SENSTAR

Physical Security Technologies for Airports
Intelligent. Innovative. Integrated.

Agenda

About Senstar

Security Challenges

Application Solutions

Senstar Products

Deployment Examples

System Integration

Conclusion

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Overview

With intelligent video management, video analytics, access control, and innovative perimeter intrusion detection systems, Senstar offers a comprehensive suite of proven, integrated technologies.

PIDS Facts	VMS Facts
35+ years experience	18+ years experience
50,000+ km of installed sensors	25,000 VMS deployments
World-wide service and support	World-wide service and support
World's largest privately owned PIDS test facility (harsh environment)	Leader in intelligent video management solutions
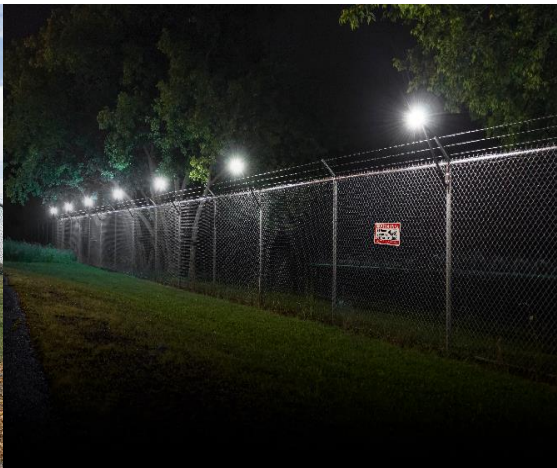
Global Reach, Local Support

Headquarters, manufacturing & sensor development:
Ottawa, Canada

Video and SMS development:
Waterloo, Canada

350+ employees worldwide,
150 technical staff

Strong balance sheet, cash on hand, no debt

Proven track record for long-term stability and support

Map labels: Sweden, UK, Germany, Netherlands, France, Spain, Israel, China, USA, Canada, Mexico, UAE, Malaysia, Philippines, Singapore, Brazil

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Security Challenges

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Physical Security Challenges

Perimeter Security

- Large, complex perimeters

- Interior zones with additional security (e.g. fuel depot)

- Controlling access over large areas

Internal Security

- High volume of traffic 24/7

- Large facilities with high camera counts

- Controlled movement

Surveillance footage of a FiberPatrol fiber optic perimeter intrusion system detecting an intrusion attempt and reporting the location to the Symphony VMS
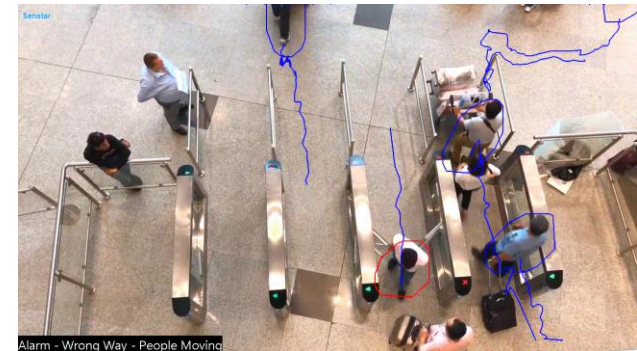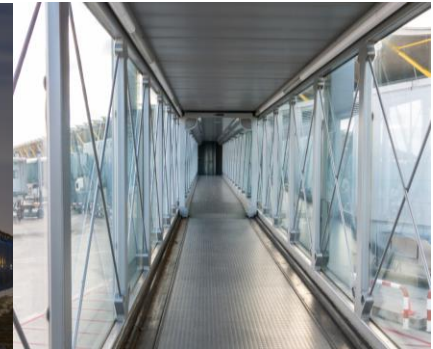

Example of Senstar's people tracking video analytic generating an alarm to indicate a potential security violation

Airport Security Concerns and Opportunities

- Government regulations
- Budgetary concerns
- Reliability and scalability of systems
- Training concerns
- Leverage security investment to improve operational efficiencies

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Application Solutions

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Perimeter Physical Security

Requirement	• Regulatory compliance • Public safety • Flexible coverage • Scale to meet different site sizes • Accurate zone detection • Support video event verification
Site characteristics	• Heavy use of outdoor lighting • Multi-layered approach • Long fence lines • 24x7 operation

FlexZone

Fence-mounted locating sensor:

- Flexible and affordable
- Scalable for any size of perimeter

FiberPatrol FP1150

Fence-mounted fiber optic sensor:

- Large perimeters
- Non-conducting, lightning immune

Buried Sensors

Covert sensor generating an invisible detection field:

- Ideal for monitoring sensitive areas within the apron that are not fenced in

Senstar LM100

2-in-1 intrusion detection and lighting solution:

- Deter and detect intruders
- Dark-Sky compliant

Symphony VMS

Scalable, affordable video management:

- People and vehicle tracking
- Face recognition and ALPR
- Centralized monitoring
- Integrated sensor and access control events

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Gate Protection

Requirement	• Regulatory compliance
	• Public safety
	• Track authorized vehicles
Site characteristics	• Mix of technologies required
	• Multi-layer potential
	• Swinging or sliding gate types
	• Manned/unmanned gates

FlexZone, FiberPatrol

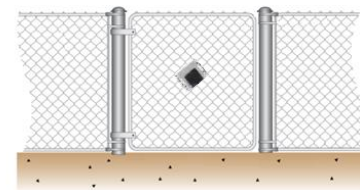Fence-mounted locating sensors:

- Highly effective on swinging gates
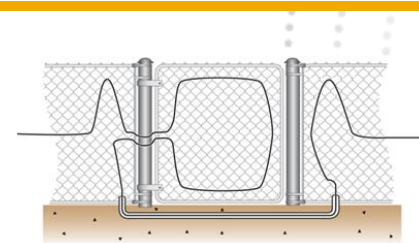
FlexZone cable protecting swinging gates

Wireless Gate Sensor

- No infrastructure required at gate
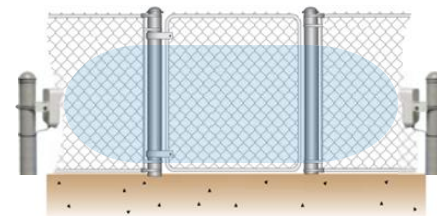- Ideal for sliding gates
- Easy to install, minimal maintenance

