

Flowing Securely

State-of-the-Art Pipeline Protection System





PipeGuard: Background

1. **Until now, securing oil and gas pipes has been an unanswered challenge**, even though its urgency has been recognized for years by the oil & gas industries.
2. **The Magal Security Group (Senstar)** identified this need, and implemented a unique technology developed by Military forces and used in the oil industry.
3. **PipeGuard** is a patent pending product, that utilizes state-of-the-art identification technology, with unique short range communications technique, and **Senstar's Alarm Management system (Fortis)**.



What PipeGuard Does

Secures pipelines against :

- Theft
- Terrorism
- Vandalism

Additional applications:

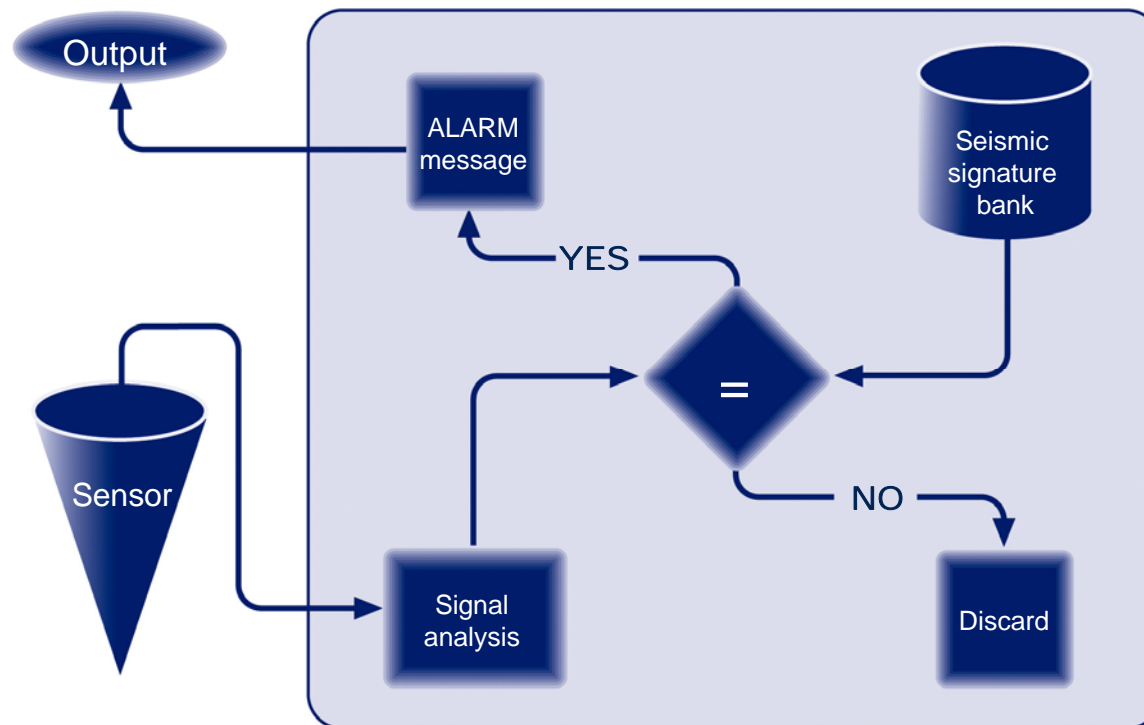
- **Underground Data Transfer Highways (buried fiber optic cables)**
- **Tunnel Digging Detection (e.g. prisons, borders, tarmacs etc.)**



