsteps up to 5-10 m from the cable;
- manual digging up to 15-30 m from the cable;
- movement of cars up to 50-60 m from the cable;
- movement and digging of heavy equipment up to 50-300 m from the cable.

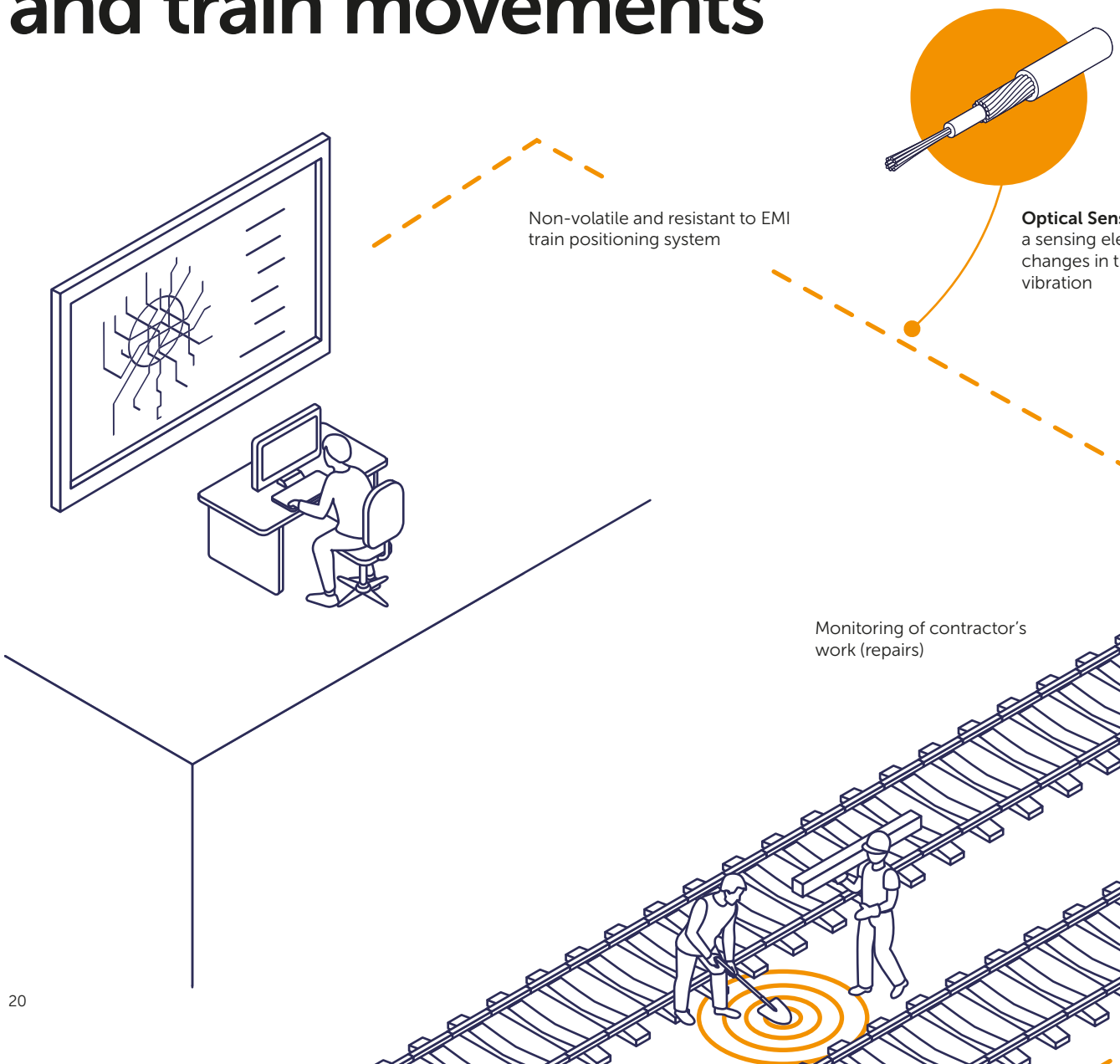




Server including **DAS** — Distributed Acoustic Sensor Analyzes and interprets signals from the sensor cable

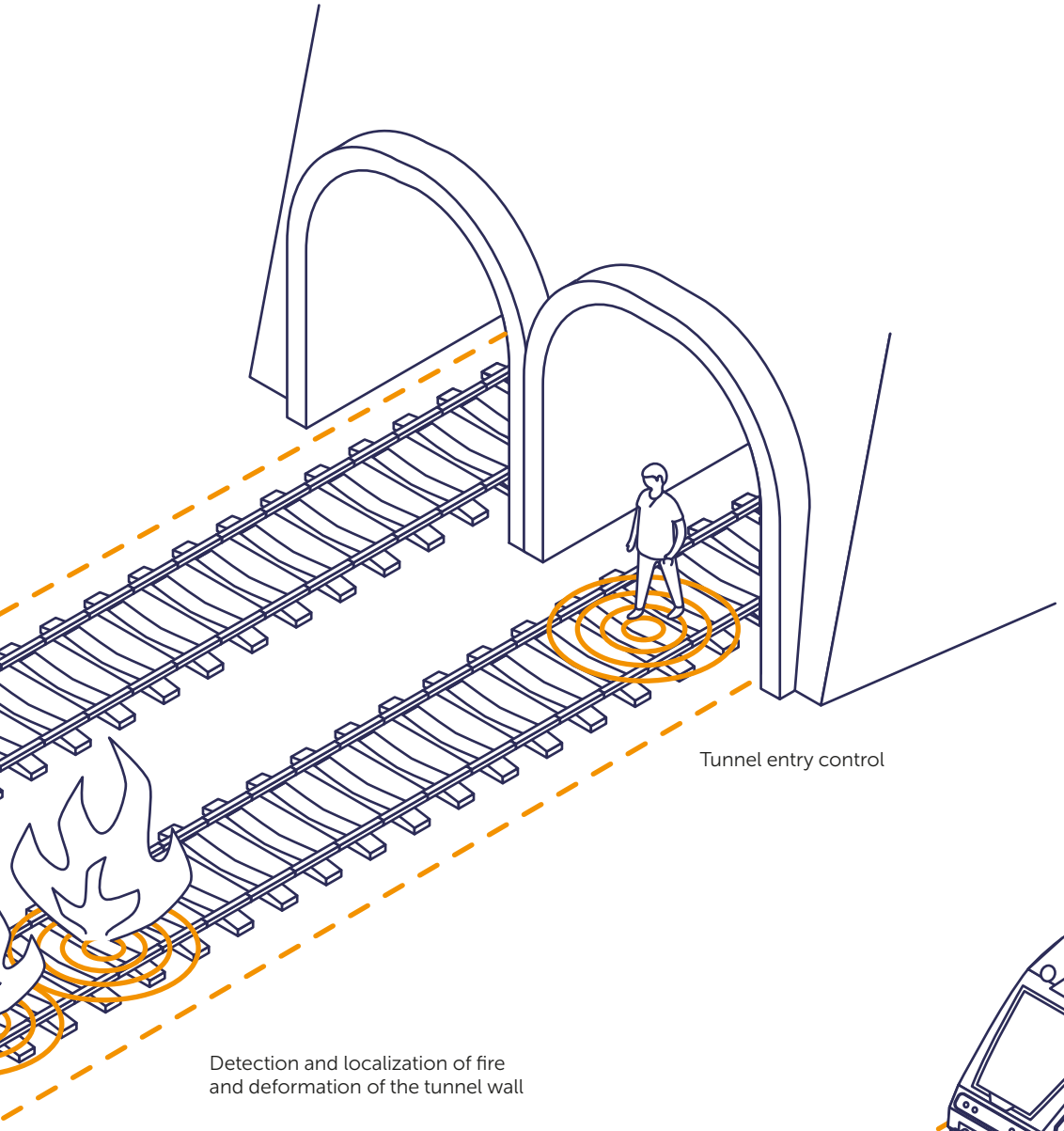
Optical Sensor Cable
a sensing element that tracks changes in the external environment vibration