Wireless Gate Sensor

UltraWave

Bi-static microwave volumetric sensor

- Works in all weather conditions
- Monitor open areas


Microwave Sensor

Video Analytics

- Track people and vehicles
- Use license plate recognition for improving security and operational efficiency

Facility Security

Requirement	• Identify suspicious activity • Control egress points • Respond immediately to security events • Collect evidence for post-event investigations
Site characteristics	• 24x7 operations • High daily inbound and outbound volumes • Centralized security office • Staff distributed over wide area
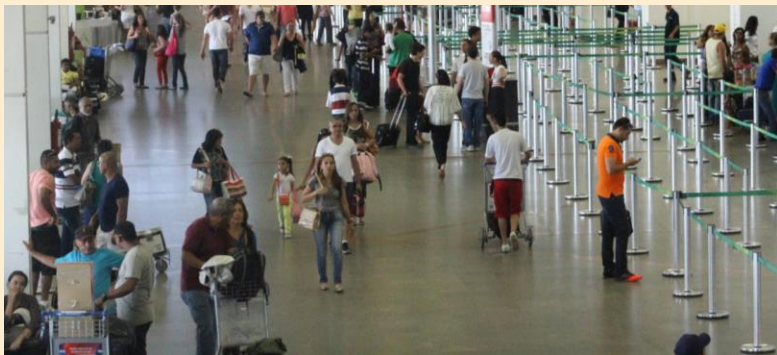
Symphony Video Management

- Support hundreds or thousands of cameras placed strategically throughout the premises
- Centralized security center with video wall and dedicated monitoring stations
- View-only displays + mobile alerts for distributed staff

Indoor/Outdoor People Tracking Analytics

- Alarm zones and virtual fences
- Wrong-way detection
- Crowd detection
- Left/removed item detection
- Hotspots/heat maps
- Face recognition (compare against authorized/alert lists)

Logistics: Air Freight ULD Container Tracking

Requirement	• Track and video verify air cargo ULD (Unit Load Device) containers
	• Provide video evidence to help Identify:
	   • Improperly routed containers
	   • Container damage and how it occurred
	   • Last known location of lost containers
	• Drastically reduce investigation times

Site characteristics	• 24x7 operations • Large air cargo distribution facility • High daily inbound and outbound volumes

Symphony VMS and Analytics

- Cameras placed strategically throughout the premises
- ULD container unique identification numbers are recognized and stored as XML by Symphony video analytic
- ULD identification captured at camera checkpoints
- Possible to track and video verify the path of a ULD device within the facility using checkpoints

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Senstar Products

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FlexZone

Description

- Sensor cable attaches directly to surface (fence, wall, or building structure)
- Alarms reported by zone and cable distance (±3 m)
- Cost-effective for small sites but scalable for all sites
- Up to 600 m (1968 ft) of coverage per processor
- Up to 60 reporting zones per processor

Key Benefits

- Low cost, easy to install
- Works with virtually all fence types
- Reduced infrastructure (power & comms over sensor)
- Software-defined zones
- Ranging minimizes weather-generated nuisance alarms, assists in locating problematic areas (e.g. loose fence fabric or sign)

FlexZone Technical Details

Main Features

- Detect and locate intrusions (600 m/1968 ft per processor)
- Pinpoint intrusions to within ±3 m (10 ft)
- Sensor cable in standard and armored versions
- Available in two models:
  - FlexZone-4: 4 software-defined zones, zone-reporting
 - FlexZone-60: 60 software-defined zones, location-reporting

Environment Specs

- Weather: –40 to 70 °C (–40 to 158 °F), 100% humidity
- Rugged all-weather hinged aluminum UL enclosure, NEMA Type 4X (IP66)
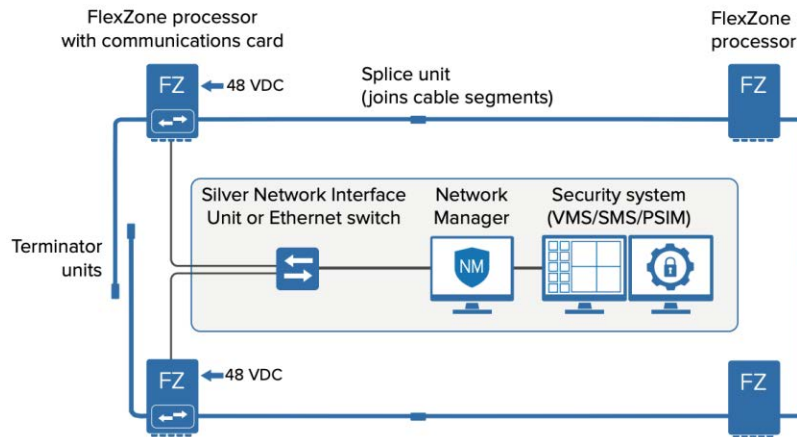
Electrical Specs

- Low power (<2.5W), PoE support via Ethernet card
- Up to 5 processors per power supply (power over sensor cables)

Networking Specs

- Communications over sensor cable reduces network infrastructure
- Ethernet, RS-422 and fiber communication card options
- Common integration interfaces (API, ASCII, or I/O)
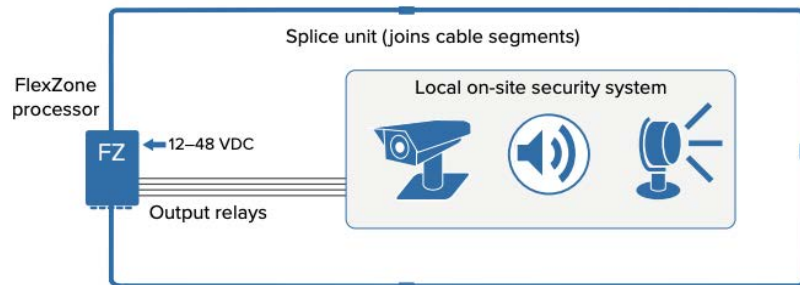
Output Relay Integration

