

Perimeter Intrusion Detection Solutions

p s i c o n



World Beating Perimeter Protection - Proven





Background

PSICON, the Perimeter Security and Intrusion Classification system, has been developed as the leading edge solution for intruder detection on perimeter walls and rigid railing structures, where traditional detection systems have historically failed.

Experience has shown that the combination of local environmental conditions and factors such as personnel and traffic movement, all dramatically affect the ability of a detection system to detect the intruder above the 'noise' of these types of interference. An effective intruder detection system must identify the intruder in bad weather, when traffic is passing by etc. This is where most conventional



detection systems fail. The fact is that achievement of adequate detection levels becomes prohibitively expensive because of the poor performance of conventional sensors on such structures.

With over 15 years experience of designing and supplying effective perimeter detection systems worldwide, Geoquip has for a long time recognised

these problems but, until now, has not been able to develop the perfect solution suitable for commercial release. PSICON is the result of extensive research and development which has enabled technologies to be exchanged from secret military development and applied to high level security applications.

The result is a powerful match of sensor capability and signal processing power which allows cost effective solutions to be proposed for such specialist applications.

Detection

The PSICON system is both sensitive and intelligent enough to be able to detect and identify the unique vibrations caused by such events as an intruder climbing unaided or with a ladder over walls or railings. Furthermore, while the system is detecting and identifying these events, it simultaneously identifies the environmental noise and separates this out so that the detection rate is significantly enhanced and the false alarm rate is greatly reduced.



In short PSICON is what many other perimeter intrusion devices can only aspire to.

PSICON is a flexible and versatile detection system which enables the best methods and location of detection to be selected. It is easily integrated with the structure of most walls and railings resulting in a covert, high performance detection system.



Detector string of geophones placed 3m apart, discretely positioned.

Installations

When PSICON is installed to protect walls and railings, the geophones are positioned to suit the style and aesthetics of the location. Individual zones are needed to take account of variations in the composition or structure of the wall or railing within the protected zone.

Solutions

PSICON can offer solutions for prestigious, heritage and high security sites. These locations have previously had to forfeit the chance of high security perimeters for site specific reasons which can adversely affect alternative perimeter technologies, for example trees (root or branch movement), proximity of roads or pathways, irregular layout, undulating terrain, free space and aesthetics.

The System

Each PSICON zone is made up of a detection string of robust seismic geophones and a PSICON analyser. Geophones (seismic detectors) are discrete vibration sensitive devices, which can be used alone or with others to detect vibrations on the perimeter structure.

The vibrations caused by intruder activity are converted into electrical signals which are sent to the analyser.

Geoquip's awareness of the difficulties involved in separating the signals produced by geophones stems from their unrivalled experience working with geophones in the oil exploration industry before entering the security market in 1983.



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Due to the significant overlap of hostile and benign signals when using frequency analysis and threshold detection techniques, it is virtually impossible to provide the required signal separation and classification performance using this conventional approach.

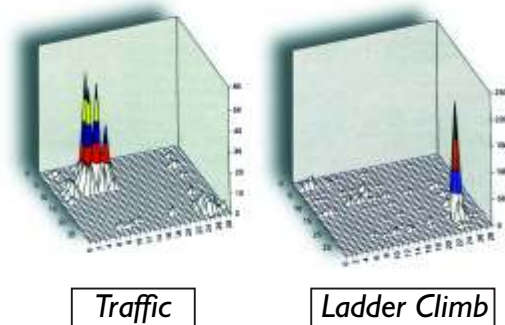
The inclusion of neural networks is rarely satisfactory due to the extensive system training and data gathering required over long periods of time and varying site conditions.

Geoquip have applied and developed the unique TESPAP signal processing technique specifically for high grade outdoor perimeter security solutions. TESPAP signal analysis, which is embodied in each PSICON analyser, incorporates technology which was first developed by the Royal Military College of Science campus of the Cranfield Institute of Technology. TESPAP provides a high level capacity for discriminating between signals caused by environmental conditions such as wind, traffic, rain, aircraft, hail, wildlife etc., and those caused by genuine intrusion attempts.

What is Tespar?

TESPAR is Time Encoded Signal Processing And Recognition.

TESPAR represents analogue waveforms produced by the geophone sensors using a series of simple numerical codes.