Monitoring of railway infrastructure and train movements



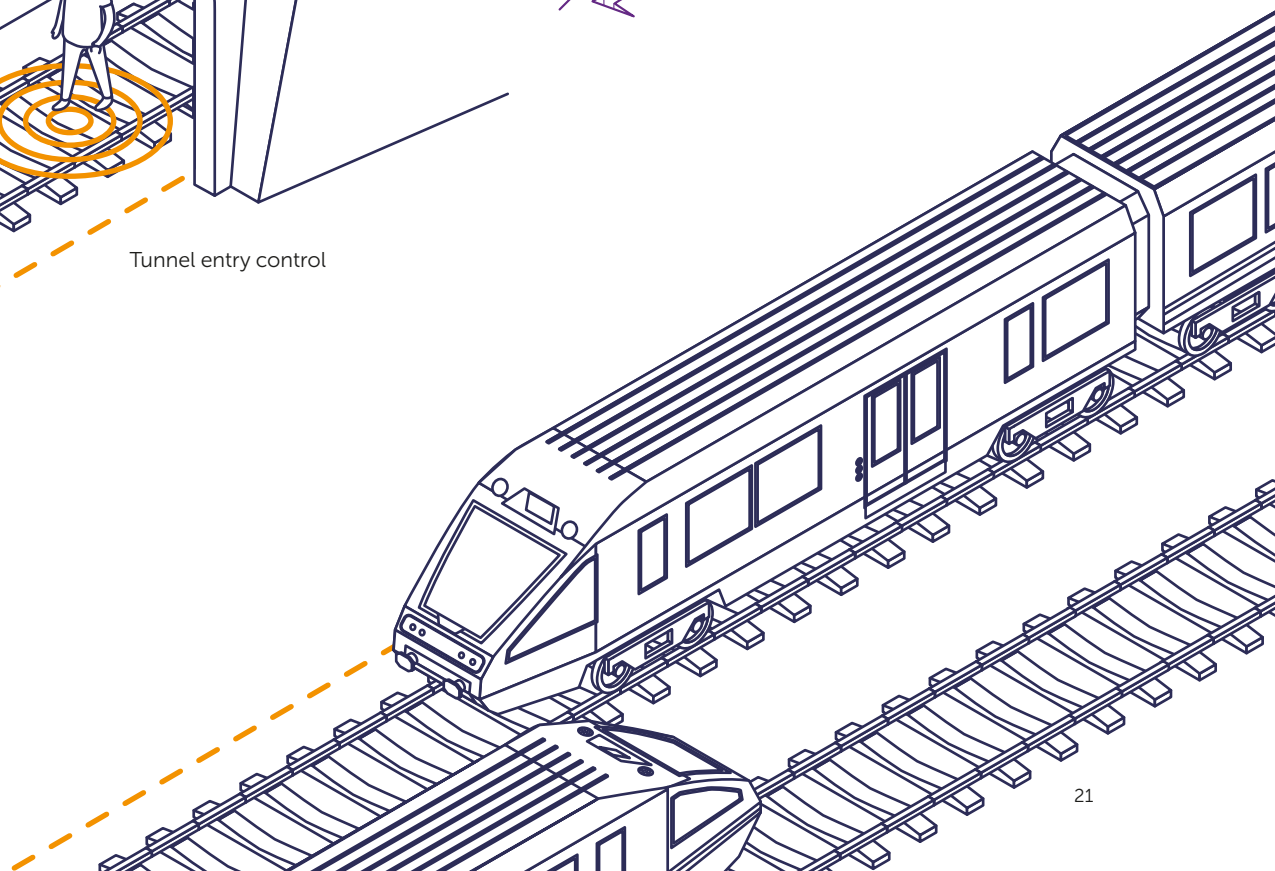
Results:

- Detection of unauthorized digging, vandalism, cable theft
- Detection of rockfalls, landslides, karst failures
- Monitoring of contractor's work (track repairs)
- Train detection — types, coordinates, speed and length
- Track defects detection



Tunnel entry control

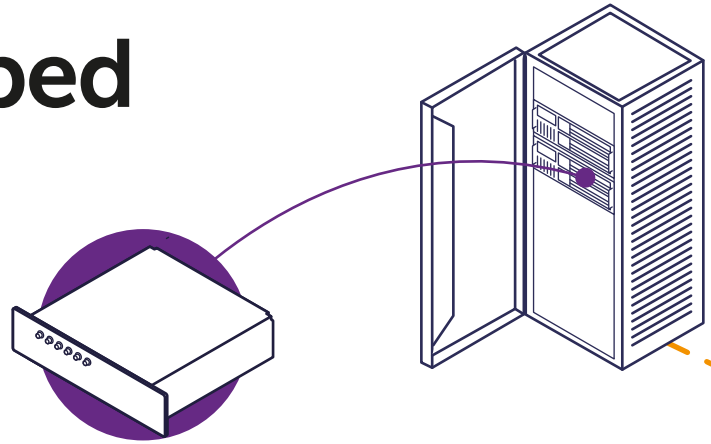
Detection and localization of fire and deformation of the tunnel wall



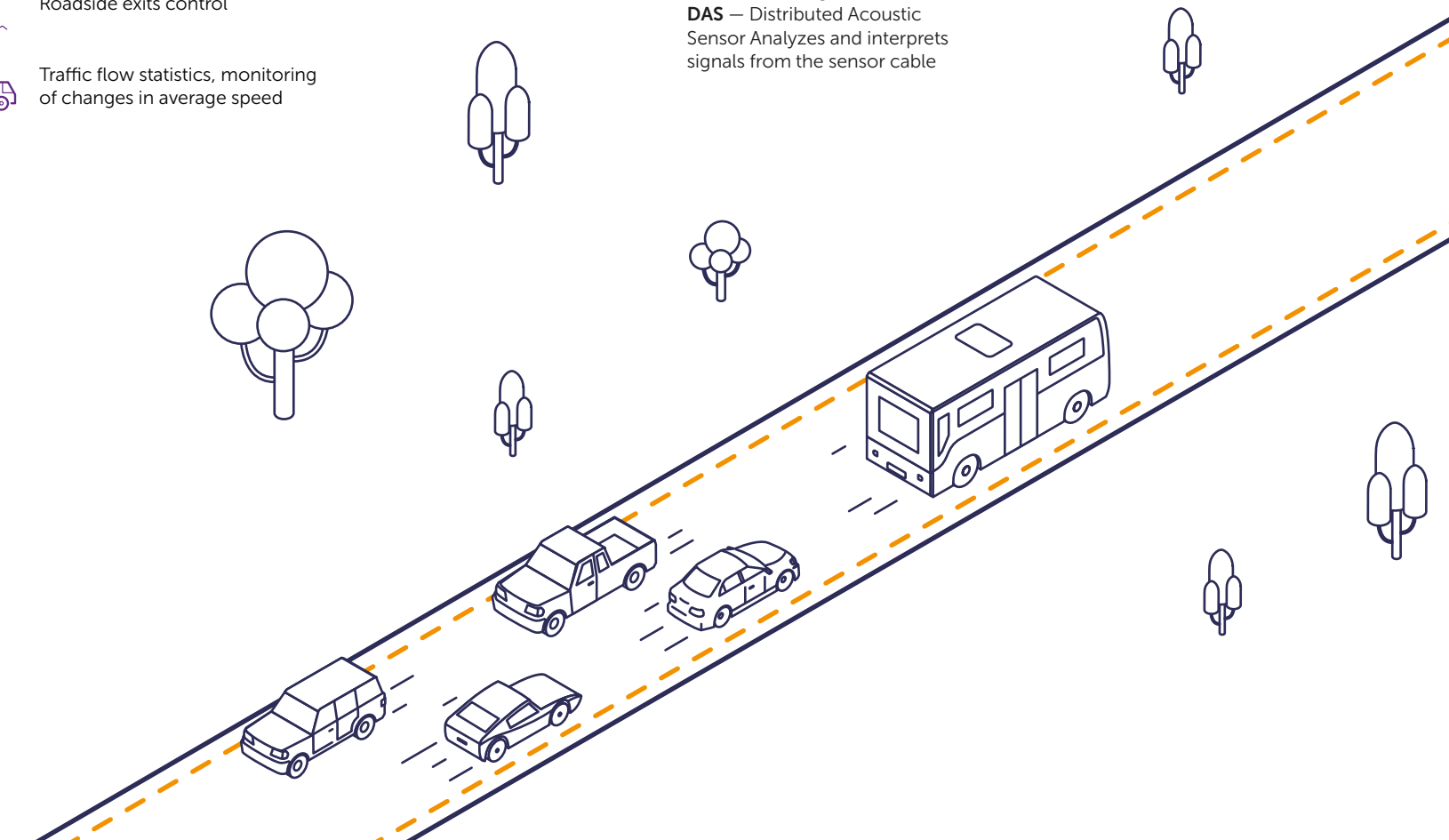
Monitoring of roadbed defects and traffic

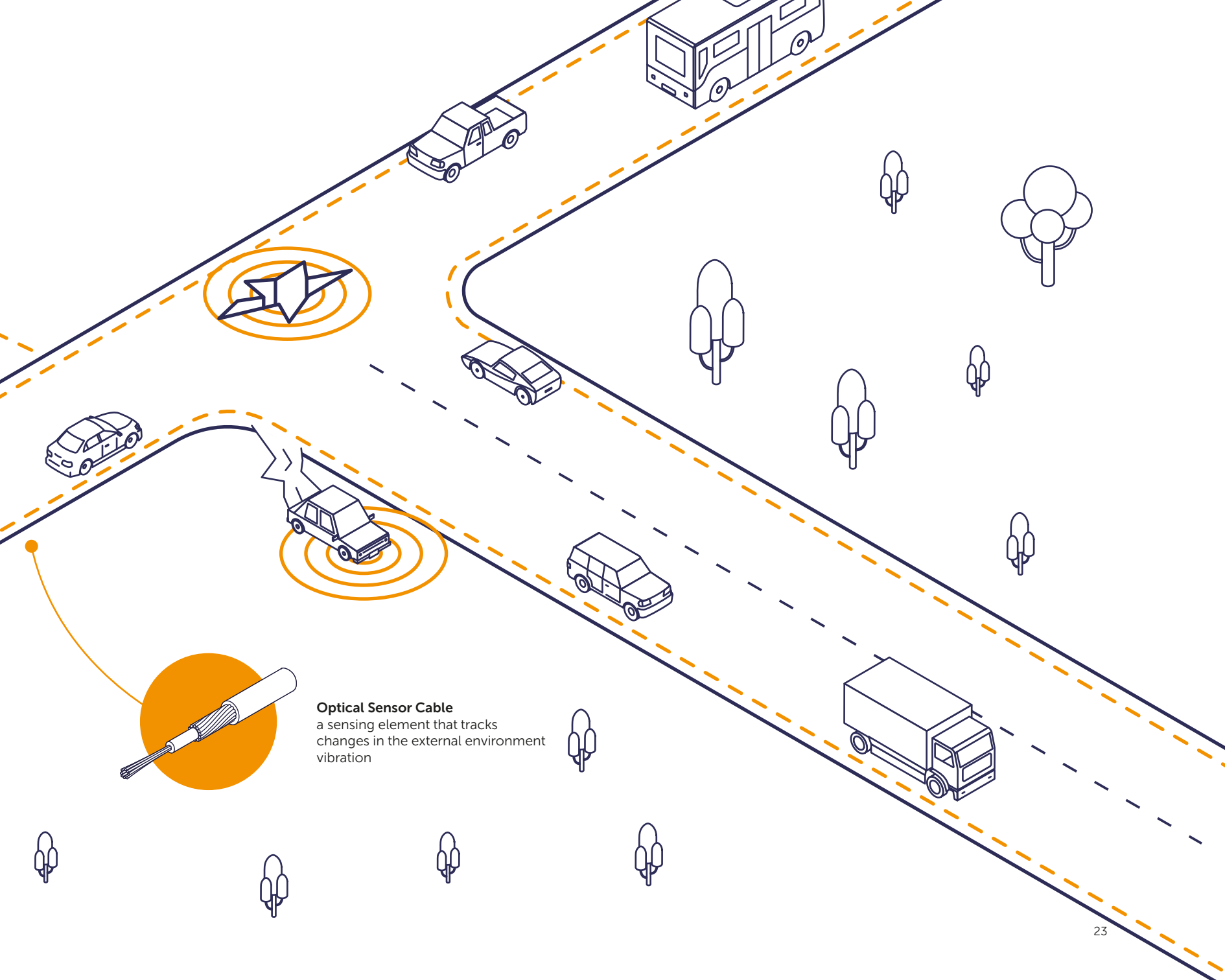
Results:

- Localization of road surface defects
- Roadside exits control
- Traffic flow statistics, monitoring of changes in average speed



Server including
DAS — Distributed Acoustic Sensor Analyzes and interprets signals from the sensor cable





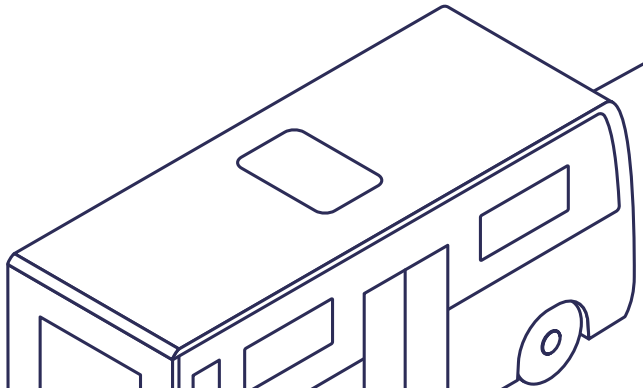
Optical Sensor Cable
a sensing element that tracks changes in the external environment vibration

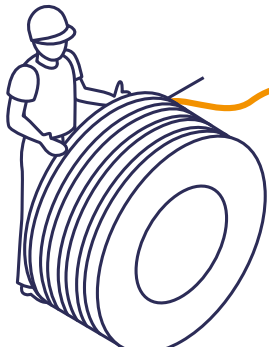
Cable ducts monitoring

The system is capable of detecting and recognizing:

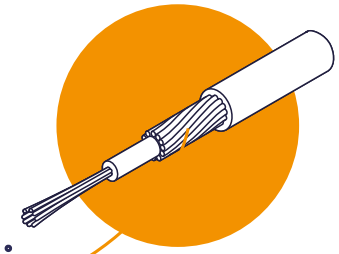
- Unauthorized cable pulling
- Opening and closing the manhole cover
- Works near and inside cable ducts
- Supervising the work of a contractor organization

Server including
DAS — Distributed Acoustic Sensor Analyzes and interprets signals from the sensor cable





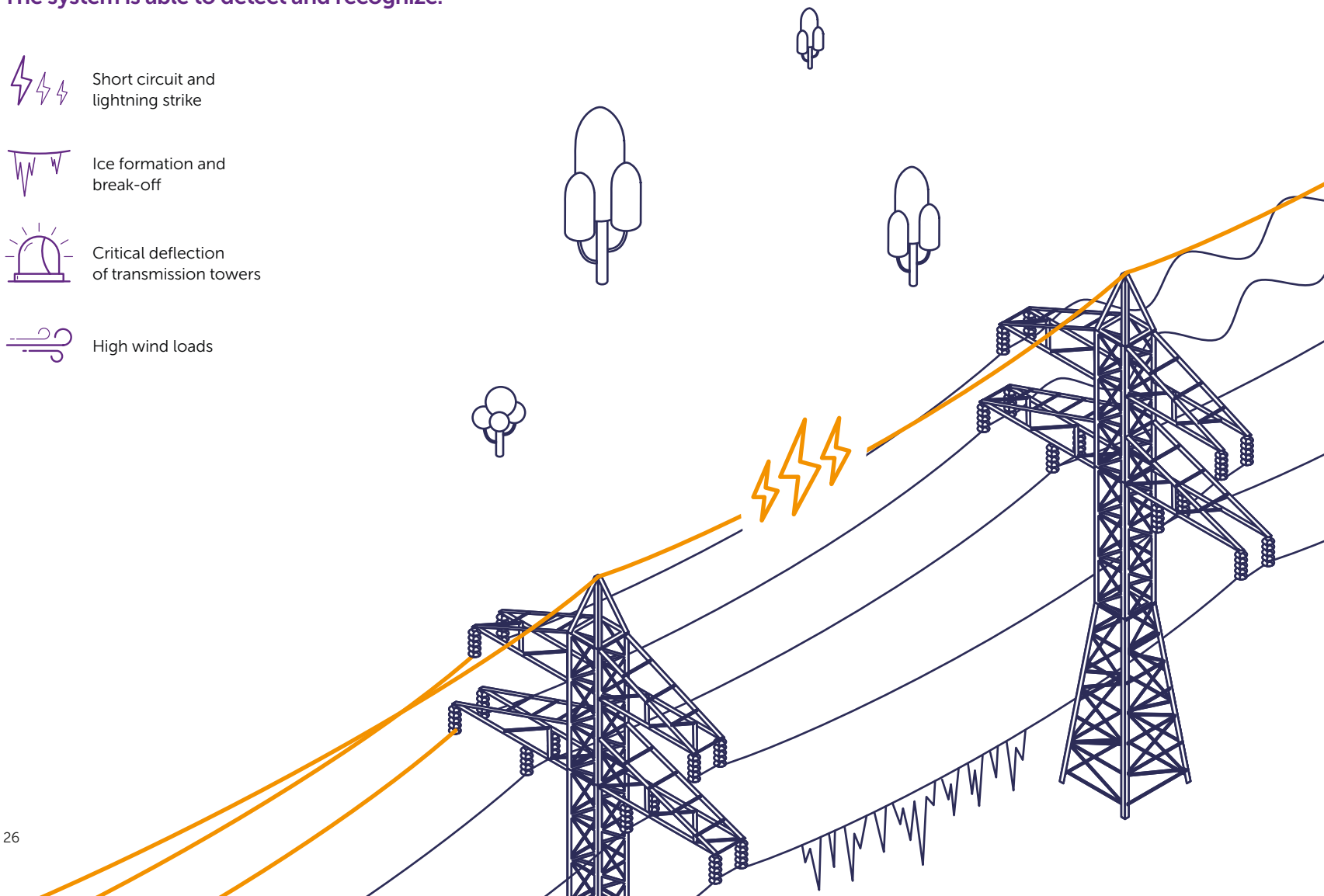
Optical Sensor Cable
a sensing element that tracks changes in the external environment vibration



Power lines monitoring

The system is able to detect and recognize:

- Short circuit and lightning strike
- Ice formation and break-off
- Critical deflection of transmission towers
- High wind loads



Sensor cable

For fiber optic monitoring systems

Monitoring of industrial and civil objects with optical sensor cables allows remote and continuous control of their condition

Measure:


Temperature


Deformation


Acoustics


Movement

Control:


Leakage


Perimeters

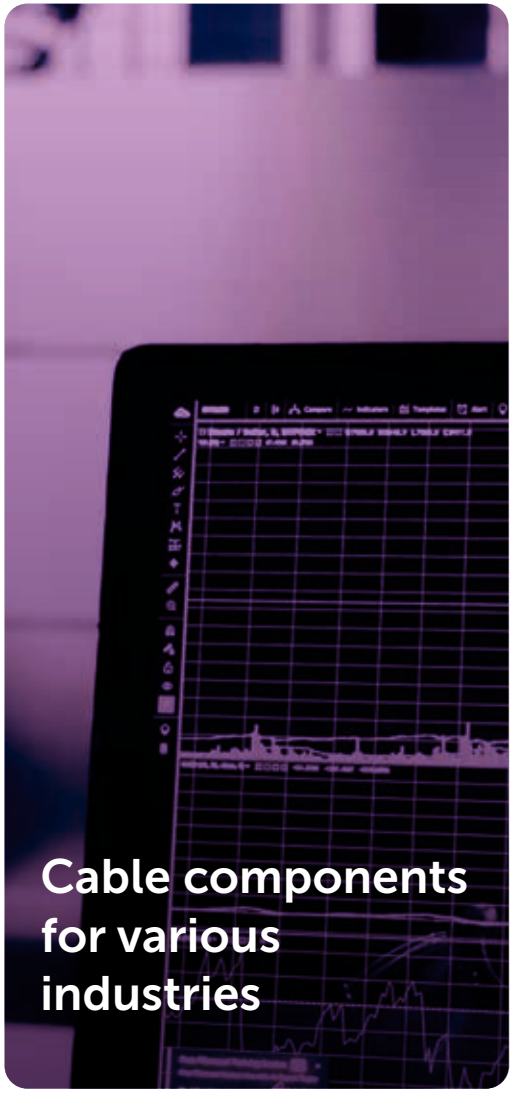

Operation mode


Fire safety


Structural health of buildings and constructions


Pig location

Applications



Oil & Gas

Designs for use in oil and gas wells

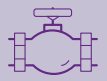
Application

Geophysical cables:
The ProLine, DeepWire and SlickLight family of cables are used for detailed exploration of the structure of the well, as well as for monitoring the state of the well during geophysical surveys and logging operations. All retrievable downhole cables are resistant to aggressive environments and high temperatures.