Networked Integration

FiberPatrol FP1150

Description

- Fiber optic sensor suitable for fence, wall, and buried applications
- Alarms reported by zone, cable distance or GPS (±4 m)
- Ideal for large sites, borders, and buried pipelines
- Up to 100 km (62.1 mi) of coverage per processor

Key Benefits

- No powered or conductive components in field
- EMI and lightning immune
- Unused fibers can be reused for other applications (e.g. communications), 25+ year cable service life
- Cut-immune configuration

FiberPatrol FP1150 Technical Details

Main Features

- Detect and locate intrusions:
  - Fence, wall, and buried perimeter applications: Up to 80 km (49.7 mi) per processor
  - TPI applications: Up to 100 km (62.1 mi) per processor
- Pinpoint intrusions to within ±4 m (15 ft)
- Up to 1440 software-defined detection zones
- Sensor cable in standard and armored versions
- Cut-immune configuration: locates up to point of cable cut
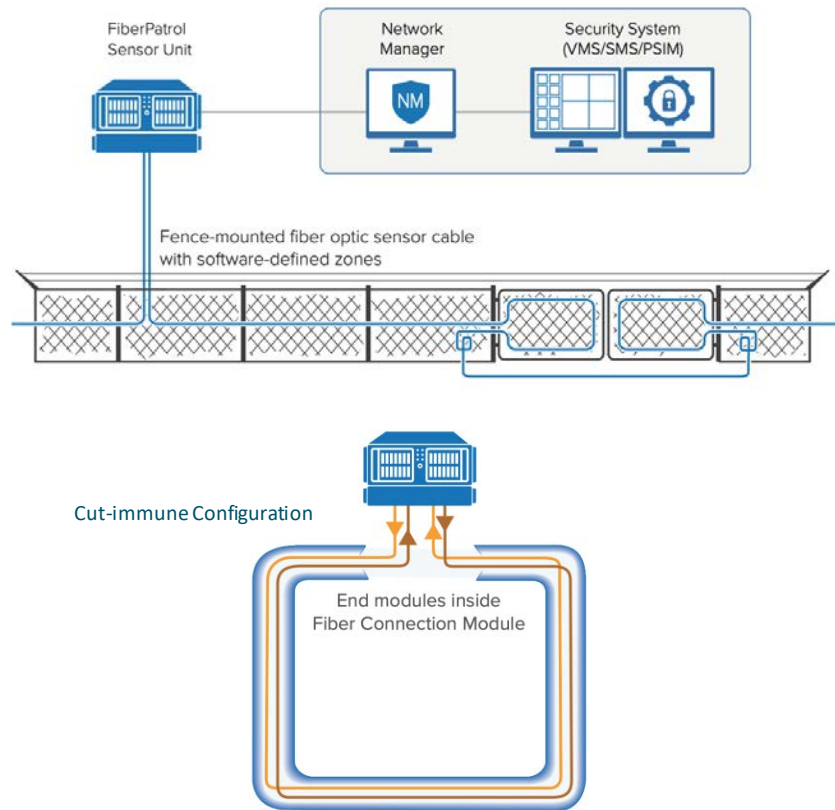- 4U height, 19-inch rack-mount Sensor Unit

Environment Specs

- All-weather sensor cable: –40 to 70 °C (–40 to 158 °F)
- Sensor unit: 0 to 50 °C (32 to 122 °F), humidity 20–80% non-condensing

Electrical Specs

- Dual redundant power supplies
- Consumption: 200W max

Networking Specs

- Dual Gigabit Ethernet
- Common integration interfaces (API, ASCII, or I/O)

FiberPatrol Sensor Unit — Network Manager — Security System (VMS/SMS/PSIM)

Fence-mounted fiber optic sensor cable with software-defined zones

Cut-immune Configuration

End modules inside Fiber Connection Module
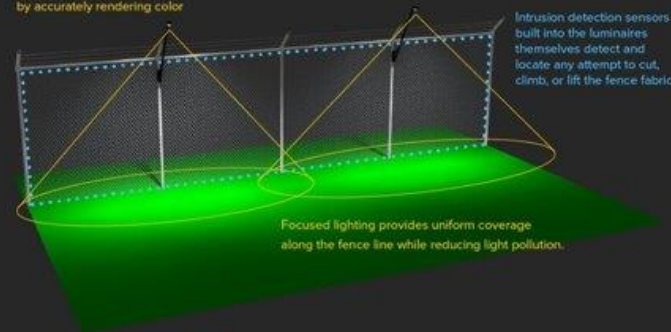
Senstar LM100

Description

- Hybrid perimeter intrusion detection and intelligent lighting solution
- Accelerometer embedded in luminaire provides detection function – locates alarms to the luminaire
- Optimized optics provide uniform, full spectrum, LED-based lighting
- Lighting is programmable based on sensor alarms and schedule

Key Benefits

- Integrated deterrence capabilities
- Save up to 95% in lighting operational/maintenance costs
- Encrypted wireless mesh network eliminates need for communications wiring

LED-based lighting with a high CRI enhances video quality by accurately rendering color

Intrusion detection sensors built into the luminaires themselves detect and locate any attempt to cut, climb, or lift the fence fabric

Focused lighting provides uniform coverage along the fence line while reducing light pollution.