These codes can be translated into an appropriate mathematical model by a variety of simple matrix representations. This TESPAP matrix offers a computer-friendly image for subsequent, almost real time, comparison of events - a feature ideally suited to perimeter security.

The analysers embody pattern matching techniques in which the matrix patterns generated by 'known cause' signals are stored in non-volatile memory. These signals are compared to 'real time' signal patterns detected by the sensor string to determine whether the signals are of hostile or benign origin.

The Psicon analyser is set up on site to respond to the specific signals generated by the geophone sensors in the response to simulated activities.

Adequate 'training' data can be acquired over the course of perhaps 3 or 4 simulations of intruder activity. This compares very favourably with the hundreds of data samples required to train neural network systems.



Key Points

The PSICON system provides:

- Protection for free standing walls and ornamental railings
- A level of intruder detection never cost-effectively achieved before
- A signal processing system which can detect intruders, yet separate out environmental noise which can generate false alarms
- A retrofit solution protecting virtually all perimeters
- A system programmable for site-specific conditions
- A covert detection system providing an invisible first line of defence
- The ability to blend in with all environments combined with the most advanced perimeter detection signal processing system
- This system is the answer for sites which require the special wall-mounted capabilities that PSICON can offer. Many high level end users who have reviewed PSICON are overwhelmed with the perimeter security control it offers them without compromising the aesthetics of the protected area in any way.



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Technical Information

sensors **Technical Specification for Sensors**

General:

A discrete vibration sensitive device (geophone) used alone or with others to detect mechanical vibrations on the perimeter wall. These vibrations are converted into electrical signals. Each detector array will comprise one or more sensor units, pre-wired by the manufacturer, to match the requirements of the zone to which the detector string will be fitted. Each detector array will be terminated with a single lead-in cable to permit connection of the detector string to the signal analyser unit.

Configuration:

Geophone sensors are supplied in 'arrays' which can accommodate up to a maximum of 16 geophones. These 'arrays' are pre-wired by the manufacturer under controlled conditions to match the site requirements. Each Psicon analyser can accept a maximum of 4 sensor arrays, each of which may have a maximum of 16 geophones.

Zone length:

A fully loaded Psicon system will offer protection up to a maximum of 200 metres, given typical fence/ wall construction materials and practices.

Sensor housing:

Each geophone sensor is supplied in a galvanised steel enclosure filled with potting materials to ensure protection against moisture penetration. A flat mounting plate is provided to facilitate fixing to flat surfaces.

Sensor dimensions:

110mm width x 75mm high x 35mm depth

Operating temperature:

-40°C to +100°C

Housing material:

All discrete sensor units are fully enclosed in weather resistant rigid thermoplastic housings. Interconnecting cable entry and exit seals are fitted.

Installation:

By any Geoquip approved PSICON installer.

Warranty:

12 months from date of approved installation.

analysers **Technical Specification for Analysers**

General:

The PSICON analyser incorporates TESPAP processing for analysis of sensor signals.

The Psicon analyser is commissioned on site using a software package available to any Geoquip approved agent or installer. The analysers embody pattern matching techniques in which data patterns generated by 'known cause' signals are stored in non-volatile memory. These patterns are then compared to 'real time' signal patterns from the detector string to determine whether the signals are of 'hostile' or 'benign' origin.

The TESPAP signal analysis system is capable of being field trained to cater for specific site conditions and events. The analyser can accommodate a number of data patterns derived from 'hostile' events such as intrusions and a number of 'benign' events such as heavy traffic or vehicle related signals, aircraft or heavy weather etc.

Outputs:

The analyser units provide independent dry relay contact outputs to signal alarm detection and tamper detection conditions. A tamper condition will be signalled if the lid of the analyser is removed or the detector string is cut or bridged. The analyser incorporates a serial data port to communicate with an IBM compatible personal computer to control modes of operation and to extract and modify stored patterns of data related to specific events detected by the sensor string (set up only).

Dimensions:

400mm high x 300mm width x 200mm depth

Weight:

6KGs

Power supply:

12V DC @ 500mA

Reverse polarity protection is provided within the analyser unit.

Housing material:

Epoxy coated sheet steel complete with hinged door sealed to IP55. Cable glands supplied to suit system configuration.

Operating temperature:

-25°C to +70°C

Installation:

By any Geoquip approved PSICON installer.

Warranty:

12 months from date of approved installation.

Further information on Geoquip systems can be obtained from:

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