

## Article Overview

Buried vibration fiber optic sensors in ASEAN provide advanced perimeter and infrastructure protection using fiber optic cables to detect intrusions and environmental disturbances.

## Technology Overview

Buried vibration fiber optic sensors operate by transmitting laser pulses through fiber optic cables installed underground or along perimeters. Vibrations or disturbances caused by intrusions--such as digging, walking, or machinery--alter the light signal, which is continuously monitored by an Alarm Processing Unit (APU) using advanced algorithms to classify events and reduce false alarms (OPTEx) . Some systems, like RaySense DAS, use Distributed Acoustic Sensing (DAS) to detect and locate intrusions along the entire fiber length, providing point-specific detection without requiring physical movement of the cable itself .

## Applications

These sensors are widely deployed for critical infrastructure protection, including:

- o Energy and utilities: power plants, gas pipelines, and oil facilities
  - o Transportation hubs: airports, seaports, and railways
  - o Military and government sites: high-security perimeters and data centers
  - o Pipeline and conduit monitoring: detecting third-party interference (TPI) along buried pipelines or fiber optic data links
- Buried sensors can detect intrusions even in harsh environmental conditions, and some systems, like Senstar's FiberPatrol FP1150, can locate intrusions to within 1 meter, making them suitable for both volumetric and point-locating security applications .

## Advantages

- o Long-range coverage: Single fiber cables can monitor perimeters up to 100 km or more .
- o Reduced false alarms: Advanced signal processing and AI-based analysis distinguish between environmental noise and actual intrusion .
- o Minimal field power requirements: Many systems do not require power along the buried cable, simplifying installation .
- o Integration with security systems: Can link to video surveillance for multi-dimensional perception and enhanced alarm accuracy .

## Market Context in ASEAN

The ASEAN region is part of the broader Asian market for vibration fiber optic perimeter systems, which is projected to grow significantly due to modernization of critical infrastructure and border security programs, with Distributed Acoustic Sensing (DAS) accounting for over 55% of regional revenue . Government and defense procurement drives nearly half of the spending, followed by energy and utilities sectors . Leading manufacturers supplying ASEAN include OPTEX, FiberSensys, Senstar, and RaySense, offering solutions compliant with high-security standards and suitable for long-term deployment in challenging environments .

## Conclusion

Buried vibration fiber optic sensors in ASEAN provide highly reliable, long-range, and low-maintenance intrusion detection for critical infrastructure and high-security perimeters. By leveraging DAS technology, AI-based signal processing, and durable fiber optic cables, these systems offer precise detection, minimal false alarms, and integration with broader security networks, making them a key component of modern perimeter protection strategies in the region.

An all-fiber vibration sensor based on the Fabry-Perot interferometer (FPI) is proposed and experimentally evaluated

When an intruder moves across the ground above a buried fiber optic sensor

As such, fiber optic sensing technology (FOST) has emerged as a promising tool for underground pipeline monitoring.

DVS is an optical instrument that uses optical fiber as a sensor for vibration sensing. The system uses a

Many applications benefit from the addition of accelerometers and vibration measurements to capture dynamic phenomena. Two key

In this paper, a damage monitoring method for buried pipelines based on distributed acoustic sensing technology is

Abstract: Distributed fiber-optic vibration sensors receive extensive investigation and play a significant role in the sensor panorama.

The detection mechanism is based on laser pulses transmitted through fiber optic cables installed along fences or other perimeter

Low-cost DAS (Distributed Acoustic Sensing) technology based on fiber optic cables is a promising option

for many

The distributed long-range sensing system, using the standard telecommunication single-mode optical fiber for the

Fiber Optic Vibration Sensor for Environmental Monitoring Fiber optic vibration sensors that use existing fiber optic cables laid for

The Asia Vibration Fiber Optic Perimeter Alarm System market encompasses distributed and point-based sensing

What are Buried Fiber Optic Sensors? When an intruder moves across the ground above a buried fiber optic sensor cable, whether

Abstract: We report detection-localization-identification of true mechanical events on a buried fiber cable up to 82km SSMF using a

Perimeter alarm demand surges across Southeast Asia as maritime patrol upgrades drive urgent procurement of

The proposal uses fiber optics to measure vibrations in a PVC beam. It evaluates single-mode and multi-mode fibers, measuring

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