Introduction

A major client in Africa expressed its need for real-time leak detection monitoring and threat identification on a 52 km pipeline. Silixa supplied its intelligent Pipeline Surveillance System which utilises a single optical fibre cable and distributed sensing technology. The iPSS offers unparalleled sensitivity and positional accuracy.

Challenge

To provide complete and uninterrupted surveillance on a 52 km crude export pipeline, to detect both leaks and identify breaches of pipeline security.

Solution

Silixa installed its intelligent Pipeline Surveillance System (iPSS™). The system consists of iDAS™ based acoustic detection technology for identifying third party intrusion events, and a temperature based leak detection system (ULTIMA™ DTS) to detect leaks. The iPSS is able to discriminate multiple simultaneous third party intrusion events and locate them accurately along the pipeline, while at the same time providing continuous leak-detection coverage.

Results

Three attempted thefts were detected within the first four weeks of operation. Given the immediate response and pin-point positional accuracy of the system, the operator was able to send a crew to the location and take action against the intruders, confiscating their equipment.
The pipeline construction and cable installation works began in 2014. A ruggedized cable containing standard telecoms fibres was installed adjacent to the pipeline in a 5 o’clock position. (See figure 1) In order to monitor the entire length of the pipeline a system was placed at either end of the pipeline within the control rooms. (See figure 2)

Alarms are managed through the surveillance management application which has a graphical interface showing the schematic layout of the pipeline network on a customised screen. On receipt of a warning, a message alerts the operator, and a marker indicates the type of event and highlights its location on the pipeline network map. The operator is then presented with further information in the alarm window that includes the time, label and location.

![Figure 1](image1.png)

*Figure 1* shows the acoustic trace of digging.

*Figure 2* on the right shows the iPSS graphical interface with two alerts; one for walking along the pipeline and one for digging near the pipeline.

![Figure 2](image2.png)

*Figure 3* above shows oil spill at the alert point along the pipeline where the tapping occurred.

![Figure 3](image3.png)

*Figure 4* above shows the installation of the fibre optic cable.

![Figure 4](image4.png)

**Conclusions**

iPSS adds immediate leak and security surveillance to buried pipelines. The unequalled fast response and positional accuracy of the iPSS allowed for rapid dispatch of assessment crews to the precise location and ensured that the pipe tapping was terminated. Result: customer control of an important asset and increased cashflow.

Silixa’s technology was deployed by Xenergi Ltd., Silixa’s partner in Nigeria.