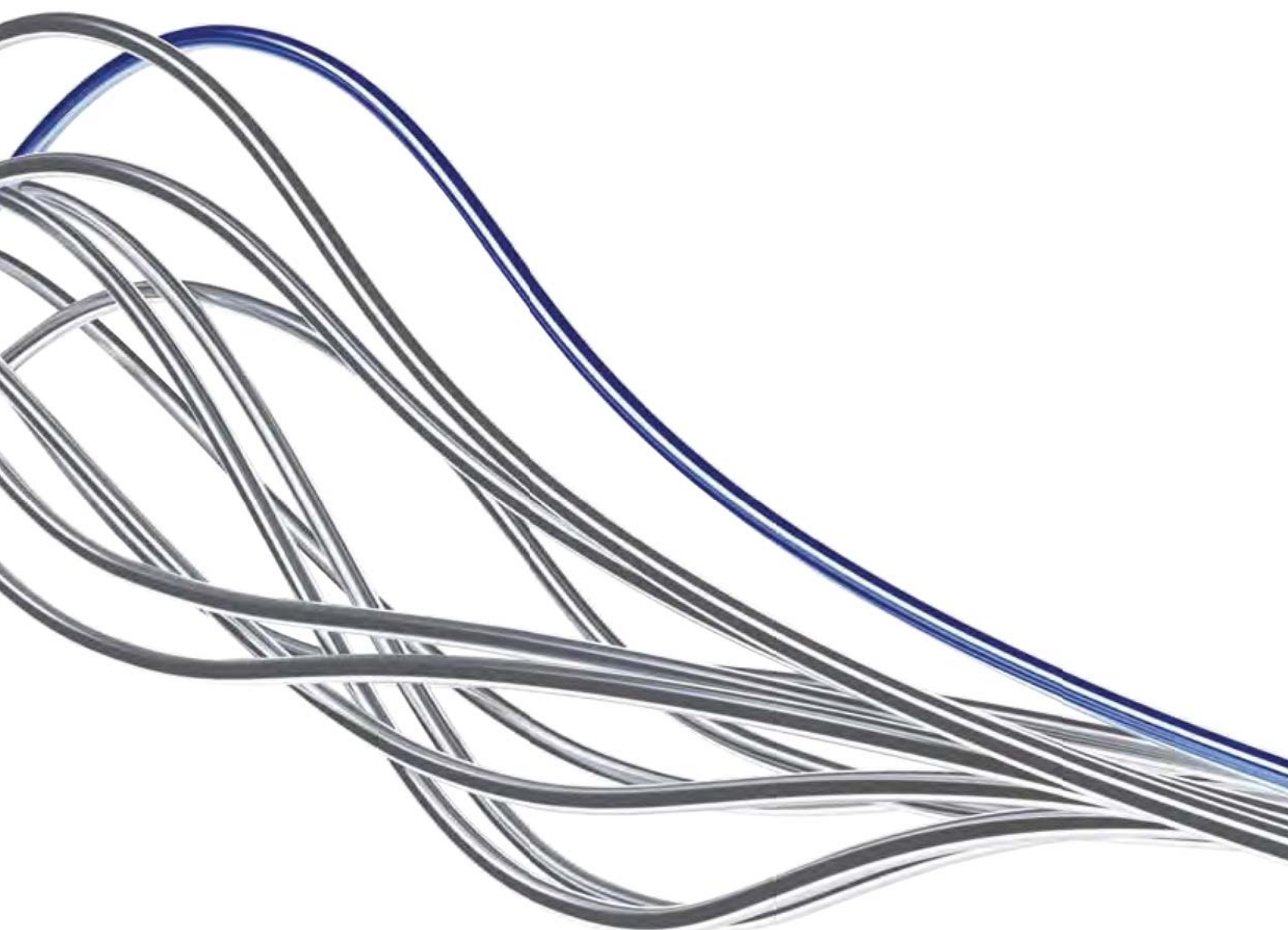OptaSense®
a QinetiQ company

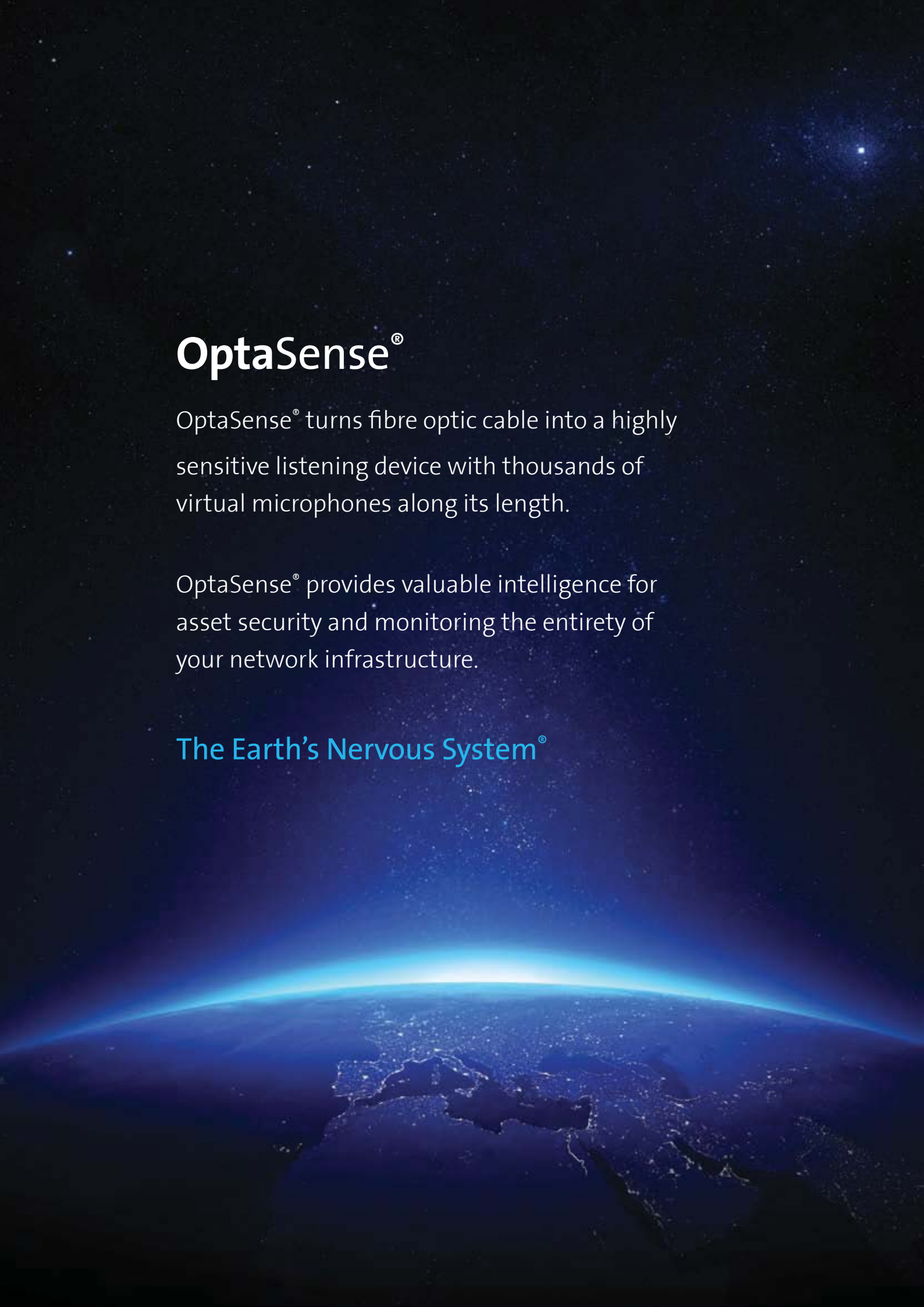# Transport Industries
Overview

OptaSense®

OptaSense® turns fibre optic cable into a highly sensitive listening device with thousands of virtual microphones along its length.

