

# Transforming Pipeline Monitoring with AI and Drone technology

*AI is the new Electricity*

CAPE TOWN, SOUTH AFRICA, August 11, 2020 /EINPresswire.com/ -- Often compared to the advent of electricity which transformed industries in the 1800's, AI (Artificial Intelligence) is already transforming society and create huge economic value. The Oil and Gas industry, [Pipeline Monitoring](#) in particular, are deriving great benefit from the implementation of BOTH drone technology and AI.



Methane Drone inspecting pipeline

## [OIL & GAS](#) Industry

Being in the oil and gas industry, both people and equipment are exposed to extreme conditions. Being able to remotely perform many maintenance tasks is of critical to this capital intensive industry.

The oil and gas industry is amongst the most complex industries which deal with stringent guidelines regarding safety, health, and environment.

- Traditional approach to monitoring used to be threshold, alarm-based systems
- But emerging technologies are now enabling digitalisation and utilising the benefits of Artificial Intelligence (AI).

## FALSE CAUSES OF ALARMS

There are numerous factors that cause false alarms on pipeline monitoring systems but one of the biggest culprits is rain. Other common causes are animals walking on the pipe or heavy trucks driving by, causing vibration patterns on the pipe that trigger an alarm.

But alarms cannot always be ignored as there are events that need to be detected and acted upon such as vandalism, drilling or hammering or other damaging impacts on the pipeline.

## CHALLENGES

A majority of traditional system alarms are false and nothing significant. This can lead to alarm fatigue, where people do not respond. The problem is that when something happens, it is usually very serious and sometimes can have catastrophic consequences.

Another major challenge with threshold based alarm systems is reporting exceptions after the fact and with limited insight into the cause.

## SENSORS

Oil & gas operators remotely monitor via a multitude of sensors such as requires sensors that, with the help of a drones, can importantly detect gas molecules for a gas leak, or temperature, levels of volume, pressure, sonic or ultrasonic sensors for flow analysis, vibration sensor for detecting vandalism, and for operating status of various equipment at tank, well, and pipeline facilities..

## TECHNOLOGIES

Oil & gas operators have been digitizing several aspects of their value chain with a variety of emerging technologies.

### Artificial Intelligence

- “Using AI’s pattern recognition to differentiate the different vibrations can create a multi-dimensional vibration patterns of different events on the pipeline.”
- “Using AI on the edge for pipelines, the algorithm can detect that granular differences between different types of impacts and can detect with high confidence over the majority of the incidents,”

### Edge computing

- “Using several technologies like embedding of sensor, storage, compute, advanced artificial intelligence, (machine learning) where intelligence will move towards the edge of various endpoint devices installed in oil & gas companies.
- “These technologies connected through 5G networks, along with technologies such as IoT, cloud computing and robotics are digitally transforming the industry.

### Drones

- Drones, capable of integrating various payloads, sensors, and imaging technologies, effectively carry out operations like, importantly, Methane Gas leak detection, as well as corridor mapping, emergency response and recovery, etc. in the oil & gas sector.

Intelligent video surveillance systems.

-CCTV cameras when integrated with AI enable more advanced solutions like face recognition, object recognition, event recognition, intelligent image processing, remote asset management, behavioural detection, and analytics.

Image analytics,

-AI allows the use of image analytics to monitor any deformation from the baseline profile of infrastructure. The real-time visibility of infrastructure integrity ensures safe operations, while also reducing the cost and human errors in meter reading.

Digital Twins.

-Digital twins is a concept whereby a digital replica of a physical facility is developed and can be a digital proxy of the physical world for the purposes of modelling effects prior to implementation.

## SOLUTIONS

Leakage detection represents the most critical element of the Oil & Gas industries inspection and detection for preventing major accidents as well as avoiding malfunction of equipment. Some of the major techniques include:

1. Multi-sensor data integration that allows modelling of vital equipment such as flowmeters and valves using AI, as well as ensuring that detection is validated with more than one type of data. For example, in an oil pipeline, you would want to analyse the flow and improve corrosion, as well as identify and pinpoint potential leaks.
2. By utilising both AI and edge computing detect and alert central operations to potential issues such as leaks, corrosion, freezing damage or vandalism. It also allows operators to capture and analyse remote operations through image analytics. But above all it adds intelligence by predicting and optimising pipeline maintenance and integrity.
3. A digital twin of a physical plant or asset can be used to optimize various processes and also make adjustments to facility designs. Different sensor types and devices may be integrated with the software to build digital profiles, and then used to predict and optimize pipeline maintenance and integrity.
4. In this regard, sensors are deployed capable of collecting information about unwanted gas leaks to avoid losses of human as well as other infrastructures and are not only capable of generating alerts but also providing information to actuators to act automatically in order to stop the leakage and mitigate the consequences.

The benefits of leveraging AI

Combining intelligent algorithms with an end to end solution that integrates sensors with real-time edge computing for profiling of assets and activities is the future for pipelines and it is here

today.

[Airborne Drones](#) is a UAV manufacturer that specialises in solutions for the Oil and Gas industry.

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