



## SENSORNET DTS GOES THE EXTRA MILE TO PROVIDE DIGITAL LEAK DETECTION MONITORING FOR ETHYLENE PIPELINE

Sensornet Ltd have recently installed and commissioned a Distributed Temperature Sensing system to monitor a 57km Ethylene Pipeline in northern Germany. This installation was monitored using a single Sentinel DTS-XR system, which is able to detect a leak in realtime and pinpoint the location to within a few metres.

### CLIENT REQUIREMENTS

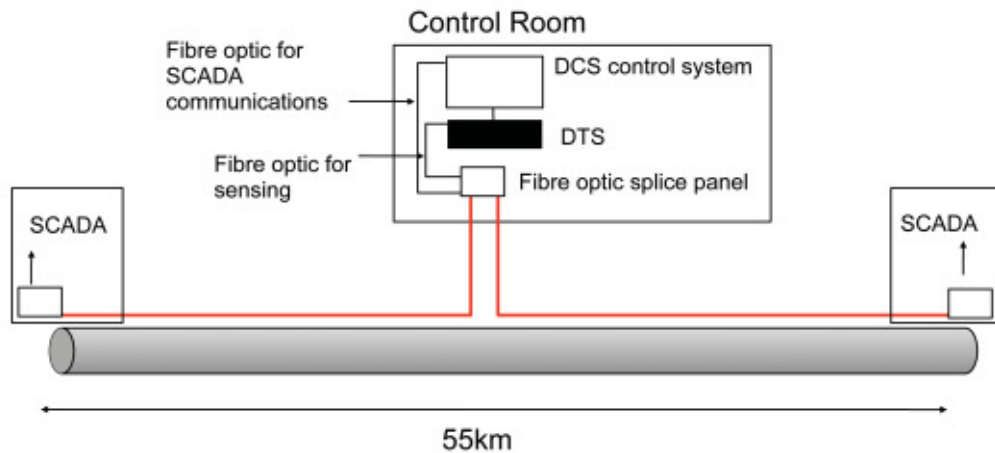
The Ethylene supply pipeline runs between the processing sites in Northern Germany. The pipe route operates at a 100bar pressure capacity and passes near residential areas. The integrity of the Ethylene pipeline is not only crucial to the operator's productivity but also to the local community and ecology and any leak from such a pipeline presents a potential environmental and safety hazard. According to German regulations such a pipeline must be monitored by a comprehensive leak detection system which also must be approved by the TUV (Technischer Überwachungs-Verein). The TUV is one of the global leaders in independent safety and quality assessment for industrial solutions and operates to the highest standard.

### APPLICATION

The sub ground pipeline was installed complete with a singlemode fibre optic cable for the entire route, with a control station in the middle of the route. The multicore cable was utilised for data, telecoms and the Distributed Temperature Sensor system. The control station was therefore a natural choice for the deployment of the HMI and DTS equipment and the placement of the stations divided the cable routes into 26 and 31km runs. For this project a long range, Singlemode DTS-XR system was utilised (Sensornet also offers systems based on multimode fibre which can cover > 60km).

### THE MONITORING GAP

The biggest issue for the client using existing technology was that it was not possible to pinpoint the location of the leak. Prior to using the Sensornet digital leak detection system, the operator used a leak detection algorithm based on mass flow rate. This mass flow system monitors the physical parameters of the flow input and output and estimates if there is a leak in the system based on a computational algorithm. An additional issue is that this algorithm needs to be finely tuned over a period of 3-6 months and is very complex. Therefore, in addition to the mass flow system the operator must also commission a helicopter to fly the length of the pipeline on a regular basis to provide a visual inspection which is an expensive undertaking.



## THE SENSORNET SOLUTION

The SensorNet solution is based on detecting the temperature changes in the environment in the event that there is a leak in the pipeline. Should a leak occur the Ethylene will cool to  $-110^{\circ}\text{C}$  and revert to its natural gaseous form. The Sentinel DTS is able to detect such a temperature change and pinpoint the location to within metres. Using SensorNet's intelligent alarms software, the route was divided into specific zones with intelligent algorithms utilised to take into account transient temperature changes and minimise false alarms. As the monitoring station was a remote site, ensuring full capability with the existing SCADA system was a priority. This not only meant using the singlemode fibre infrastructure that was specified for the data acquisition network, but also integrating the DTS reporting and alert functions with the third party HMI. SensorNet provided this interface via a standards based Ethernet OPC server.

## SUBSTANTIAL BENEFITS

The SensorNet Digital Leak Detection system provides protection over the entire length of the pipeline and is a non-intrusive detection system. In the event of a leak, this can be detected in real time and the location pinpointed to within a few metres. The response team can therefore react instantly and can be at the location of the leak without delay thus minimising the potential environmental and safety hazards. This sentiment was echoed by representatives of the TUV who independently approved and accredited the SensorNet Sentinel DTS system.

## MEASURABLE PERFORMANCE

The Sentinel DTS-XR offers the most advanced performance available today. Measurement time can be from 10 seconds and temperature changes smaller than  $0.1^{\circ}\text{C}$  can be detected. For a 60km pipeline measurement points can be taken every 2m, providing over 100,000 points along the entire length of the pipeline, thus providing the operator with total integrity over the entire length of the pipeline.



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