



APAC SURVEILLANCE

FIBRE OPTIC RAIL MONITORING

SENSTAR®



Western Australia's **expansion of mining rail network—particularly in the Pilbara region, is considered a strategic infrastructure asset of national importance.**

Western Australia's expansive mining rail networks, particularly in the Pilbara region, are considered national critical infrastructure with high vulnerability to both physical and digital sabotage due to their remote locations, vast distances, and increasing reliance on automation.

While physically robust, the network's exposure stems from its high economic value, isolated nature, and reliance on complex, interconnected operational technology.



These rail systems are essential for transporting iron ore, the country's largest export commodity by value and weight, from inland mines to ports at Dampier and Port Hedland for global export, our '[Fiber Patrol](#)' systems can be utilized as a critical component of modern, autonomous, and secure mining logistics sabotage.

Key aspects of fiber optic monitoring on WA's mining rails include:

Technology Application (DAS): Distributed Acoustic Sensing (DAS) uses existing or specialized fiber optic cables to detect acoustic vibrations and strain changes (e.g., foot traffic, train movement, machinery, or cutting tools) on the tracks.

High-Risk Coverage: Fiber optics are frequently used to monitor high-value, critical infrastructure, such as automated train routes in the Pilbara, to detect intrusions, ground movement, or potential sabotage.

Capacity: A single fiber optic cable can monitor up to 80-100 km of infrastructure.

Industry Drivers: Major miners like Rio Tinto, BHP, and Fortescue (FMG) are transitioning towards autonomous operations, which necessitate high-fidelity monitoring to protect assets from accidents or intentional disruptions.

FIBER PATROL

How It Works

FiberPatrol works by transmitting pulses of laser light into a single-mode optical fiber and accurately measuring the minute light reflections that occur along its length.

Features and Benefits

- Detect and locate perimeter intrusions over a distance of up to 80 km (Processor at every ± 80 km)
- Pinpoint intrusions with a ± 4 m (13 ft) accuracy
- Accurate locating of multiple simultaneous intrusions
- Sensor cable continues to operate up to the point of a cut
- Dual sensor channels
- 100% operational after a cable cut in cut immune configuration; maximum perimeter 40 km (24.8 mi)
- Classification algorithms for fence-climb, fence-cut, manual digging, machine digging, engine noise, and vehicle motion
- High Probability of Detection (Pd) and low Nuisance Alarm Rate (NAR)
- Up to 1,440 software-configurable detection zones
- No outdoor power, grounding, or communication infrastructure required
- EMI and lightning immune
- Field components intrinsically safe
- Alarms reported by zone number, cable distance and/or GPS coordinates
- Multiple options for integration with SMS, VMS and PSIM platforms
- Easy to install and maintain - nothing outside but fiber-optic cable
- Can host Senstar Network Manager to minimize cyber vulnerabilities
- Possible to use sensor cable with fire ratings such as LSZH, fire retardant, and fire resistant

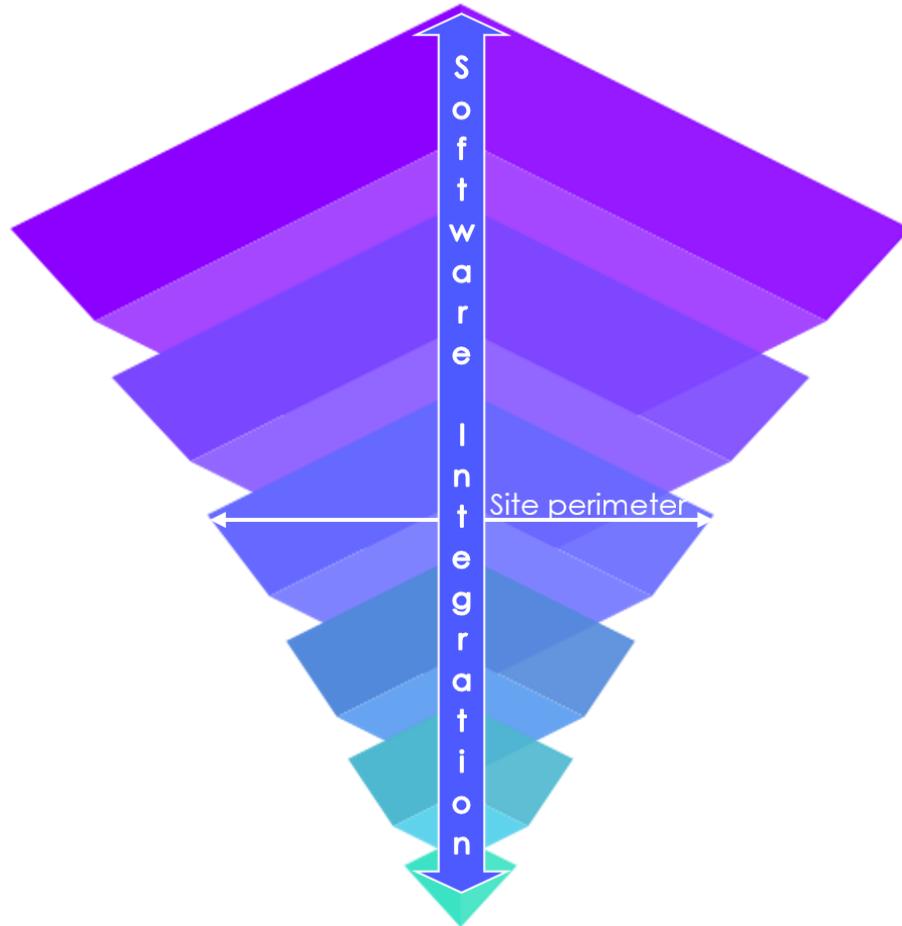
A disturbance of the fiber caused by ground vibrations changes the amount of light returned from that point. FiberPatrol's reflectometry-based technology does not require the light to traverse the full length of cable. If a cable is cut, FiberPatrol retains the ability to detect and locate intrusions up to the point of the cut, thus enabling the system to support cut-immune configurations.

Train safely stopped

Sand drift over rails



Mine security envelope risk analysis



System	Requirement driver
Drone Overcover (24/7 drone monitoring controlled by mine security drone pilots)	High risk / volatile, quasi war zone. (Highly recommended)
Counter 'unfriendly' drone systems / radar & LR Cameras. URS (Unmanned Remote Sensors)	High risk / volatile, quasi war zone with evident threats or investigations.
Fenceline monitoring – Fibre / APVs	High likelihood of perimeter incursions for theft for malicious damage
Inward facing 'CCTV' / AI camera systems	Useful for security but also for vehicle tracking / H&S etc.
Physical manned patrols	Risk analysis dependent
Site access controls	X-Ray, scanning, 'sniffing' for drugs , explosives etc. Risk analysis dependent

CAPABILITIES

- Containerised x-ray/ baggage scanning
- Ultra Long-range radar and cameras (30km)
- Fiber optic perimeter monitoring
- LIDAR camera systems
- Drone observation and patrol
- Counter drone systems
- Unmanned networked ground sensors
- Amphibious boats

Perth based, global capability

www.apacsurveillance.com