Permanent downhole cables:
FlatPack and ProTEC cables are an indispensable link between downhole depth tools (pressure gauges, temperature sensors, etc.) and ground recording and control equipment. The cables have a flat shape of standard sizes, which best ensures placement along the tubing and compatibility with traditional fastening elements for the oil and gas industry.

Hydraulic control lines:
Small diameter pipes for well production equipment, bottom hole cutter, controlled from the surface (SCSSV).

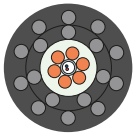
Capillary tube:
Designs are used for precise dosing of chemical reagents and their delivery with minimal losses to the required level of a downhole



Pipeline monitoring:
Cables are used to monitor leaks on pipelines.

ProLine-H

Discover more



Cable design

1. Optical fiber
2. Water-blocking gel
3. Stainless steel tube
4. Copper conductor
5. Insulation
6. Armoring steel wires incorporated into outer jacket
7. Outer jacket

Application

- Retrievable downhole cable
- Distributed downhole monitoring (DTS, DAS)
- Well logging
- Signal transmission from downhole tools
- Power supply to downhole tools

Features

- Easy sealing
- Enhanced corrosion protection
- High tensile strength and crush resistance

Parameters

Temperature rating	+90°C +125°C +140°C +150°C +180°C +200°C	+194°F +257°F +284°F +302°F +356°F +392°F
Cable diameter	8.0–22.0 mm	0.314–0.866 in
Copper conductor section	0.5–2.5 mm^2	20–13 AWG
Fiber count	up to 12	
Minimum bending radius (no load)	×20ø	

Design options
Various combination of copper conductors and optical fibers in one cable

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L
Jacket: HDPE, PP, ETFE, FEP, PFA
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

ProLine-C

Discover more

Cable design

1. Copper conductor
2. Insulation
3. Armoring steel wires incorporated into outer jacket
4. Jacket

Application

- Retrievable downhole cable
- Well logging
- Signal transmission from downhole tools
- Power supply to downhole tools

Features

- Easy sealing
- Enhanced corrosion protection
- High tensile strength and crush resistance

Parameters

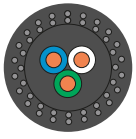
Temperature rating	+90°C +125°C +140°C +150°C +180°C +200°C	+194°F +257°F +284°F +302°F +356°F +392°F
Cable diameter	8.0–22.0 mm	0.314–0.866 in
Copper conductor section	0.5-16.0 mm^2	20–8 AWG
Minimum bending radius (no load)	×20ø	

Design options
Various OD and number of copper conductors

Materials
Jacket: HDPE, PP, ETFE, FEP, PFA
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

ProLine-PW

Discover more



Cable design

1. Insulated copper conductor
2. Inner jacket
3. Armoring steel wires incorporated into outer jacket
4. Outer jacket

Application

- Installation of ESP without killing a well
- Power supply to ESP

Features

- Easy sealing
- High resistance to aggressive environments
- High tensile strength and crush resistance

Parameters

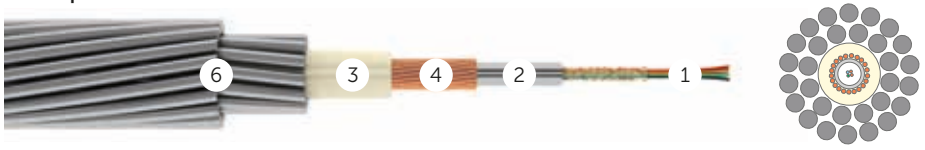
Temperature rating	+90°C +125°C +140°C +150°C +180°C +200°C	+194°F +257°F +284°F +302°F +356°F +392°F
Cable diameter	20.0–22.0 mm	0.787–0.866 in
Copper conductor section	8.0-16.0 mm^2	9–6 AWG
Minimum bending radius (no load)	×20ø	

Design options
Integration of hydraulic lines
Integration of optical lines for distributed sensing (DTS, DAS)

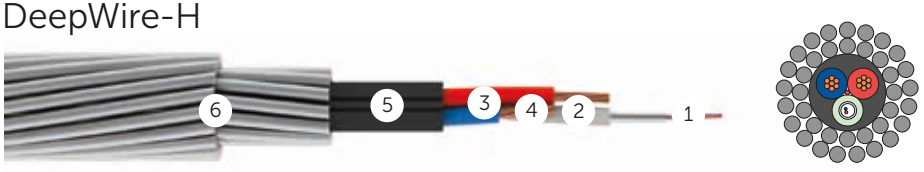
Materials
Jacket: HDPE, PP, ETFE, FEP, PFA
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

DeepWire

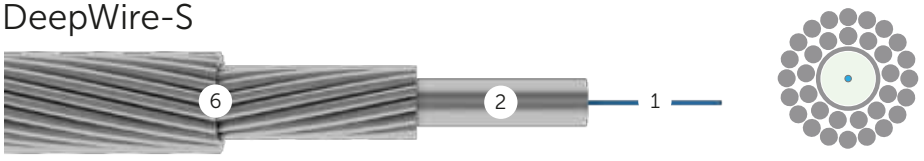
DeepWire-H



DeepWire-H



DeepWire-S



Cable design

1. Optical fiber
2. Stainless steel tube
3. Insulation
4. Copper conductor
5. Inner jacket
6. Stainless steel wires

Features

- Resistant to extreme temperature
- Hydrogen-resistant fiber
- High strength in compact design

Application

- Retrievable downhole cable
- Distributed downhole monitoring (DTS, DAS)
- Well logging
- Signal transmission from downhole tools
- Power supply to downhole tools
- Steam Assisted Gravity Drainage (SAGD)

Parameters

Discover more

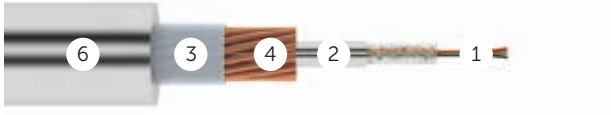
Temperature rating	+90°C +150°C +180°C +200°C +260°C +300°C	+194°F +302°F +356°F +392 °F +500°F +572°F
Cable diameter	4.5–18.5 mm	0.177–0.728 in
Copper conductor section	0.75-3.0 mm^2	18-13 AWG
Fiber count	up to 12	
Minimum bending radius (no load)	×20ø	
Minimum sheave diameter	×55ø	

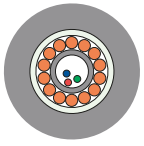
Design options
Single or double layer steel tube
Gel-filled or gel-free FIMT
Copper conductor
Corrosion-resistant wire

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 316L, Incoloy, Inconel
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

SlickLight

SlickLight-H





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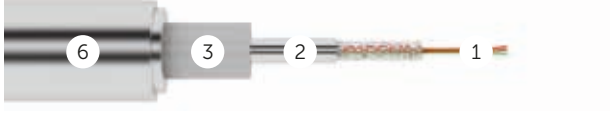
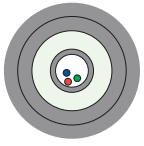
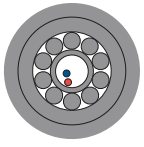


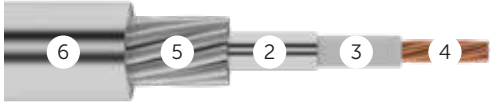


SlickLight-S



SlickLight-C

SlickLight-C



Cable design

1. Optical fiber
2. Stainless steel tube
3. Insulation
4. Copper conductor
5. Galvanized high carbon steel wires
6. Outer protection tube

Features

- Compact size & low weight
- Corrosion-resistant
- High temperature proof
- Hydrogen-resistant fiber

Application

- Retrievable downhole cable
- Well logging
- Distributed downhole monitoring (DTS, DAS)
- Signal transmission from downhole tools

Parameters

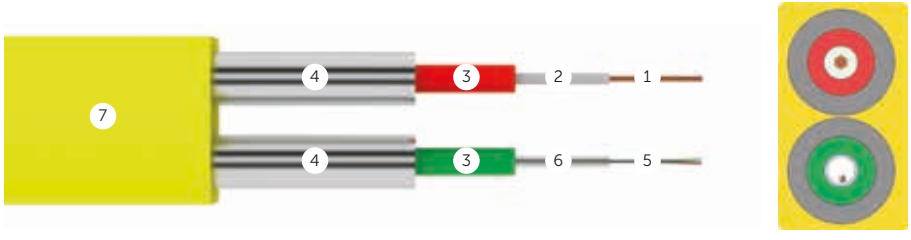
Discover more

Temperature rating	+90°C +150°C +180°C +200°C +260°C +300°C	+194°F +302°F +356°F +392°F +500°F +572°F
Cable diameter	3.2-6.35 mm	0.125–0.25 in
Copper conductor section	0.75-3.0 mm^2	18–13 AWG
Fiber count	up to 12	
Minimum bending radius (no load)	×20ø	

Design options
Single or double layer steel tube
Gel-filled or gel-free FIMT
Armor of steel wires
Copper conductor

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 316L, Incoloy, Inconel
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

FlatPack



Cable design

1. Copper conductor
2. First layer of insulation
3. Second layer of insulation
4. Stainless steel tube
5. Optical fiber
6. Encapsulation
7. Outer jacket