Senstar LM100 Technical Details

Main Features

- Detect intrusions to closest luminaire
- Supports any fence height, spaced 3 to 6 m (10 to 20 ft) apart
- Programmable schedule and light intensity
- Settings may be applied to all, zone-specific, or individual luminaires

LED Specs

- Brightness: 53 lux per luminaire (163 total lumens generated)
- Instant-on illumination and strobing

Environment Specs

- Weather: –40 to 70 °C (–40 to 158 °F), 100% humidity
- Rugged all-weather hinged aluminum UL enclosure, NEMA Type 4X (IP66)

Electrical Specs

- Consumption: 2.5W per luminaire
- Wiring: 14 or 16 AWG, 2-wire

Networking Specs

- Encrypted wireless mesh eliminates on-fence communications wiring
- Ethernet, RS-422 and fiber communication card options
- Common integration interfaces (API, ASCII, or I/O)
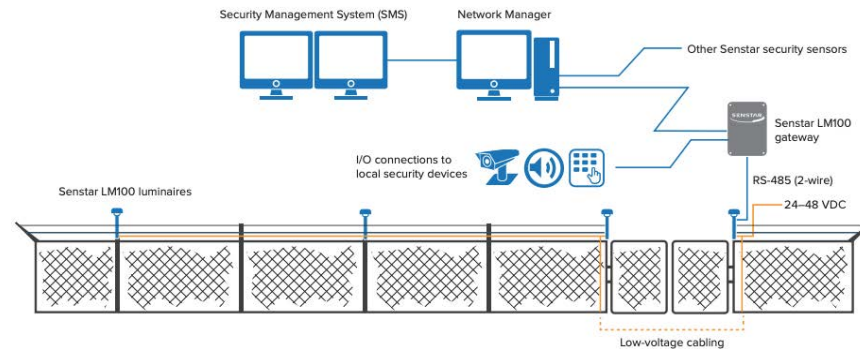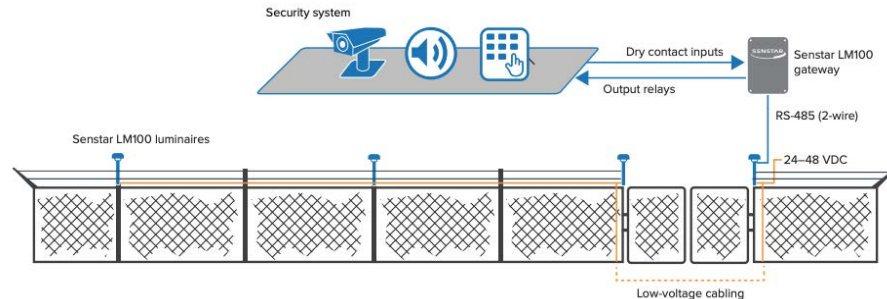
OmniTrax

Description

- Covert, buried sensor cable generates detection field
- Alarms reported by zone and cable distance (±1 m)
- Ideal for small and medium sites
- Up to 800 m (1/2 mile) of coverage per processor

Key Benefits

- Ranging capability
- Terrain-following and covert installation
- Works in virtually any type of material
- Active volumetric detection
- Reduced infrastructure (power & comms over sensor)
- Software-defined zones

OmniTrax Technical Details

Main Features

- Detect and locate intrusions (800 m / 0.5 mile per processor)
- Pinpoint intrusions to within ±1 m (3.3 ft)
- Sensor cable available in 3 versions

Environment Specs

- Weather: –40 to 70 °C (–40 to 158 °F)
- Rugged all-weather hinged aluminum CSA/UL enclosure, NEMA Type 4X (IP33)

Electrical Specs

- Power requirement per processor (9W)
- Up to 5 processors per power supply (power over sensor cables)

Networking Specs

- Communications over sensor cable reduces network infrastructure
- RS-422 and fiber communication card options
- Common integration interfaces (API, ASCII, or I/O)

Networked Integration
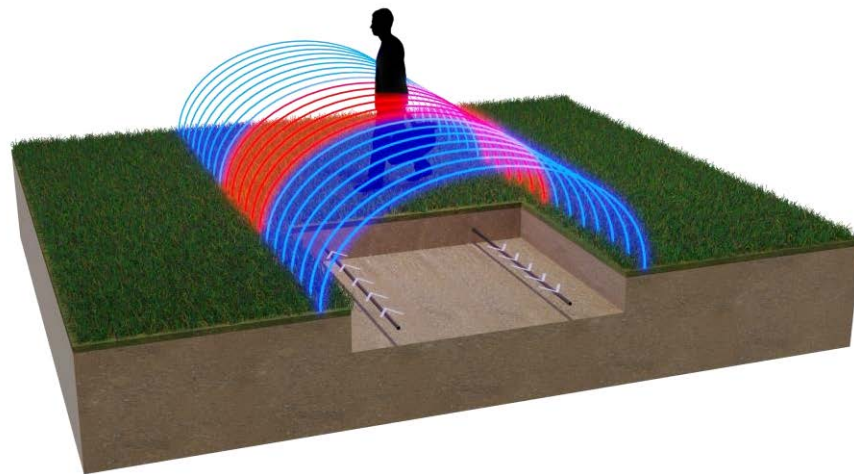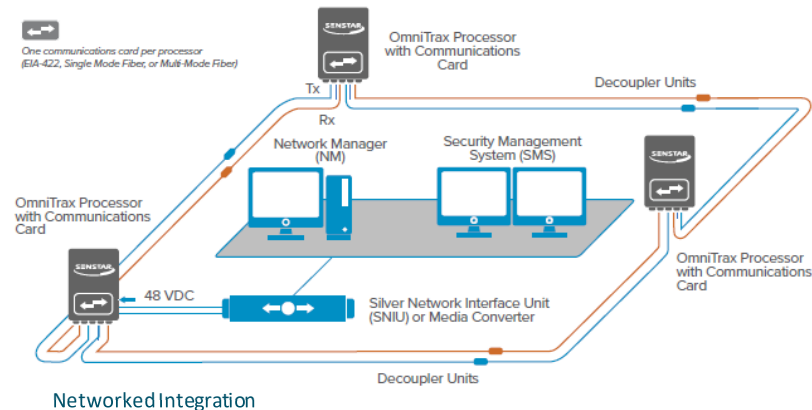
Gate and Gap-Fill Solutions

Wireless Gate Sensor

- Detects movement and/or vibration on gates and doors of all times
- Includes auxiliary input to monitor status of gate contact
- Available in solar powered and battery-only versions

UltraWave Microwave Sensor

- A fully digital bi-static microwave sensor that generates a cigar-shaped field between a Tx/Rx pair (up to 200 m or 656 ft)
- Ideal for gates, open areas and security backfill
- Reliable detection in all weather conditions, including rain, fog and snow

