APSENSING.

# Airport Monitoring Using Fiber Optic Sensing Technology

The Challenge

In an interconnected world, the smooth operation of airports forms a central basis for the growth and prosperity of our society. Recent events have demonstrated how vulnerable key hubs are to acts of sabotage. In times of great tension, targeted attacks on our critical airport infrastructures are no longer mere theory. It is therefore a societal responsibility and in the interest of operators to take effective measures that can ward off such attacks. In doing so, the challenge is to effectively and meaningfully monitor the diverse and expansive infrastructure of airports.

The Innovation

In the human body, a complex nervous system transmits signals that enable us to feel touch or pain. Distributed fiber optic sensing [Distributed Temperature Sensing (DTS); Distributed Acoustic Sensing (DAS)] uses optical fibers that run parallel to airport infrastructures and, analogous to a nervous system, enable the detection, localization and classification of attacks on runways, pipelines, power cables, railroads or telecommunications infrastructure. Unusual activity is detected, alerted, and located over

very long ranges of up to 70 km, with meter accuracy and in real time, enabling immediate countermeasures and helping to prevent major damage and apprend the perpetrators. The recorded and stored data can also make a valuable contribution in the forensic processing of acts of sabotage.
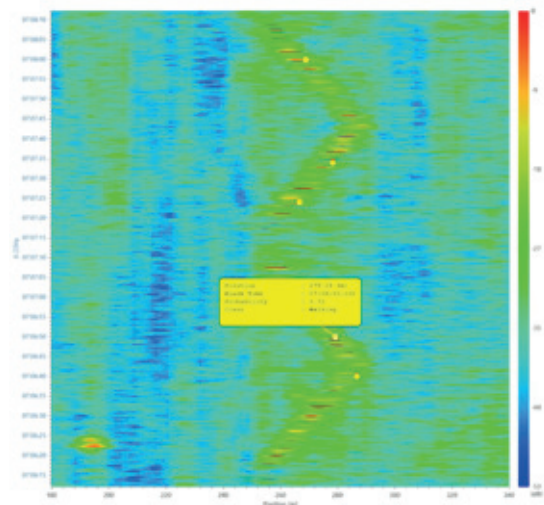
Outward and return journey of a person along the buried area of a fence using DAS technology from AP Sensing

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AP Sensing's solutions make the movement of objects such as cars, machines and even people visible and thus trackable. Excavation work such as tunneling, shoveling, digging and the opening of shafts are localized with meter precision and detected in real time. In this way, AP Sensing's solutions help to accurately assess the situation and protect infrastructure networks.

Software developed specifically for this purpose uses machine learning (ML) and artificial intelligence (AI) techniques to process and analyze measurements from our DAS instruments. AI enables intruder detection by analyzing the vibration patterns that certain activities - such as climbing over fences, cutting fences, shoveling, digging, vehicle movement - have on the environment.

The Solution

AP Sensing's system is a true phase-based DAS that provides quantitative measurements of vibration, acoustic signals, and temperature changes over long distances along a simple fiber optic cable.

Our 2P Squared DAS technology works like a chain of thousands of microphones with a range of over 70 km. Each acoustic event is localized and analyzed in real time with an accuracy of a few meters. In conjunction with highly specialized algorithms, the system decides whether the event poses a threat to the object.

Reliable & Effective

AP Sensing's comprehensive monitoring solution for critical airport infrastructure provides an effective way to minimize operational risks caused by attacks. Real-time detection and precise localization of such events enables rapid identification of the attacker and immediate mobilization of countermeasures. AP Sensing's distributed fiber optic sensing solutions are deployed by over 600 customers in 70 countries. More than 5000 installed systems already protect vital elements of modern infrastructure worldwide.
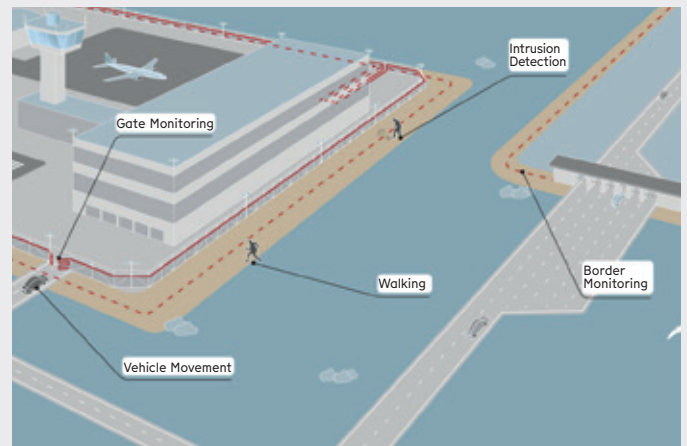
made in Germany | c UL us LISTED | SIL✓ IEC 61508 / IEC 61511 | ⟨Ex⟩ | VdS | FM APPROVED | Passion for Plants. For every unit sold, AP Sensing plants 100 trees.

Why AP Sensing?

- Industry-leading monitoring solution with state- of-the-art fiber optic technology and cutting-edge AI algorithms for superior performance.
- Best measurement results through unique technologies such as 2P Squared Distributed Acoustic Sensing (DAS) and our code-correlated Distributed Temperature Sensing (DTS) technology.
- Monitoring over long distances of up to 70 km, localizing all acoustic and vibration events along a simple optical fiber in real time.
- Detection and classification of various events such as fence climbing, fence cutting, and digging activities. Tracking of people and vehicles.
- Experienced, global leader in perimeter, power cable, pipeline, and transportation infrastructure monitoring systems.
- Designed, developed and manufactured in Germany.

THINKING AHEAD