OptaSense® provides valuable intelligence for asset security and monitoring the entirety of your network infrastructure.
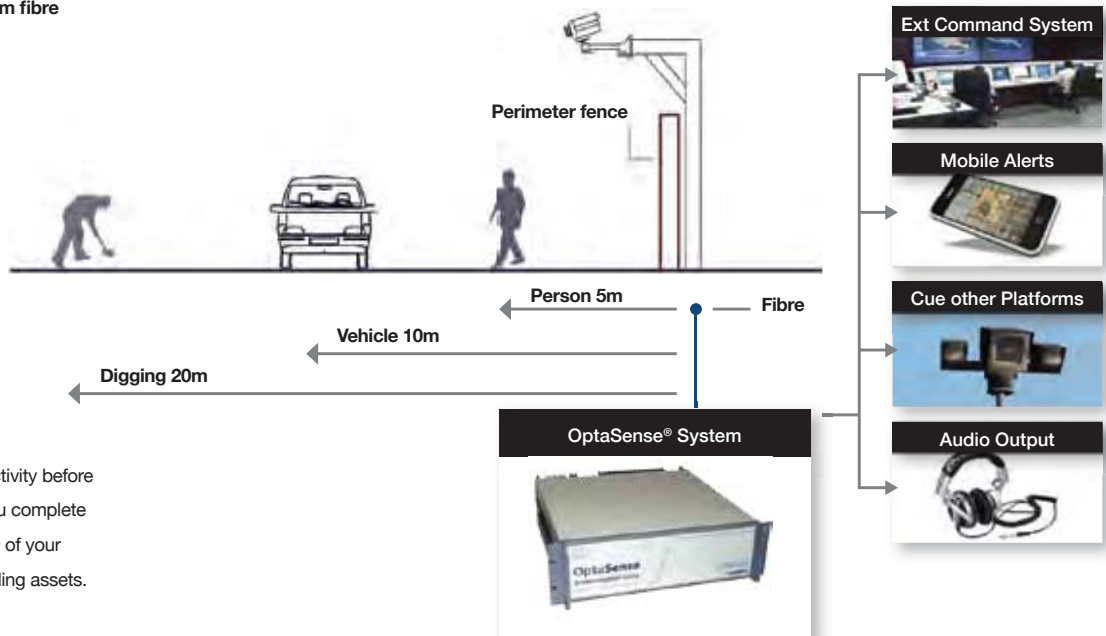
The Earth's Nervous System®

OptaSense® is designed to detect, classify and locate events with sufficient accuracy and early warning to enable corrective action to be put in place to prevent intrusion, damage, harm, or interruption.

Unique features

► Retro fit to your environment
- Uses existing fibre optic cable and requires no modifications
- Low infield power consumption
- No new infield equipment locations required

► Smart zones & custom user interface
- OptaSense® can be tailored to your pipelines exact needs

► Classification engine
- Intelligent software effectively minimises nuisance alarms

► Cues other security platforms
- Integrate with other platforms such as CCTV & UAVs (OPC, Pelco and others supported)

► Management reporting & forensic analysis
- Instantly review historical data of activity around your pipeline

Closed Circuit Audio (CCA) to compliment CCTV

Detection ranges from fibre

Perimeter fence

Person 5m

Vehicle 10m

Digging 20m

Fibre

Ext Command System

Mobile Alerts

Cue other Platforms

Audio Output

OptaSense® System

OptaSense® detects activity before the fence line giving you complete *situational awareness* of your perimeter and surrounding assets.

Train and Track Monitoring

OptaSense® provides real time, accurate and valuable data into the hands of our clients that allows rapid decision making and incident response. It is a single sensing system that provides simultaneous monitoring over complete rail or road networks enabling :

- Traffic Monitoring and Control: Tracking moving assets in real time
- Safety and Security: Managing and monitoring authorised and unauthorised movement
- Asset Condition Monitoring: Status of wheel flats, generators, pumps and machines
- Infrastructure Monitoring: Managing rock fall, broken rails, landslip, tunnel and bridge collapse scenarios.