Wireless Gate Sensor Technical Details

Main Features

- Accelerometer analyzes vibration, motion, and position data
- Compatible with virtually all gate types (swinging, lifting, sliding (cantilever), garage, etc.)
- Compatible with FlexZone and Senstar LM100 (up to 4 WGS per processor)
- Solar panel and battery-only versions
- Reports intrusion, supervision, RF link, and auxiliary input alarms

Environment Specs

- Weather: –40 to 70 °C (–40 to 158 °F), 100% humidity
- Rugged all-weather acrylic casing, NEMA Type 4X (IP66)

Electrical Specs

- Solar panel version:
    - Eliminates need to replace batteries
    - Super capacitor design eliminates battery memory or cycle life limitations
    - On-board emergency power
- Battery version:
    - 1.5V "D" battery, approximately 1 year of operation

Networking Specs

- Encrypted 128-bit wireless link to receiver card
- Unlicensed operation in regional ISM band
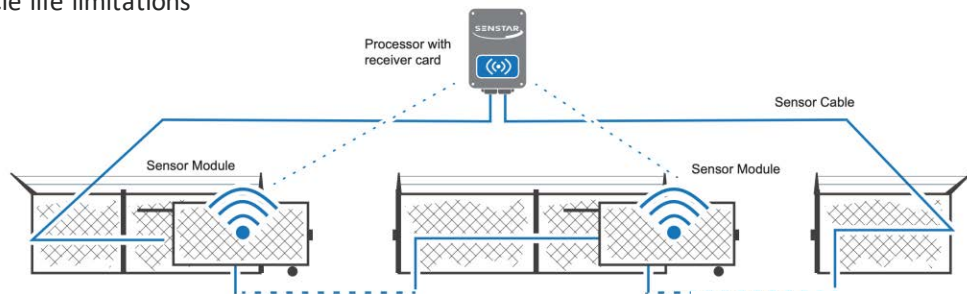
UltraWave Technical Details

Main Features

- Detection range:
    - Walking target: 5 to 200 m (16 to 656 ft)
    - Crawling target: 5 to 150 m (16 to 492 ft)
    - Commando roll: 5 to 100 m (16 to 328 ft)
- Clear zone with total width of 4% of the Tx-Rx separation distance required
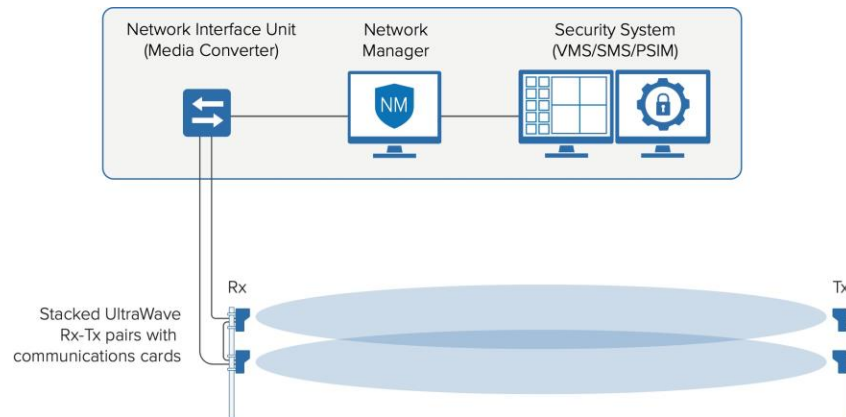
Environment Specs

- Weather: –40 to 70 °C (–40 to 158 °F), 100% humidity
- High-impact ABS plastic, marine white enclosures

Electrical Specs

- Low power: Transmitter 1.5W, Receiver 2.6W

Networking Specs

- Wireless link between Transmitter and Receiver reduces cabling
- Ethernet, RS-422 and fiber communication card options
- Common integration interfaces (API, ASCII, or I/O)

Network Interface Unit (Media Converter)

Network Manager

Security System (VMS/SMS/PSIM)

NM

Stacked UltraWave Rx-Tx pairs with communications cards

Rx

Tx

Symphony Common Operating Platform

- Scalable, high-performance open architecture
- Integrated alarm management and on-screen controls for cameras, two-way audio, perimeter intrusion, access control, and I/O devices
- Built-in video analytics
- Intelligent video search via metadata
- Intuitive Windows®, web, mobile and thin client interfaces
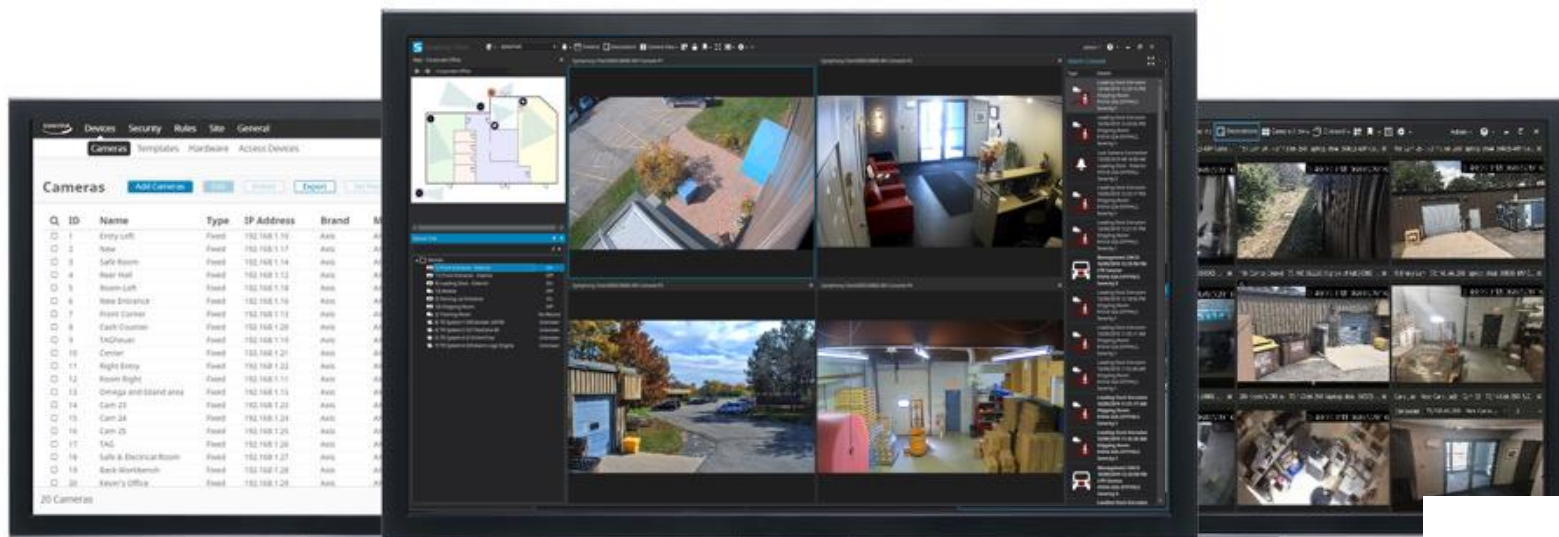
Symphony Architecture: Scalable and Open