Application

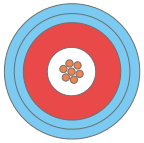
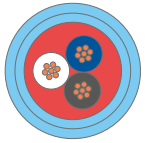
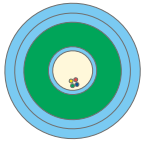
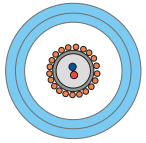
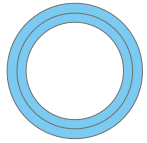
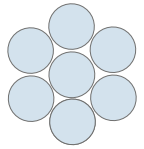
- Permanent downhole cable
- Signal transmission from downhole tools
- Power supply to downhole tools
- Distributed downhole monitoring (DTS, DAS)
- Continuous downhole control

Features

- Customized design
- Combination of electrical conductors and optical fibers in one cable
- High resistance to aggressive environments
- Full compatibility with standard fittings
- Rectangular shape — secure attachment to oil-well tubing
- Optical fiber — high density of data — precise and fast decisions

Discover more

Units:

						
1 center conductor	3 stranded conductors 18 AWG	Optical unit up to 12 OF	Hybrid coax conductor with OF	Hybrid twisted conductor with OF	Control line tube	Bumper bar / Reinforcing element UTS 45 kN / 10 000 lbf
Copper conductor section						
18 AWG - 13 AWG	18 AWG	–	0.5 - 2.5 mm^2	0.5-1.5 mm^2	–	–
Fiber count						
–	–	up to 12 OF	up to 12 OF	up to 4 OF	–	–
Maximum external pressure						
–	–	–	–	–	80 Mpa	–
Maximum internal pressure						
–	–	–	–	–	100 Mpa	–

Encapsulation:

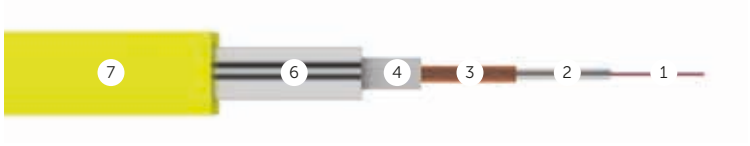
 11 x 11 mm

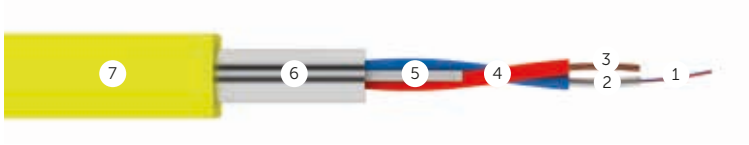
 11 x 20 mm

 11 x 28 mm

 11 x 37 mm

ProTEC-H





Cable design

1. Optical fiber
2. Stainless steel tube
3. Copper conductor
4. Insulation
5. Filler
6. Stainless steel tube
7. Outer jacket (encapsulation)

Application

- Permanent downhole cable
- Signal transmission from downhole tools
- Power supply to downhole tools
- Distributed downhole monitoring (DTS, DAS)
- Continuous downhole control

Features

- High resistance to aggressive environments
- Full compatibility with standard fittings
- Square shape — secure attachment to oil-well tubing
- Optical fiber — high density of data — precise and fast decisions
- Combination of copper conductors and optical fibers in one cable

Parameters

Discover more

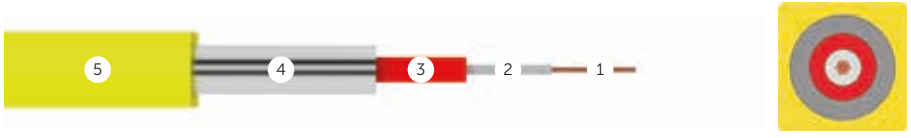
Temperature rating	+90°C +150°C +180°C +200°C +260°C	+194°F +302°F +356°F +392°F +500°F
Minimum installation temperature	-40°C	-40°F
Cable dimensions (square encapsulation)	11.0×11.0 mm	0.433×0.433 in
Protecting tube diameter	6.35 mm	1/4 in
Copper conductor section	0.5-2.5 mm^2	20–13 AWG
Fiber count	up to 12	
Minimum bending radius (no load)	×20ø	

Design options
Gel-filled or gel-free FIMT
Round encapsulation

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L, Incoloy, Inconel
Encapsulation: HDPE, PP, ETFE, FEP, PFA
Insulation: PP, ETFE, FEP, PFA

ProTEC-C

Discover more



Cable design

1. Copper conductor
2. First layer of insulation
3. Second layer of insulation
4. Stainless steel tube
5. Outer jacket

Application

- Permanent downhole cable
- Signal transmission from downhole tools
- Power supply to downhole tools

Features

- High resistance to aggressive environments
- Full compatibility with standard fittings
- Square shape — secure attachment to oil-well tubing

Parameters

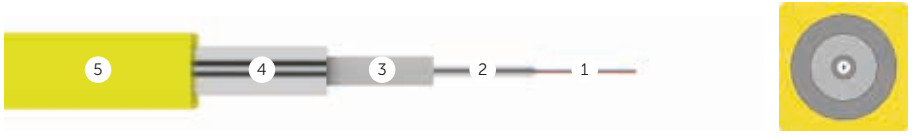
Temperature rating	+90°C +150°C +180°C +200°C +260°C	+194°F +302°F +356°F +392°F +500°F
Minimum installation temperature	-40°C	-40°F
Cable dimensions (square encapsulation)	11.0 × 11.0 mm	0.433x0.433 in
Copper conductor section	0.5-2.5 mm^2	20–13 AWG
Minimum bending radius (no load)	×20ø	

Design options
Round encapsulation

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L, Incoloy, Inconel
Encapsulation: HDPE, PP, ETFE, FEP, PFA

ProTEC-S

Discover more



Cable design

1. Optical fiber
2. Stainless steel tube
3. Insulation
4. Stainless steel tube
5. Outer jacket

Application

- Permanent downhole cable
- Distributed downhole monitoring (DTS, DAS)
- Continuous downhole control
- Signal transmission from downhole tools

Features

- High resistance to aggressive environments
- Full compatibility with standard fittings
- Square shape — secure attachment to oil-well tubing
- Optical fiber — high density of data — precise and fast decisions

Parameters

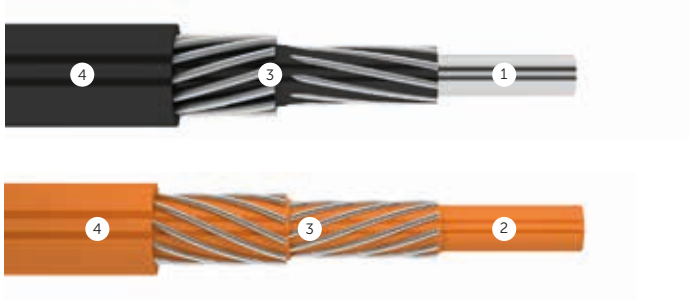
Temperature rating	+90°C +150°C +180°C +200°C +260°C +300°C	+194 °F +302 °F +356 °F +392 °F +500 °F +572°F
Minimum installation temperature	-40°C	-40°F
Cable dimensions (square encapsulation)	11.0 x 11.0 mm	0.433x0.433 in
Protecting tube diameter	4.0 mm 6.35 mm	1/4 in
Fiber count	up to 12	
Minimum bending radius (no load)	x20ø	

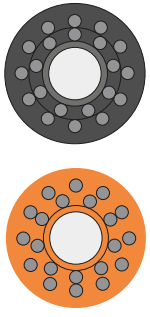
Design options
Gel-filled or gel-free FIMT
Round encapsulation

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L, Incoloy, Inconel
Encapsulation: HDPE, PP, ETFE, FEP, PFA
Insulation: PP, ETFE, FEP, PFA

Capillary Tube

Discover more





Cable design

1. Capillary tube
2. Polymer tube
3. Armoring steel wires incorporated into outer jacket
4. Outer jacket

Application

- Downhole chemical injection

Features

- Easy sealing
- Flexible
- High resistance to internal and external pressure
- Outer jacket resistance to high temperatures
- High resistance to aggressive environments
- Corrosion-resistant alloys are suitable for high hydrogen sulfide environments

Parameters

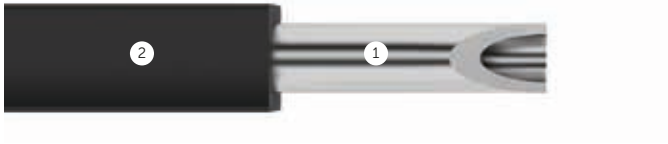
Temperature rating	+90°C +125°C +140°C	+194°F +257°F +284°F
Tube inner diameter	3.6 - 7.0 mm	0.118–0.275 in
Outer jacket diameter	10.0 - 17.0 mm	0.393–0.669 in
Inner operating pressure	from 20 MPa	from 2900 psi
Minimum bending radius	×20ø	

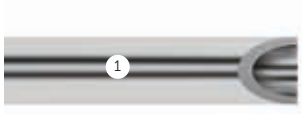
Design options
Inner polymer or stainless steel tube

Materials
Tube: stainless steel 304, 316L, Incoloy, Inconel
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance
Jacket: PP, PE

Hydraulic Control Line

Discover more





Cable design

1. Steel Tube
2. Outer jacket

Application

- Hydraulic control line

Features

- High resistance to internal and external pressure
- High resistance to aggressive environments
- Full compatibility with standard fittings
- Square shape — secure attachment to oil-well tubing