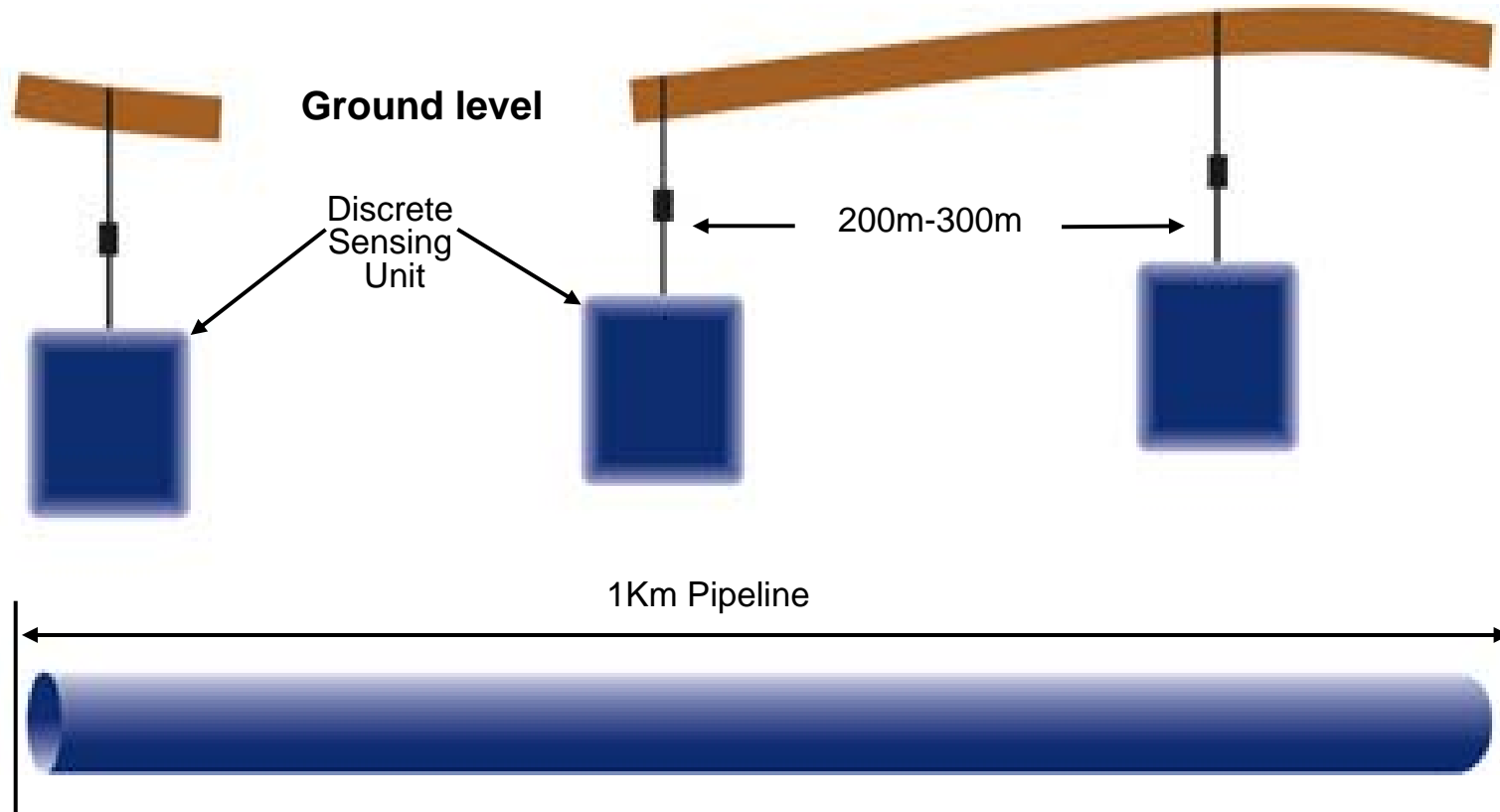
Why PipeGuard is the ideal solution

- **Damage prevention: Sounds alarm before the damage is caused**
- **Covert (non-exposed) components**
- **Intrusion recognition capability – confidence level of over 98%**
- **Accurate location of intrusion attempt**
- **Suitable to all weather conditions and soil types**
- **System redundancy capability**
- **Applies to all pipe sizes: From existing and operational to new pipes under construction**

