Providing total integrity throughout your pipeline network, ensuring efficient, safe and secure operation

Sensornet's Digital Pipeline Integrity Monitoring Solution consists of a suite of products and services that provide the client with the peace of mind that their pipeline is operating efficiently, safely and securely. This solution can be deployed and configured to detect and report the following:

- Third Party Interference
- Pipe Stress
- Ground Shift
- Leak Detection
- Pipe Temperature

- Slug Detection
- Condition Monitoring
- Pig Monitoring
- Asset Protection
- Riser Monitoring

CLOSE THE MONITORING GAP

With conventional technology there is a gap between what you think is occurring and what is actually happening. This information gap can delay detection of any natural or man-made event that could affect the operation of your process. Such delays are critical and can lead to potentially expensive and hazardous situations. Sensornet's solution overcomes the limitations of many technologies available today to close the monitoring gap and improve system availability, integrity and safety.

MONITORING GAP WITH EXISTING TECHNOLOGY

There are a number of standalone systems available today that can provide threat, strain and leak detection solutions. These do not provide the integration, accuracy and varied monitoring capabilities of the Sensornet system.

Conventional systems rely upon point sensing technologies to estimate locations of events. Positioning these in the correct and most relevant locations can be a challenge. These can also be affected by single large and often harmless events that can blind the systems to specific activities that can affect the process.

SENSORNET DIGITAL PIPELINE INTEGRITY MONITORING

Sensornet's Digital Solution provides complete coverage of the pipeline or process. Our suite of fully Distributed Sensing products include Temperature (DTS), Strain (DSS) and Acoustic (DAS). These can be deployed individually or in any combination to provide the level of monitoring required by the client. Each system utilizes fibre optic monitoring technology and can be deployed using the existing telecommunications or Control and Instrumentation network. The operator can decide to provide total pipeline coverage or to concentrate on specific high risk regions. With the sensing fibre in place it is possible to relocate and redeploy equipment as sections of pipeline move up the risk register.

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BE THERE

THIRD PARTY INTERFERENCE (TPI)

Locate potentially hazardous movement within the pipeline corridor. Human movement can be detected within 10 metres of the sensing cable and mechanical digging up to 500 metres. Intrusion is detected and alarmed before contact with the pipe is made. Location is accurate to 10 metres longitudinal length. Individual events are identified and categorized according to the alert levels and reported to the security personnel or systems. Complete pipeline corridors can be monitored remotely at the Central Control Centre with further direct communication with mobile security or inspection personnel.

PIPE STRESS

Accurately locate pipe strain caused by buckling, hammer, structural fault, anchor drag or ground shift. A resolution of 20 microstrain can be detected at 1 metre intervals. This system can be permanently deployed for real-time monitoring or can be provided periodically as part of a regular surveillance program. Full service and reporting can be provided by Sensornet or by the client's trained personnel.

GROUND SHIFT

Pipelines are not always installed within the most stable ground conditions. The Distributed Strain Sensing system accurately locates any ground movement caused by landslide, erosion, seismic or structural activity with a resolution of 20 microstrain at 1 metre intervals. Monitoring can be deployed on a permanent basis or as part of a regular surveillance program by fully trained client personnel or the Sensornet maintenance team.

## LEAK DETECTION – ON SHORE PIPELINES

Leak detection can be accurately detected to the nearest 1 metre via temperature changes in the surrounding environment. Temperature resolution of 0.01°C ensures small liquid leaks can be detected and quantified. Gas leaks will be indicated by the Joules Thompson effect. Levels of change are dependant upon product properties and soil conditions. Sensornet are able to model the effects of leaks and determine specific detection times and levels upon application.

LEAK DETECTION – OFF SHORE PIPELINES

Leak location can be detected to the nearest 10 metres by changes in the acoustic pitch of the surrounding water. Liquid and gas leaks can be detected and aurally verified in real time or via audio playback. This system can be deployed globally with a single Central Control Room monitoring all pipelines. Accurate event location can reduce ROV and diver costs and ensure remedial action is taken immediately.
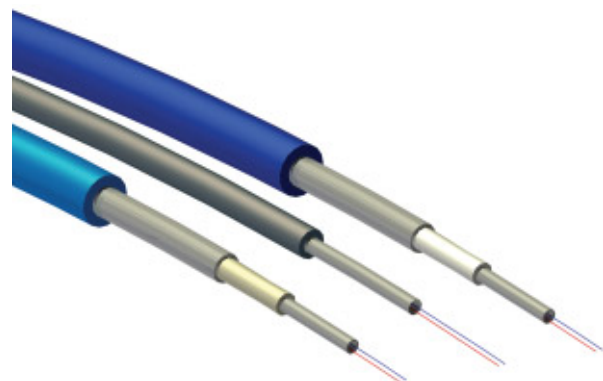
Sensornet proprietary sensing cables have been designed for a wide variety of pipeline integrity monitoring applications

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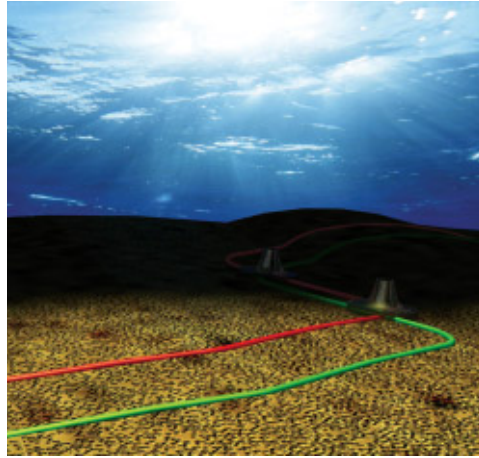
PIPE TEMPERATURE

Heat Trace (SECT), Direct Electric Heating (DEH) or Water Jacket heated lines can be monitored to ensure the system is operating safely and efficiently within the product's specified parameters. Temperature monitoring allows for the maintenance windows to be minimized and can improve productivity by reducing hydrate build up.