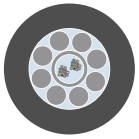
Parameters

Temperature rating рейтинг	+90°C +150°C +180°C +200°C +260°C	+194°F +302°F +356°F +392°F +500°F
Tube outer diameter	6.35 mm	1/4 in
Tube wall thickness	0.8 mm	0.031 in
Maximum external pressure	80 Mpa	11600 psi
Maximum internal pressure	100 Mpa	14500 psi
Outer jacket dimensions	11.0 x 11.0 mm	0.433x0.433 in
Tube weight (with jacket)	110 (180-210) kg/km	0.74 (0.121–0.141) lb/ft

Design options
Round encapsulation
Without encapsulation

Materials
Tube: stainless steel 316L, Incoloy, Inconel
Jacket: HDPE, PP, ETFE, FEP, PFA

UniSense



Cable design

1. Optical fibers
2. Stainless steel tube filled with water-blocking gel
3. Armor wires
4. Outer jacket

Application

- Connection of downhole cables with network
- Distributed monitoring of extended objects
- Pipeline leak detection
- Fire prevention system
- Subsea umbilical

Features

- Access cable
- Compact size & low weight
- High tensile strength
- High crush resistance
- Excellent rodent resistance
- Remains functional under direct flame

Parameters

Temperature rating	+90°C +125°C +140°C +200°C	+194°F +257°F +284°F +392°F
Maximum rated design tension	4-10 kN	900-2250 lb
Crush resistance	1 kN/cm	571 lb/in
Cable diameter	4.5-12.7 mm	0.157-0.472 in
Fiber count	up to 96	
Minimum bending radius	x20ø	

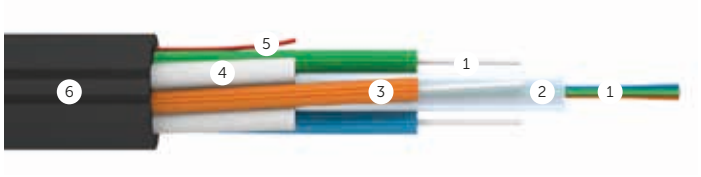
Discover more

Design options
Fire rated
Gel-filled or gel-free FIMT
Various temperature rating
Without armor

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L
Jacket: HDPE, PP, ETFE, FEP, PFA
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

Non-metallic MultiSense

Discover more



Cable design

1. Optical fiber
2. Gel-filled loose tube
3. Tight-buffer
4. Fiberglass rods
5. Ripcord
6. Outer jacket

Parameters

Temperature rating	+90°C +125°C +140°C	+194°F +257°F +284°F
Cable diameter	4.5 mm	0.177 in
Cable weight	20 kg/km	0.013 lb/ft

Application

- Distributed temperature sensing
- Distributed acoustic sensing
- Distributed strain sensing
- Distributed monitoring of extended objects

Design options
Structured jacket for a better grip with monitored objects
Additional protective layers
Steel tube encapsulation

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Jacket: HDPE, PP, ETFE, FEP, PFA

Features

- Multiple synchronous measurements
- All types of distributed sensing (DTS, DAS, DSS) in one design
- Compact size & low weight
- All-dielectric design
- Increased acoustic sensitivity

Structural health monitoring

Designs are used to monitor the condition of industrial facilities and urban infrastructure

Application

Buildings and structures

Transport

Ground movements

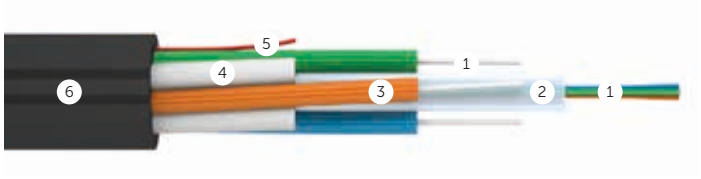
Fire safety systems

Geothermal phenomena

Cryogenic monitoring

Non-metallic MultiSense

Discover more



Cable design

1. Optical fiber
2. Gel-filled loose tube
3. Tight-buffer
4. Fiberglass rods
5. Ripcord
6. Outer jacket

Application

- Distributed temperature sensing
- Distributed acoustic sensing
- Distributed strain sensing
- Distributed monitoring of extended objects

Features

- Multiple synchronous measurements
- All types of distributed sensing (DTS, DAS, DSS) in one design
- Compact size & low weight
- All-dielectric design
- Increased acoustic sensitivity

Parameters

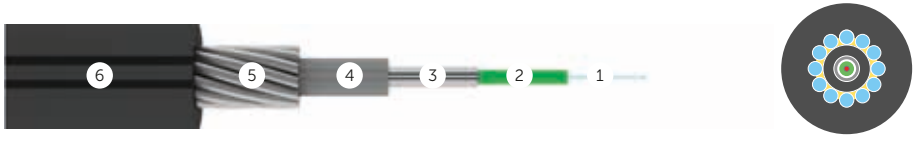
Temperature rating	+90°C +125°C +140°C	+194°F +257°F +284°F
Cable diameter	4,5 mm	0.177 in
Cable weight	20 kg/km	0.013 lb/ft

Design options
Structured jacket for a better grip with monitored objects
Additional protective layers
Steel tube encapsulation

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Jacket: HDPE, PP, ETFE, FEP, PFA

StrainSense

Discover more



Cable design

1. Optical fiber
2. Tight-buffer
3. Stainless steel tube
4. Inner jacket
5. Armor wires
6. Outer jacket

Application

- Distributed deformation monitoring of extended objects
- Soil movements monitoring (DSS)

Features

- Optimized for strain sensitivity
- High resistance to aggressive environments
- High tensile strength and crush resistance

Parameters

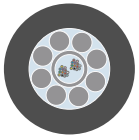
Temperature rating	+90°C +125°C +140°C +200°C	+194°F +257°F +284°F +392°F
Maximum rated design tension	4-10 kN	900-2250 lb
Cable diameter	4.5-12.7 mm	0.157-0.472 in
Minimum bending radius	x20ø	

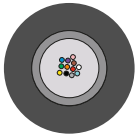
Design options
Structured jacket for a better grip with concrete

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L
Jacket: HDPE, PP, ETFE, FEP, PFA

Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

UniSense





Cable design

1. Optical fibers
2. Stainless steel tube filled with water-blocking gel
3. Armor wires
4. Outer jacket

Application

- Connection of downhole cables with network
- Distributed monitoring of extended objects
- Pipeline leak detection
- Fire prevention system
- Subsea umbilical

Features

- Access cable
- Compact size & low weight
- High tensile strength
- High crush resistance
- Excellent rodent resistance
- Remains functional under direct flame

Parameters

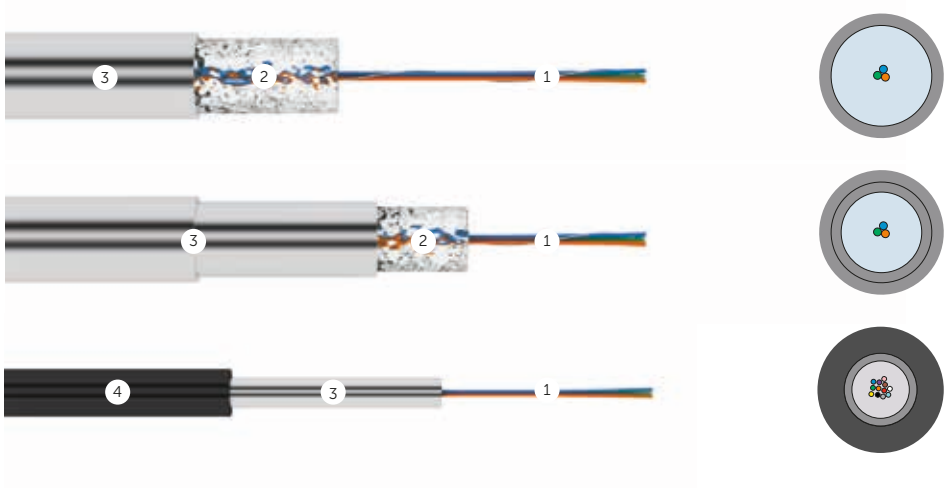
Temperature rating	+90°C +125°C +140°C +200°C	+194°F +257°F +284°F +392°F
Maximum rated design tension	4-10 kN	900-2250 lb
Crush resistance	1 kN/cm	571 lb/in
Cable diameter	4.5-12.7 mm	0.157-0.472 in
Fiber count	up to 96	
Minimum bending radius	x20ø	

Discover more

Design options
Fire rated
Gel-filled or gel-free FIMT
Various temperature rating
Without armor

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L
Jacket: HDPE, PP, ETFE, FEP, PFA
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

FIMT



Cable design

1. Optical fibers
2. Water-blocking gel
3. Stainless steel tube
4. Outer jacket

Features

- Can be used as a cable component or as a finished sensing cable
- Remains functional under direct flame
- Compact size & low weight

Application

- Distributed monitoring of extended objects (DAS, DTS, DSS)
- Access cable

Parameters

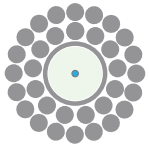
Discover more

Temperature rating	+90°C +150°C +180°C +200°C +260 °C (the highest level of temperature for design with plastic encapsulation) +300 °C and more upon request	+194°F +300°F +356°F +392°F +500°F (the highest level of temperature for design with plastic encapsulation) +572°F and more upon request
Steel tube outer diameter	1.1-6.35 mm	0.043–0.25 in
Cable diameter	1.9-10.0 mm	0.075–0.394 in
Fiber count	up to 96	
Minimum bending radius	x 20ø	

Design options
Single or double layer steel tube
Gel-filled or gel-free FIMT
Plastic jacket
Fire rated

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L, Incoloy, Inconel
Jacket: HDPE, PP, ETFE, FEP, PFA

TempSense



Cable design

1. Optical fiber
2. Stainless steel tube
3. Armor wires

Application

- Retrievable downhole cable
- Distributed downhole monitoring (DTS, DAS)
- Well logging
- Cryogenic monitoring