Sensing Unit: Basic Flow Logic



System Installation Concept





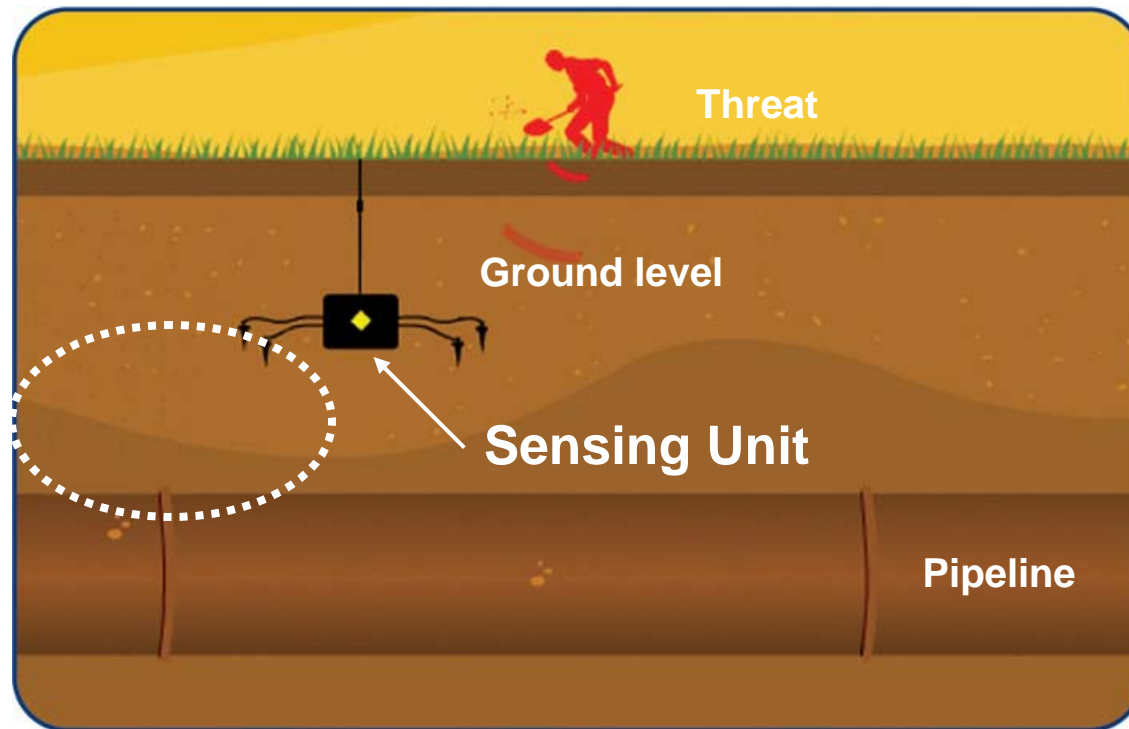
PipeGuard: Unique Features

- **Identification Capability:** Combines seismic sensors (**Geophones**) with an advanced identification technology.
- **Autonomous, Discrete, Buried Sensing Units:** Signal analysis fully conducted in each processor unit. “Alert message” forwarded to control centre only when signal is recognized as “real”.
- **Wireless Communication:** Based on short range transmission to neighboring units and to nearest pumping/valve station in order to make use of a duplex communication network.
- **Fully digital S/W based** - The PipeGuard system is designed to enable remote critical parameters tuning along the way via the communication channels.
- **Growth potential** – Up to 4 additional sensor inputs are available for network transmission (e.g. H₂S, Methane, moisture, ultrasonic, microphonic).

