

Core features

- Completely underground - does not interfere with site aesthetics
- Very high Probability of Detection (PD)
- Very low False Alarm Rate / Nuisance Alarm Rate (FAR / NAR)
- Tamper-proof
- Redundant and resilient mesh network
- Very low power consumption
- Robust and rugged capsulation
- Easy to install on existing pipelines compared to fiber sensors

Description

PipeGuard is a sophisticated, patent pending sub-surface intrusion detection sensor for underground asset protection.

Based on state-of-the-art embedded geophone technology, PipeGuard offers a unique tool for the protection of pipelines, communication lines, buildings and other assets from terrorism, theft and inadvertent third party digging damage.

Multiple PipeGuard sensor units can be arranged in a wired or wireless mesh network configuration to detect and report hazardous activity near the protected asset in real-time. System integration is simple; each sensor unit can be configured in about 1 minute.

Markets

PipeGuard is a robust, modular solution for detecting sub-surface threats to oil and gas pipelines, underground utilities (water, electricity, communication) and critical assets such as banks and prisons.

How it works

Basic sensing unit

Each sensor is a self-contained element, sealed in an anti-corrosion container comprised of the following elements:

Geophones - the heart of the sensor unit is an array of four geophones, which independently and redundantly detect vibrations created by digging or drilling.

Data from all four geophones are simultaneously processed in order to accurately locate the distance and direction of the vibration as well as the type of activity causing it. Accurate location technology is critical to contain an intrusion attempt and create an alarm only when the activity poses a threat and occurs within the pre-defined protected area.

Processing unit

Each unit is built around a central processing unit which manages the sensor and its communication. The processing unit compares incoming vibration signals with a database of recognized seismic activities in order to achieve a 99% PD and a very low rate of FAR / NAR alarms.

Power

Each sensing unit has low power consumption and is powered by a lithium battery pack, with a minimum five-year shelf life even in the most demanding mode (i.e. wireless communication mode).

Communication

Each sensing unit communicates with its nearby sensors through a robust mesh network, either through fiber optic cables or wireless radio communication. The wireless network is based on spread-spectrum technology that results in very low UHF power emissions, making it appropriate for most civilian and military applications.

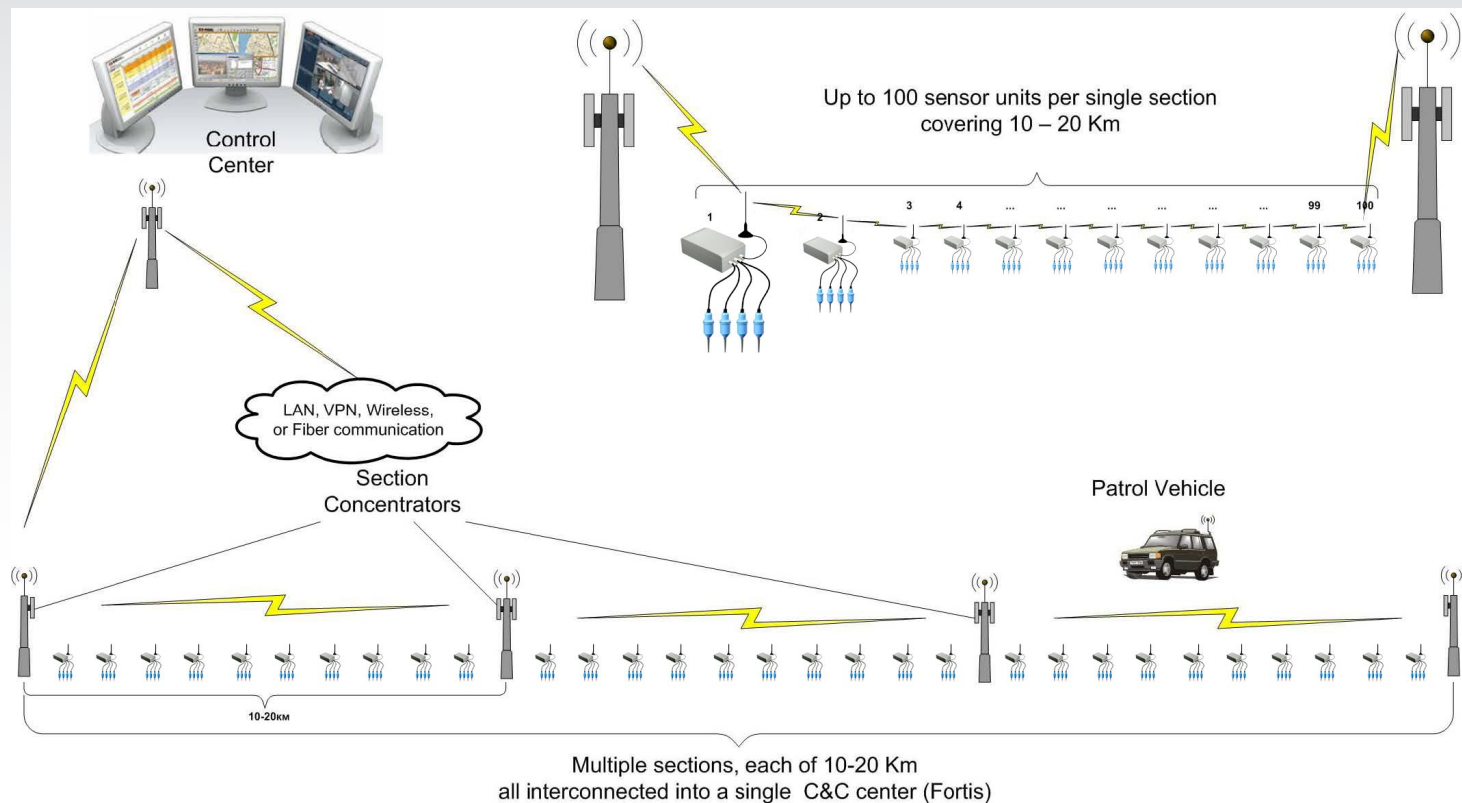
System layout

Sensor units are buried along the pipeline or close to the protected object, at any depth between the pipe / object and the ground surface. In a typical pipe protection application, each sensing unit can be installed anywhere within 10 meters on either side of the pipeline.

Each sensor unit functions autonomously but transmits alarms two and from its nearby units using a unique identifier.

All communications are eventually routed to a main control center to further manage threats detected by the system. The system is flexible enough to enable software updates of each unit remotely over the network.

Wireless system configuration



Specifications are subject to change without prior notice.