Features

- Resistant to extreme temperature
- Hydrogen-resistant fiber
- High strength in compact design

Parameters

Temperature rating	+90°C +150°C +180°C +200°C +260°C +300°C	+194°F +302°F +356°F +392°F +500°F +572°F
Cable diameter	4.5–18.5 mm	0.177-0.728 in
Copper conductor section	0.75-3.0 mm^2	18-13 AWG
Fiber count	up to 12	
Minimum bending radius (no load)	×20ø	
Minimum sheave diameter	×55ø	

Design options
Single or double layer steel tube
Gel-filled or gel-free FIMT
Copper conductor
Corrosion-resistant wire

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 316L, Incoloy, Inconel
Armor wire: GIPS (galvanized improved plowed steel) or GEIPS (galvanized extra improved plowed steel), stainless steel or specialty Ni-based alloys for higher corrosion resistance

Cable components for various industries

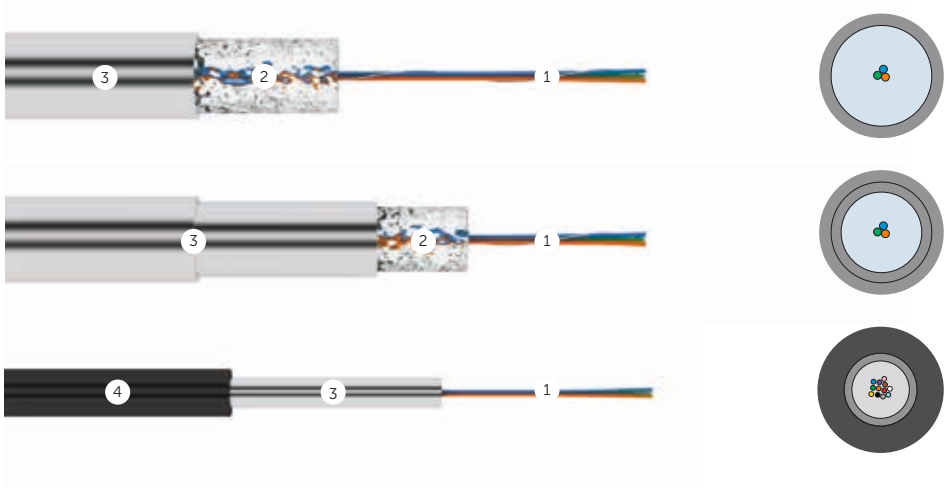
Cables can be used as an independent sensor cable, as well as a component of various types of cables

Application

Distributed monitoring of extended objects

Access cable

FIMT



Cable design

1. Optical fibers
2. Water-blocking gel
3. Single or double layer steel tube
4. Outer jacket

Features

- Can be used as a cable component or as a finished sensing cable
- Remains functional under direct flame
- Compact size & low weight

Application

- Distributed monitoring of extended objects (DAS, DTS, DSS)
- Access cable

Parameters

Discover more

Temperature rating	+90°C +150°C +180°C +200°C	+194°F +300°F +356°F +392°F
	+260 °C (the highest level of temperature for design with plastic encapsulation) +300 °C and more upon request	+500°F (the highest level of temperature for design with plastic encapsulation) +572°F and more upon request
Steel tube outer diameter range (without jacket)	1.1-6.35 mm	0.043–0.25 in
Cable diameter	1.9-10.0 mm	0.075–0.394 in
Fiber count	up to 96	
Minimum bending radius	x 20ø	

Design options
Single or double layer steel tube
Gel-filled or gel-free FIMT
Plastic jacket
Fire rated

Materials
Optical fibers: SM or MM, coating depends on temperature rating
Tube: stainless steel 304, 316L, Incoloy, Inconel
Jacket: HDPE, PP, ETFE, FEP, PFA
Other options available upon request.

Application-driven cables

Discover more

Geophysical surveys and fiber-optic monitoring require very specific cables to ensure safety, performance and durability in difficult operating conditions. These cables must be reliable and withstand high temperature, pressure, moisture, corrosion and vibration.

Each project has its own characteristics and requires individual cable designs that meet different operating conditions. Incab has the necessary design and manufacturing experience to develop structures according to your requirements.

1. Describe the task to be solved

2. We will offer the cable design that is most suitable for your field of application

3. We will produce test samples

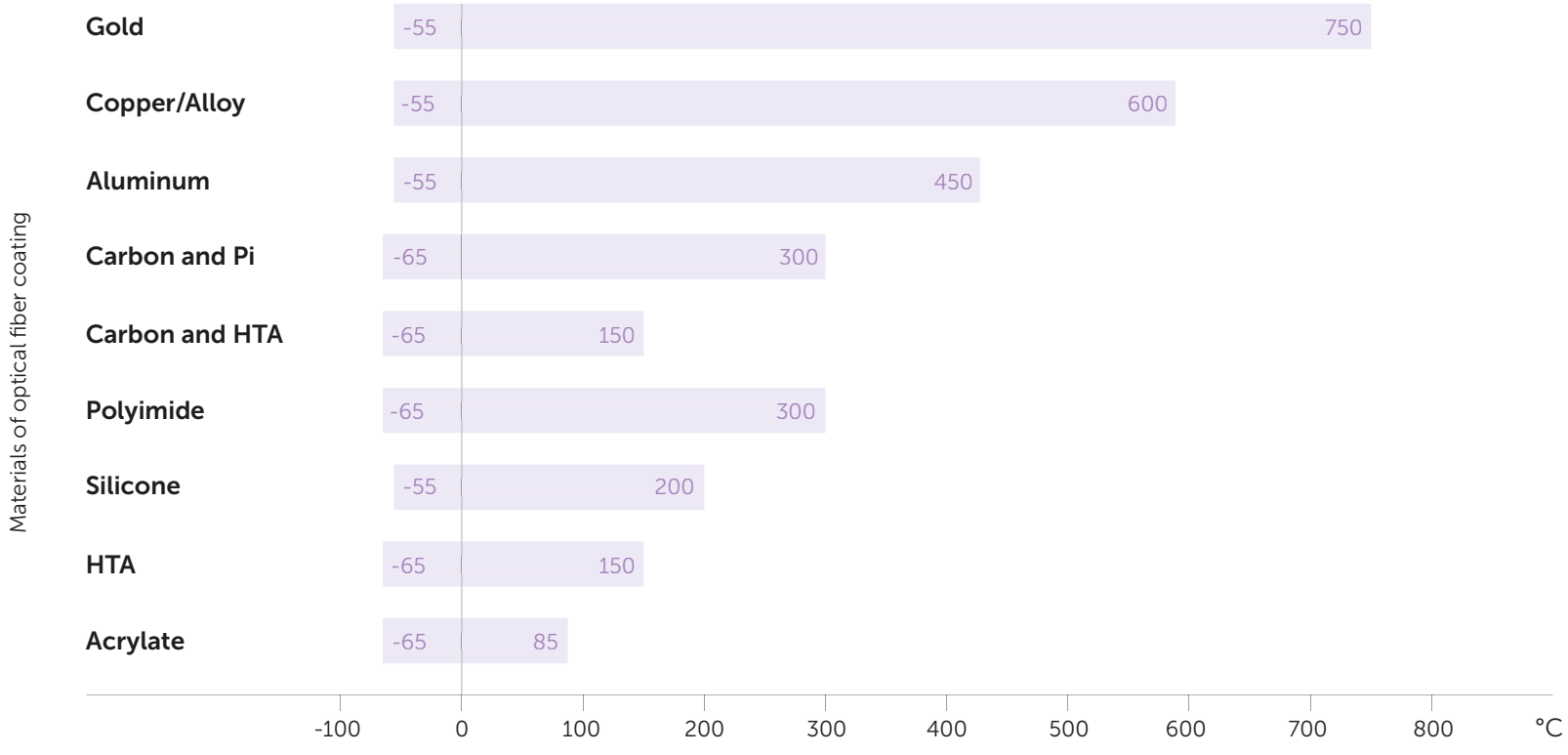
4. We will test the sample and put the cable into production

5. We will supply you with a ready-to-use product

6. We will be in touch with you for any questions

sensor@incab.ru

Coatings for various temperatures



Technical assistance Incab.PRO

Selection of fiber optic
cable design with the optimum technical features based on project specific technical requirements

Development of technical solutions

Selection of all components
and related accessories

Assistance in expertise-related issues with
controlling authority or the Customer

Assistance in calculations for the project
- calculation of the electric field of overhead lines (intersections of two overhead lines)
- determination of the optimal point of suspension of ADSS
- calculation of strain and sag tensions of ADSS / OPGW
- calculation of additional load on tower from ADSS
- calculation of thermal effect of short-circuit currents on OPGW

Project analysis
evaluation of technical decisions of your project, and generation of optimization proposals

Test center

Cable testing in the Test Center guarantees reliability and long design life. We perform the entire range of necessary tests:

Water ingress

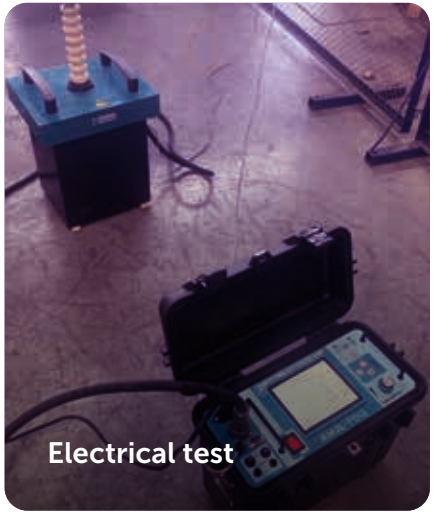
Mechanical tests
(vibration, tensile performance, repeated bending, twist, impact, crush)