Critical Parameters: Conceptual Comparison

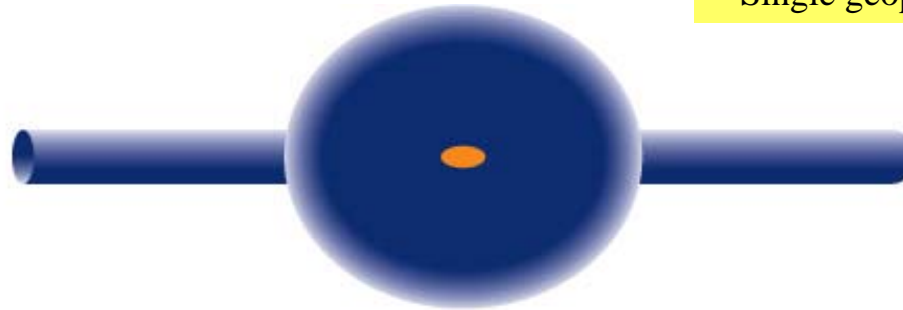
	Character	PipeGuard	Fiber-Optic cable	Trace wire
1	Intrusion identification	Very Good (>98%)	Medium - Low	None
2	Multiple event	Very good	Low	None
3	FAR (false alarm rate)	Low	Medium	Low
4	Location accuracy	High	High	Medium
5	System installation	Existing and New	New installations	N/A
6	Robustness	High. System is constructed on independent detectors	Low. Fiber-Optic cable failure compromises the entire system	Low. Wiring failure compromises the entire system