Symphony installs on off-the-shelf hardware, supports thousands of network devices as well as industry standards (ONVIF profiles S and G), and is designed to have a low server footprint.

- Multi-server architecture (no separate management or analytic servers, one installation package)
- Embedded failover (no need for Windows® Clustering)
- Licensed per-camera, not by individual servers or workstations

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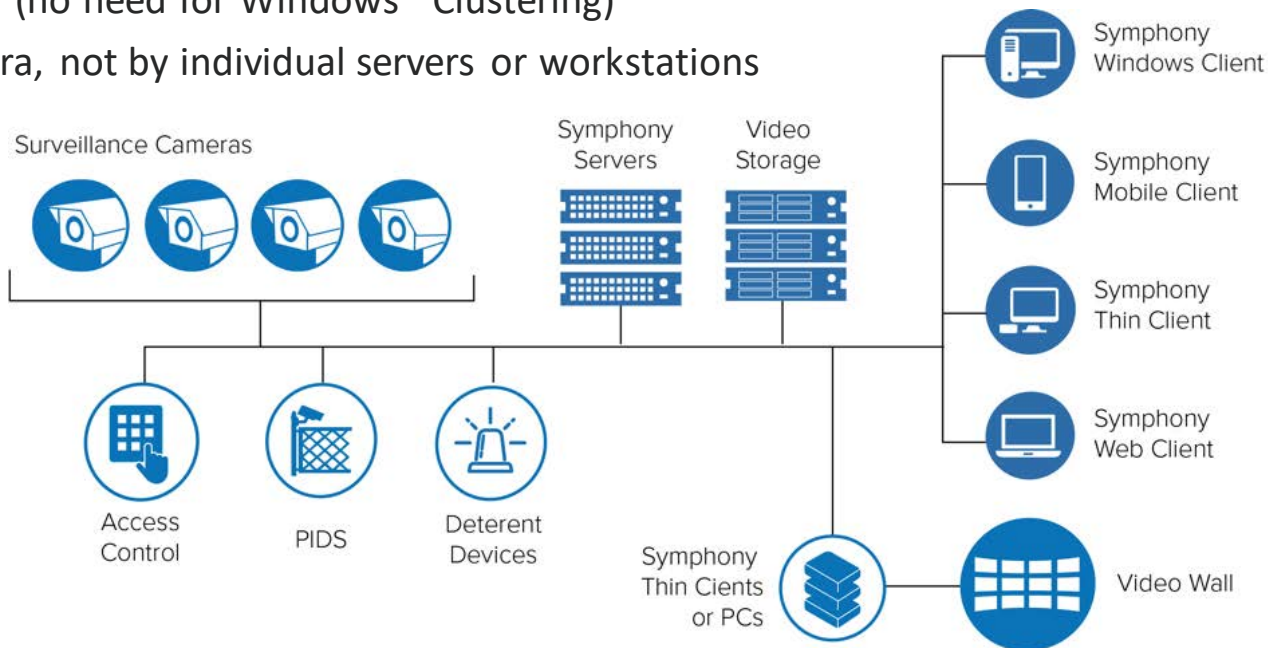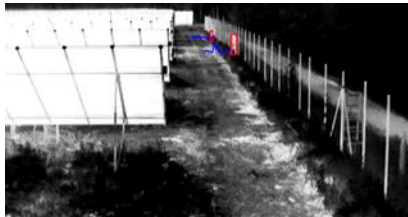
Video Analytics

- Video analytics can be enabled in real-time without additional servers

- Server or edge-based

- Licenses are movable from one camera to another

- Server-based analytics work with virtually all cameras, including low-light and thermal

Senstar Analytics (1 of 2)

Analytic	Description	Applications	Example
Camera Tampering	Detects if video has been compromised through view obstruction or position-altering	Detecting camera tampering	
Signal Loss	Detects if analog video input is one solid color, which may indicate signal loss	Detecting video loss with analog cameras/encoders	
Outdoor Tracking	Robust outdoor person and vehicle tracking for dynamic outdoor environments. Unlike simple motion detection, analytic compensates for weather, shadows, and small objects. Can be used a trigger for active deterrent devices, including the Senstar LM100 and 2-way intercoms	Tripwire, alarm zone, loitering, and people counting for outdoor environments	
Auto-PTZ	Performs auto-tracking. Requires event trigger for initial object detection (e.g. via Outdoor Tracking analytic). Enables operators to perform other tasks during security events Maximizes functionality of PTZ cameras	Alarm trigger	

Senstar Analytics (2 of 2)

Analytic	Description	Applications	Example
Left and Removed Item Detection	Detects left/removed items based on user-defined min/max object size	Detecting left or removed objects	
ALPR	Detects and captures license plates	License plate detection	
Face Recognition	Detects faces and compares against allow/disallow lists	Two-factor authentication processes for access control	

Thin Client

Description

- Network video display appliance
- Decodes and displays up 16 live video streams
- Compatible with ONVIF Profile S and RTSP camera streams
- When paired with Symphony, provides playback, export, and video wall functions