By utilising a client's available fibre core, the OptaSense® sensing system eliminates the need for trackside installations, power, copper cables and resource attendance along the infrastructure. The system utilises zero trackside or roadside equipment and power and further significantly reduces the need for maintenance personnel to work along the infrastructure.

A single roadway or rail network equipped with two OptaSense® sensing systems can provide monitoring and protection of 80km in length and individual sites and systems can be easily networked to provide coverage over a client's complete infrastructure.

OptaSense® delivers real time alerts coupled with trend-linking analysis enabling the capture of the precursor activity to actual incidents and thus provides a prevention capability.

The system outputs interface to the client's command and control system and at the same time can be presented on smart internet connected devices anywhere in the world.

Beneficially, operational, technical and maintenance training are reduced to a single system whilst whole life Capex and Opex costs are also significantly reduced.

Rail: Protecting Infrastructure

Along railtrack infrastructure, OptaSense®, acts as a single sensing system and places the equivalent of 4,000 sensors every 40km, in turn either replacing or reducing the need for other standard trackside systems.

Security

The OptaSense® sensing system detects and alerts to unauthorised movement and activity trackside addressing threats such as copper theft, graffiti gangs, vandalism and potential terrorist activity.

Work Party Safety

Safeguarding trackside personnel OptaSense® monitors the location and activity of authorised work parties and train management around them.

Public Safety

The OptaSense® sensing system further safeguards vehicles and pedestrians at unmanned level crossings and platform end exits.

Infrastructure Safety

Detecting and generating alerts for rock fall, broken rail land slip, bridge and tunnel collapse/strike can also be managed by a the installed OptaSense® system.

Livestock Intrusion

The OptaSense® sensing system detects livestock groups wandering on the track and into tunnels.

The OptaSense® sensing system tracks all train metrics in real time and provides all necessary signalling to monitor:

- Direction, speed, length and integrity and location
- Headways both front and rear
- Dynamic time and distance to fixed points and any incident location

Monitoring Assets

With OptaSense® each moving asset can be identified through its unique acoustic signature which can be monitored to detect change such as deterioration. This includes wheel flats, hot axle boxes, points and barrier machines, along with generators, pumps and plant.

Road Traffic Management

Using already laid fibre, ideally on both sides of the highway, new levels of traffic flow monitoring, management incident detection and hard shoulder monitoring are all achievable with the whole OptaSense® "network" interfacing in real-time to traffic command and control systems. This single buried sensor will replace all or most of the current roadside point sensors and provides in real time:

Traffic Condition

Traffic is monitored at 10 metre points in real time along the whole length of the deployed roadside fibre. The constant data output can be integrated into a client's existing command and control systems which in turn instructs their various roadside traffic signage as well as providing the infrastructure operators and maintainers with a set of clear Graphical User Interfaces to allow for effective monitoring and decision making.

Congestion, Incident Detection & Queue Protection

Journey times between selected points and junctions are monitored and reported dynamically.

Incident Detection

The sensing system will detect when moving traffic comes to a halt as part of the traffic monitoring application above and provide an accurate location of the incident. Sections of slow moving traffic are also displayed in real time.

In addition, any associated noise created by an incident in close proximity to the fibre, is separately detected and will add to the understanding of the severity of the incident.

Roadside Information

Hard Shoulder Monitoring and All Lane Working

With a fibre installed close to or in the hard shoulder the sensing system has the capability to monitor traffic flow as well as stopped traffic.

Personnel Detection & Work Party Safety

To compliment incident detection and hard shoulder monitoring, the sensing system will detect personnel walking in close proximity to the fibre including authorised workers.