Temperature tests
(cooling, heating, temperature cycling, increased humidity)

Electrical tests
(electrical resistance of circuit "armor-ground (water)", leakage current)


Tensile performance

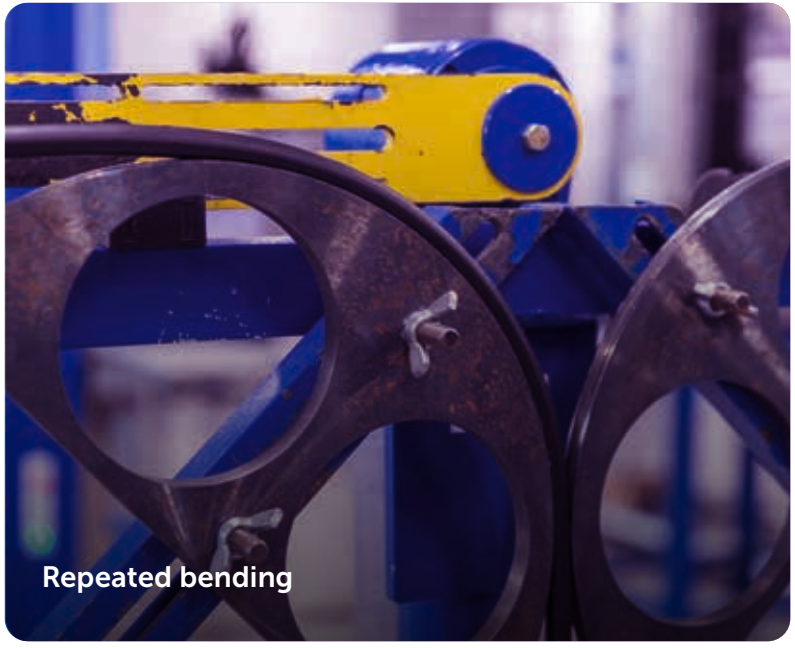
Impact


Electrical test


Climatic test


Crush


Gas ingress


Repeated bending


Twist

Control of fiber strain inside the cable with BOFDA/BOFDR (fibrisTerre)

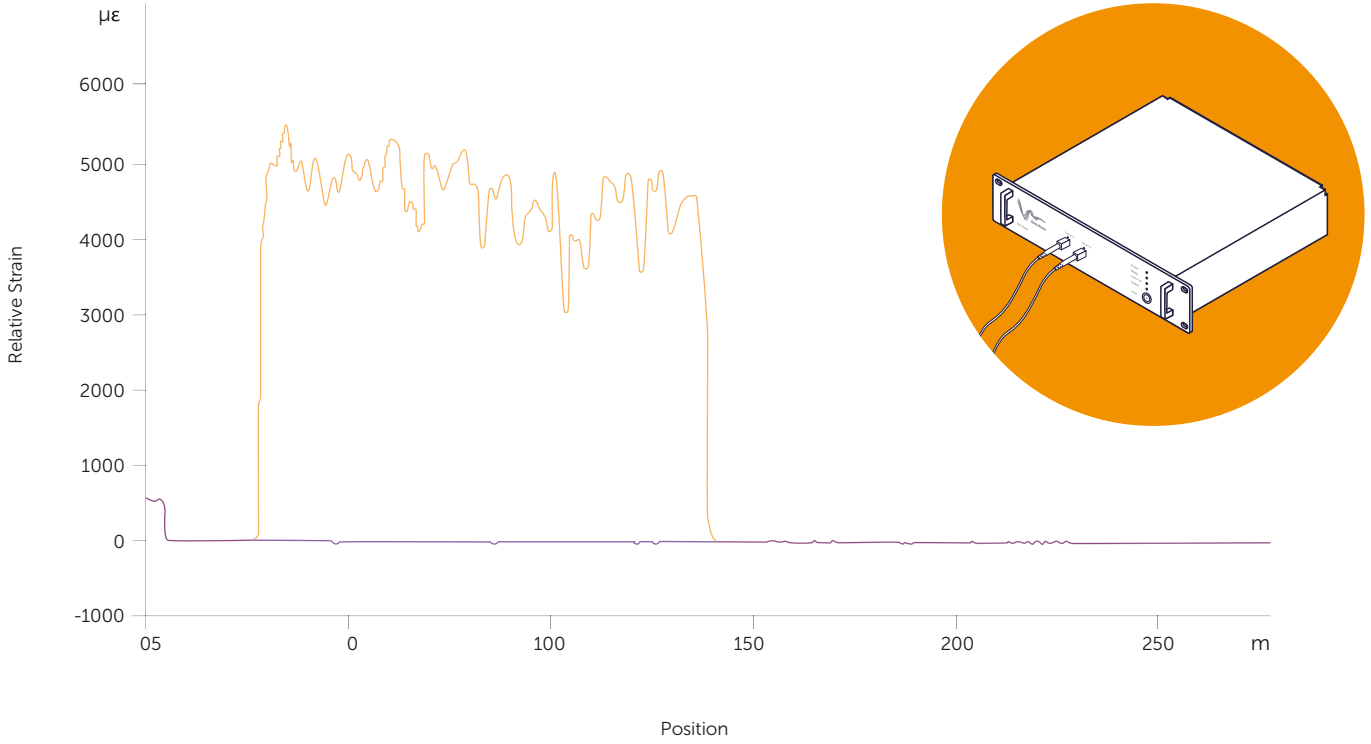
We specify:

- Central Brillouin Frequency
- Strain sensitivity of Brillouin Frequency
- Temperature sensitivity of Brillouin Frequency

No slippage of strain measuring fibers

How you benefit:

- Precise and complete characteristics of specialty cables for distributed monitoring
- Fast and efficient system deployment and predictable response to events
- Reliability and long cable lifetime



Reversing cable cycling machine

with programmable tension loads, suitable for precise bending tests

The test-bench is unique and very important for Oil&Gas cable designs as it allows testing the number of cycles before a break

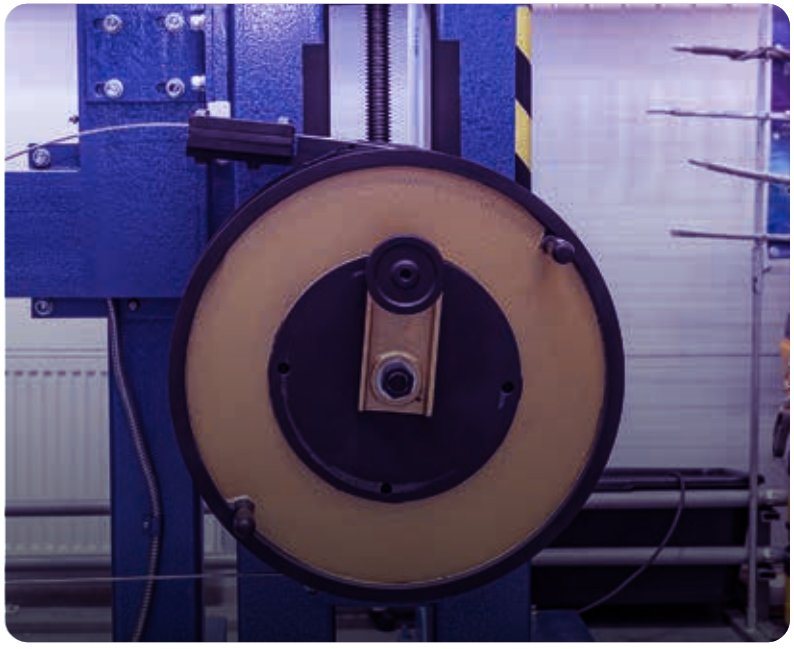
We specify:

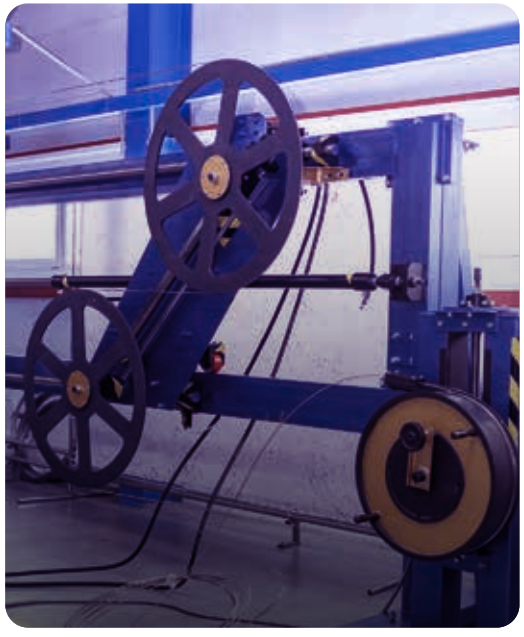
- cable strain
- fiber strain
- fiber attenuation
- copper conductor resistance
- Brillouin scattering
- mechanical damage

Testing in accordance with IEC 60794-1-21 method 8

Test-bench parameters:

- Bending radius: 200 — 500 mm / 7.874 — 19.685 in
- Maximum tension: up to 500 kg (5 kN / 1124 lb)
- Possibility to test autonomously, without operator's engagement
- Maximum number of cycles: 20 000
- Maximum tested cable diameter: 10 mm / 0.393 in





Why Incab?

Service and support

1. Definition of technical requirements
2. Feasibility study of new cable designs
3. Prototyping, special and type testing
4. Definition of qualification procedures
5. Tests & Measurements on installation sites
6. After sales support

Quality philosophy

Best materials

Best people

100% step-by-step quality control

"Quality means doing it right when no one is looking".

Henry Ford

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sensor@incab.ru