Key Benefits

- Easy to install and use
- Compact, durable, fanless design
- Powered via PoE
- Manage locally or remotely
- Touchscreen, mouse and mobile app support (no keyboard required)
- Supports Symphony privacy controls

Thin Client Technical Details

Main Features

- Video output: HDMI 1080p (cable included)
- Supported layouts: 1: 1920 x 1080 @ 25 fps, 2: 960 x 1080 @ 25 fps, 4: 960 x 540 @ 25 fps, 6: 640 x 540 @ 20 fps, 9: 640x 360 @ 20 fps, 12: 480 x 360 @ 10 fps, 16: 480 x 270 @ 10 fps
- ONVIF Profile S and RTSP support
- One-way audio (from audio-capable cameras)
- Video playback, export, and video wall functions (via Symphony)

Interfaces

- 100 Mbps Ethernet (RJ-45) (additional interface via USB-Ethernet adapter)
- 2 USB ports (USB 2.0)
- Audio output (3.5 mm)

Control Options

- Mouse (USB), touch screen, TV remote control via HDMI-CEC, PTZ joystick
- Web interface
- Mobile app (iOS, Android)

Privacy Controls (via Symphony)

- Dynamic and static masks
- Password protection and restricted operator mode
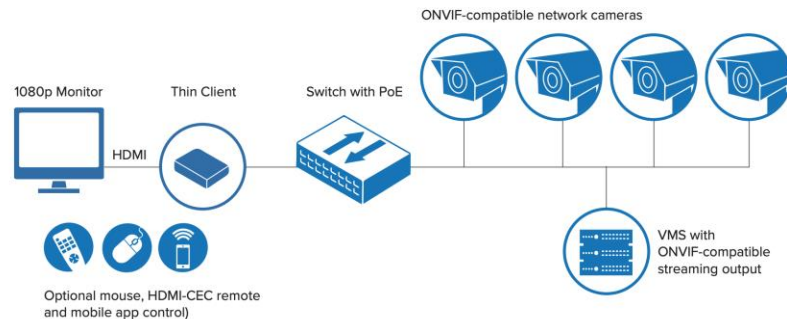
Stand-alone Deployment (Direct Connect)
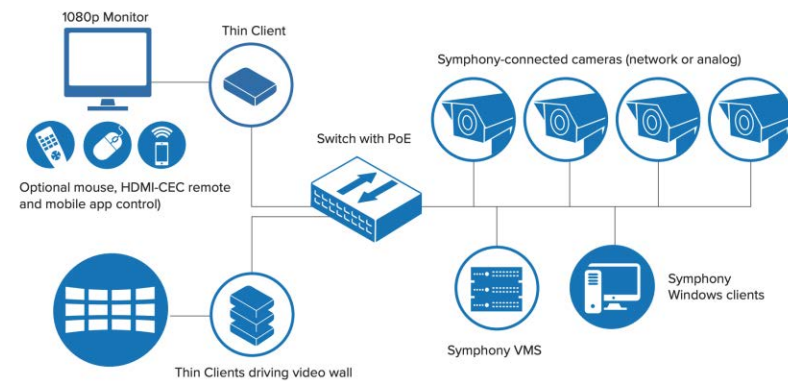
Symphony VMS Deployment

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Deployment Examples

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Deployment Example: Large Cargo Airport (U.S.)

Business Challenge:

- Large cargo airports featuring an 8 km (5 mi) perimeter

Technical Challenge:

- Parts of perimeter adjacent public bus stops (people leaning on fence)

- Other solutions generated hundreds of false alarms per day

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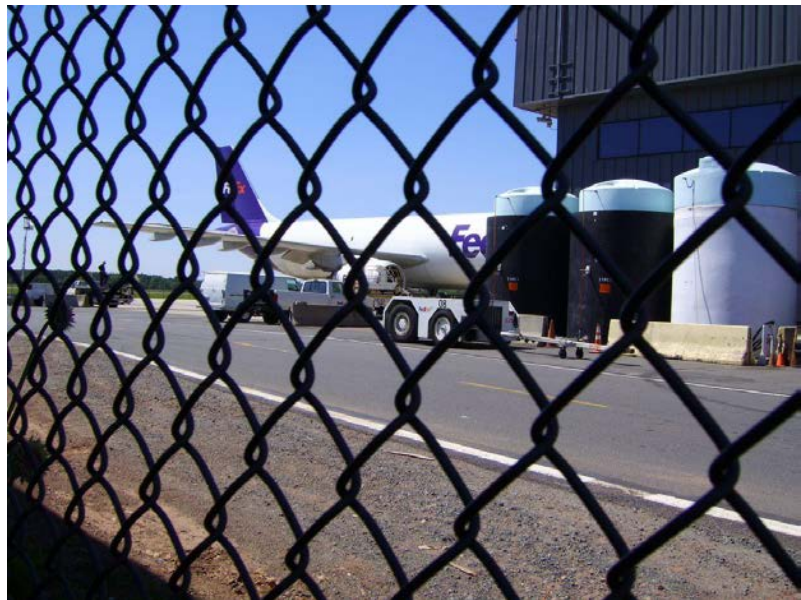
The Solution: Large Cargo Airport (U.S.)

Technology:

- Multi-layer solution: fiber optic fence-mounted + buried intrusion detection systems

- Software to manage alarms from the multiple systems

Outcomes:

- Perimeter secured

- Successfully operating with very low false alarm rate

"They told us to 'Relax. We are going to do this right and you're going to be extremely satisfied.' And we are.""