Traffic jam build up

Time

Distance
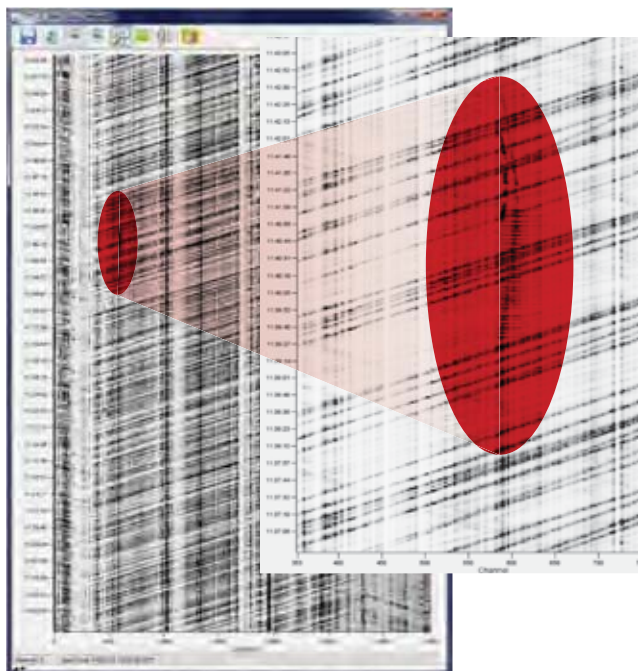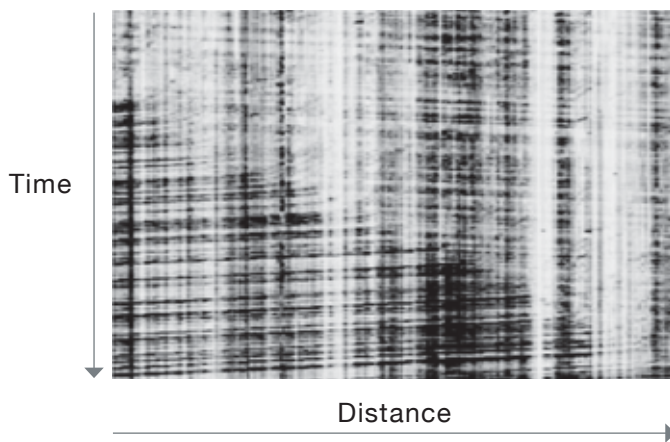
Personnel Alert:
Unauthorised personnel

Post Processing

In addition to real time data outputs the pattern of life across the infrastructure can be analysed over longer periods of time. This pattern of life view will assist an operator in understanding and planning for:

- Busy traffic periods
- New road builds
- Better highway access and egress
- Effective incident response and traffic management
- Provision of evidence to support incident investigation
- Effective positioning of cameras and physical security barriers.

A Global Business

OptaSense® is a world-beating British technology, built on decades of home-grown expertise at QinetiQ. Globally, combined with local delivery and service capability our solutions are protecting some of the world's most valuable assets, whilst leading development in adjacent markets like transports, subsea and utilities.

Exploration & Production

Accidental Damage Prevention

Accidental Damage Prevention

Theft Prevention & Counter Terrorism

Theft Prevention & Counter Terrorism

Infrastructure Monitoring

Application Areas

- Oil & Gas
- Transport
- Defence & Security
- Telecommunications

10,000 km of assets under protection approaching 100,000,000 km-hrs of surveillance

Already OptaSense® has grown from just 3 people to over 160 employees in four years and OptaSense® with solutions being deployed in over 40 countries, working either directly or through knowledge transfer, to enable local partners to install, maintain and operate the OptaSense® systems locally.

With offices in the London, Dubai, Houston, Boston and Calgary we are addressing the needs of pipeline protection and management, oil field services, transport, borders and military and critical site security.

Our technology protects thousands of miles of pipeline worldwide as we continue to work with major Oil and Gas corporations internationally to improve yield and return on investment. Increasingly our technologies are being selected to monitor the world's largest networks.

While other companies also operate in the field of distributed acoustic sensing, OptaSense® has combined the technology of the "listening fibre" with the power of advanced acoustic algorithms to build The Earth's Nervous System®.

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