SLUG DETECTION

Acoustic signature of a slug can be detected within the Tie Back. The progress of the slug can be traced to ensure the correct measures are taken on the platform to reduce velocity and catch the slug. This increases safety and can help to maximize platform productivity.

CONDITION MONITORING

The inclusion of fibre optic accelerometers within the network can be used to remotely monitor pumps and generators etc. As machinery wears the acoustic pitch changes. This monitoring can form part of a maintenance program to ensure maximum availability. The system can also be used as acoustic confirmation that the expected activity has begun, e.g. generator has come online to support low battery load.

PIG MONITORING

Follow the progress of a Pig throughout the pipe network by tracking the acoustic signature. Changes in speed can signify hydrate build up. Location of the Pig can be pinpointed should retrieval be required. This system can be installed permanently or as part of a regular maintenance package by Sensornet.

ASSET PROTECTION

Extend the fibre optic network around remote facilities to detect any unwanted intrusion and protect facilities such as Block Valve and Compressor Stations etc. Individual components such as satellite transmitters and solar panels can also be protected remotely. The system can be integrated with existing security systems to activate cameras and personnel. This can be monitored at a Central Control Centre that monitors a number of diverse locations.

RISER MONITORING

Prolong the life expectancy of the Riser by monitoring the number, location and severity of flexes during operation. The Distributed Strain Sensor will monitor the entire length of the riser and can provide real-time and historical data to the client in order to make informed decisions on the operational capacity of the system.

To close your monitoring gap, visit www.sensornet.co.uk

SENSORNET PROVIDES THE COMPLETE SOLUTION

Providing the full suite of hardware, installation, project management and interpretation services Sensornet is able to offer a simple one-stop solution for your permanent monitoring requirements. As a part of our commitments to our ISO 9001 procedures we are dedicated to providing you with our utmost level of service at all times.

ENGINEERING DESIGN

The Sensornet team will design the entire engineering solution for you. This includes the system topology, fibre optic cable designs that can also support SCADA and telecommunications and all required ancillary components. All remote components are environmentally certified and approved for use in hazardous zones.

INSTALLATION SERVICES

Sensornet has highly trained personnel and equipment to perform fibre optic installations across a number of industries. Each specific installation requires specialised knowledge and equipment as well as dedicated fibre optic cable designs. Sensornet has built this knowledge over a number of years and together with installation partners is able to tackle the most challenging of installations.

SURVEILLANCE SERVICES

Not all systems require 100% real-time monitoring. Sensornet are able to provide some services as part of a regular surveillance package. This may include Pipe Stress, Ground Shift or Pig monitoring. The Sensornet Service Team will work with the client to perform regular monitoring and compile reports accordingly. Additional maintenance of all systems can be provided to ensure the tight detection tolerances are maintained and systems are operating satisfactorily. These can be achieved on site or remotely where network access can be granted.

PROJECT MANAGEMENT

The Sensornet team will manage your entire project right through to its handover. We operate to the highest standards of quality; our solution is, after all, about increased safety and security. We are ISO 9001 accredited and meet all current Health & Safety regulatory requirements.

VISUALISATION AND INTERPRETATION

Each of the systems can be integrated into the client's DCS, SCADA or Security system. Integration into the client's control system allows alarms or average values to be displayed as part of the SCADA package. This can be achieved by OPC or Modbus protocols.

Alternatively the systems can be configured for use in standalone format. GIS maps can be used to highlight precise locations of events. These can also be integrated with intelligent hand-held devices to show location and type of alert and provide route information from the individuals' current location if required.

Bespoke interpretation software and data processing can be provided. This is tailored dependent upon the suite of packages and the levels of monitoring required.

SAFETY AND RELIABILITY

A key aspect to the implementation of any monitoring system is to minimize the number of false alarms. The Sensornet systems can be configured to detect only the events the client wishes to alert. Leak detection solutions use a number of algorithms to monitor rate of change and value of change against the ambient conditions. Only when the precise parameters are met will this be alerted. Likewise our intruder detection system conducts a baseline reading to filter any normal noise. Levels of intruder detection can then be classified with varying levels dependent upon the area under test. This can take regular activities such as traffic and trains into consideration.

All Sensornet's solutions are built and designed to the highest standards and safety levels. The sensing cable itself is a passive component and is therefore suitable for hazardous rated zones and is immune to EMC interference. The leak detection system has been independently certified to Safety Integrity Level 3 (SIL3) and is suitable for integration into Emergency Shut Down (ESD) systems.

For more details on the Sensornet system or for a custom engineered solution to your specifications please contact your local Sensornet representative.

Sensornet has offices in Europe, North and South America, Middle East & Asia-Pacific – please see our website for details

www.sensornet.co.uk

To close your monitoring gap, call +44 20 8236 2550 or visit www.sensornet.co.uk

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