System Installation & Components

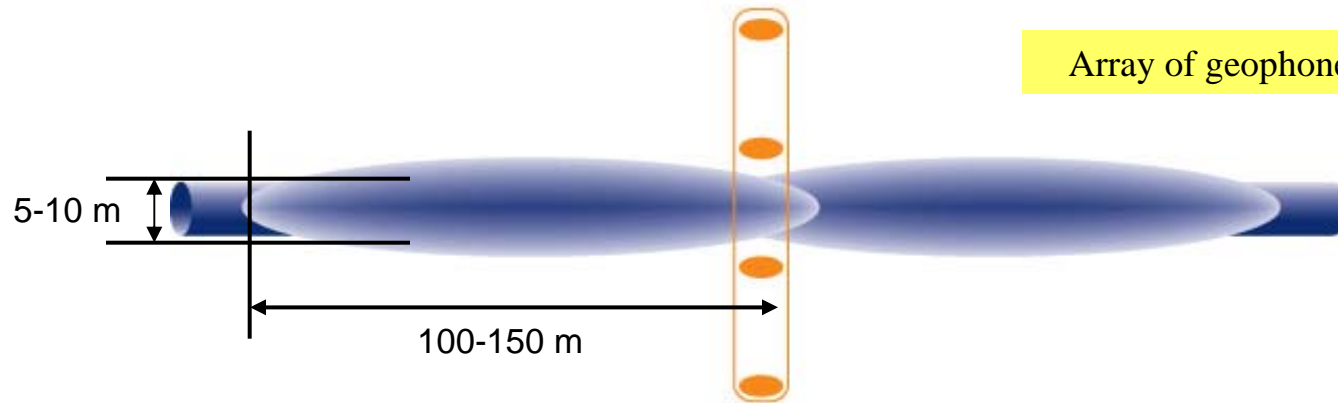


Principle of Phased Array Coverage

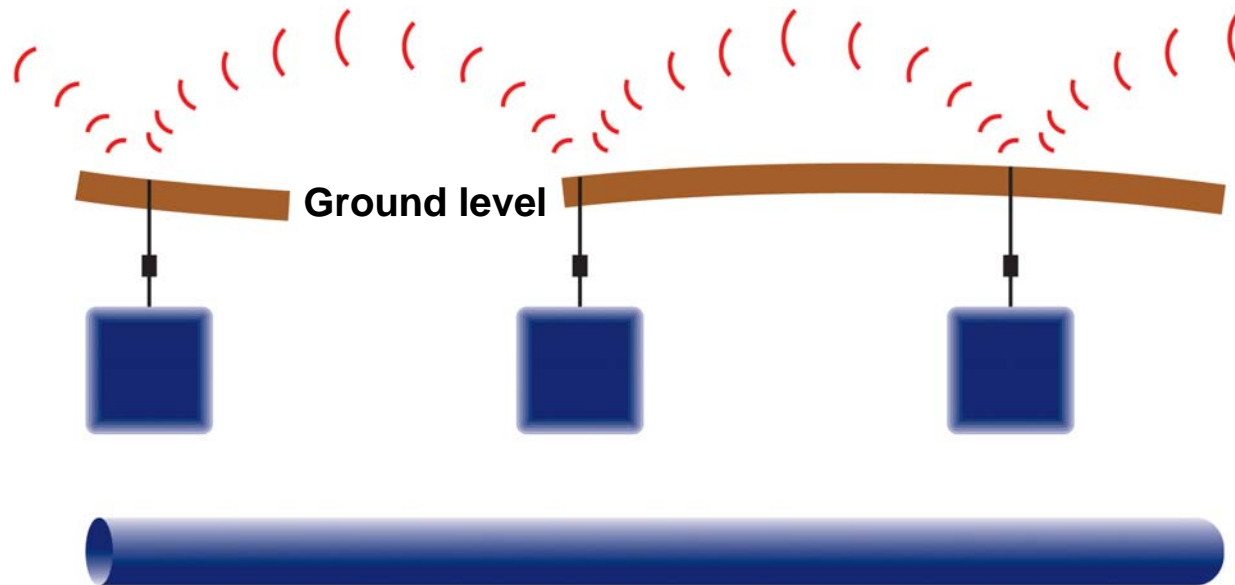
Single geophone coverage area



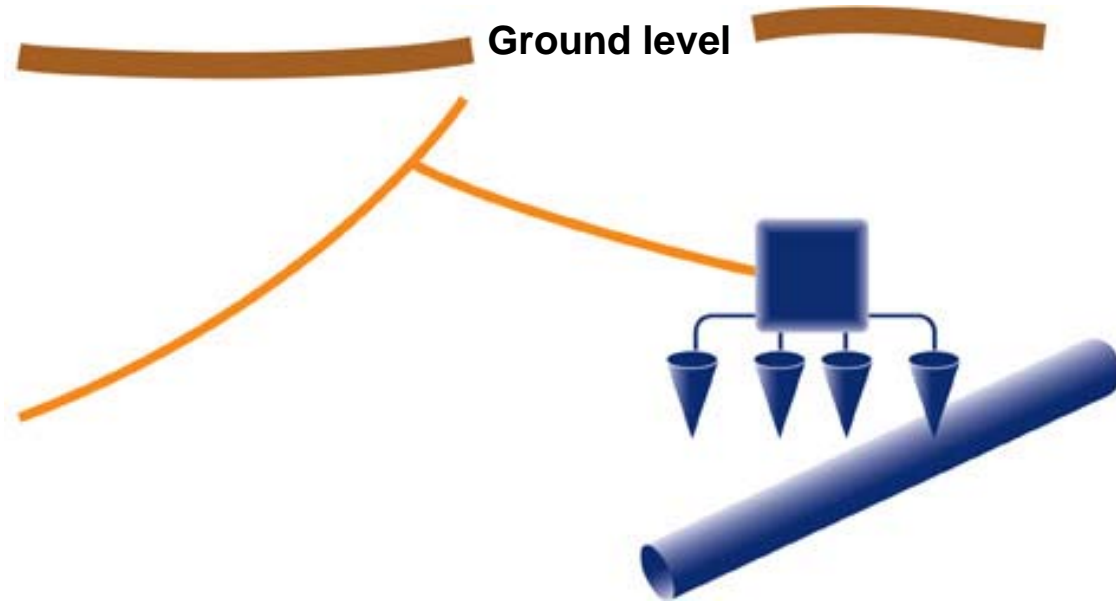
Array of geophones coverage area



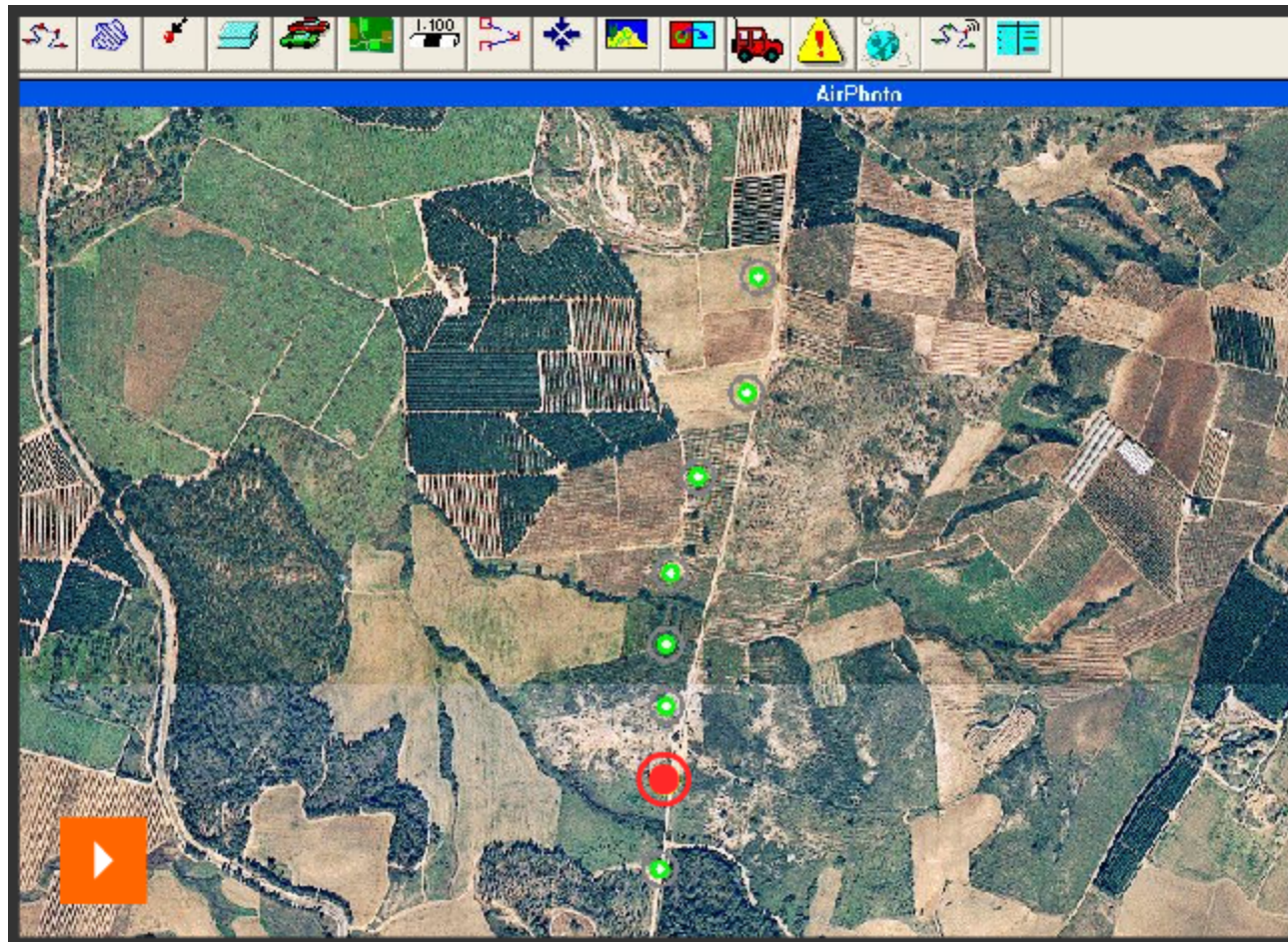
Wireless configuration concept scheme



Wire configuration concept scheme



Security Management display concept



Displayed information on the alert:

*Alert from sensor #147 : Excavation with
Confidence level of 98%*

Position is 5364/7764 (UTM)

Time of event: 12:43

Closest patrol call-sign "Charlie 21"





Summary

- **PipeGuard is the definitive solution for the longtime recognized gap in the securing of Oil & Gas pipelines.**

PipeGuard combines:

- **state-of-the-art technologies**
- **well proven hardware**
- **Real-time Security Management Display and Control**