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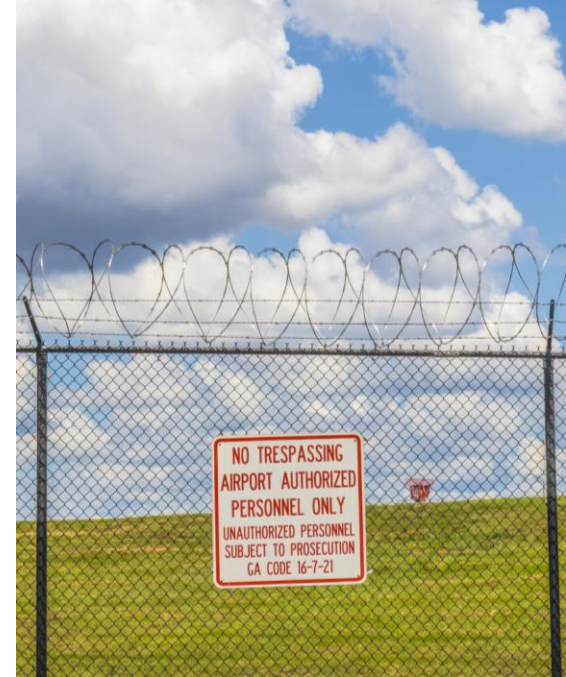
Deployment Example: Large European Airport

Business Challenge:

- Campus-wide video system

- Open platform that scales on-the-fly

- Migration path to analytics available

Technical Challenge:

- Bring legacy and new cameras into a single video management system

- Integrate with airport IT management platform

- Ensure 99.99% availability

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The Solution: Large European Airport

- By the numbers:
  - 3000+ cameras
  - 20+ Servers
  - 1000+ I/O devices
  - 1000+ Clients
- Meets privacy (GDPR) and cybersecurity requirements
- Scalable, efficient cost-saving architecture

"We selected this system because of its scalability, expandability, and configurability"

SENSTAR®
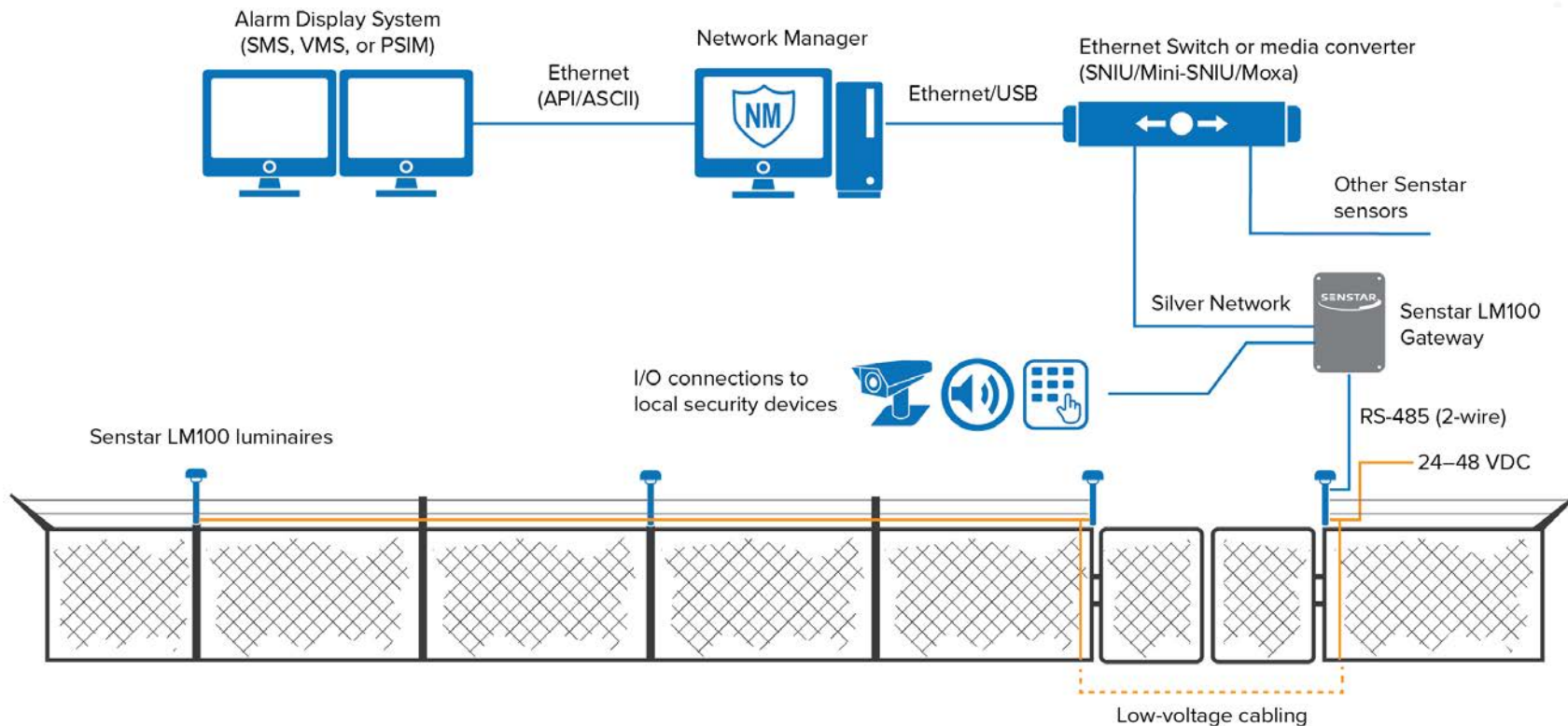
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System Integration Options

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PIDS Example: Networked System

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Senstar Network Manager

The Senstar Network Manager software is an intelligent gateway that provides an interface between the perimeter sensors, other connected security devices, and Senstar/third-party security software (VMS, SMS, PSIM etc).

Sensor connectivity
- Ethernet, fiber and RS-422 networking
- Support for star and loop networks
- Communication over sensor cables (FlexZone, OmniTrax)
- Configuration via local (USB) and network connections

Network Manager software
- Runs on PC as a service
- Supports all Senstar sensors
- Built-in alarm logic engine
- Minimal system requirements
- Redundancy with failover support
- Alarm and event logging
- Diagnostic utilities

Integration options
- Senstar software:
  - Symphony VMS
  - StarNet 2 SMS
  - Senstar AIM
- API-based integration with third-party VMS, SMS, or PSIM software
- ASCII text over TCP/IP or serial
- Hardware I/O

PIDS + VMS + Senstar Access Control

Senstar sensor and third-party security devices

Network Manager

NM

Surveillance cameras

Senstar Symphony

Access control hardware

Symphony Access Control

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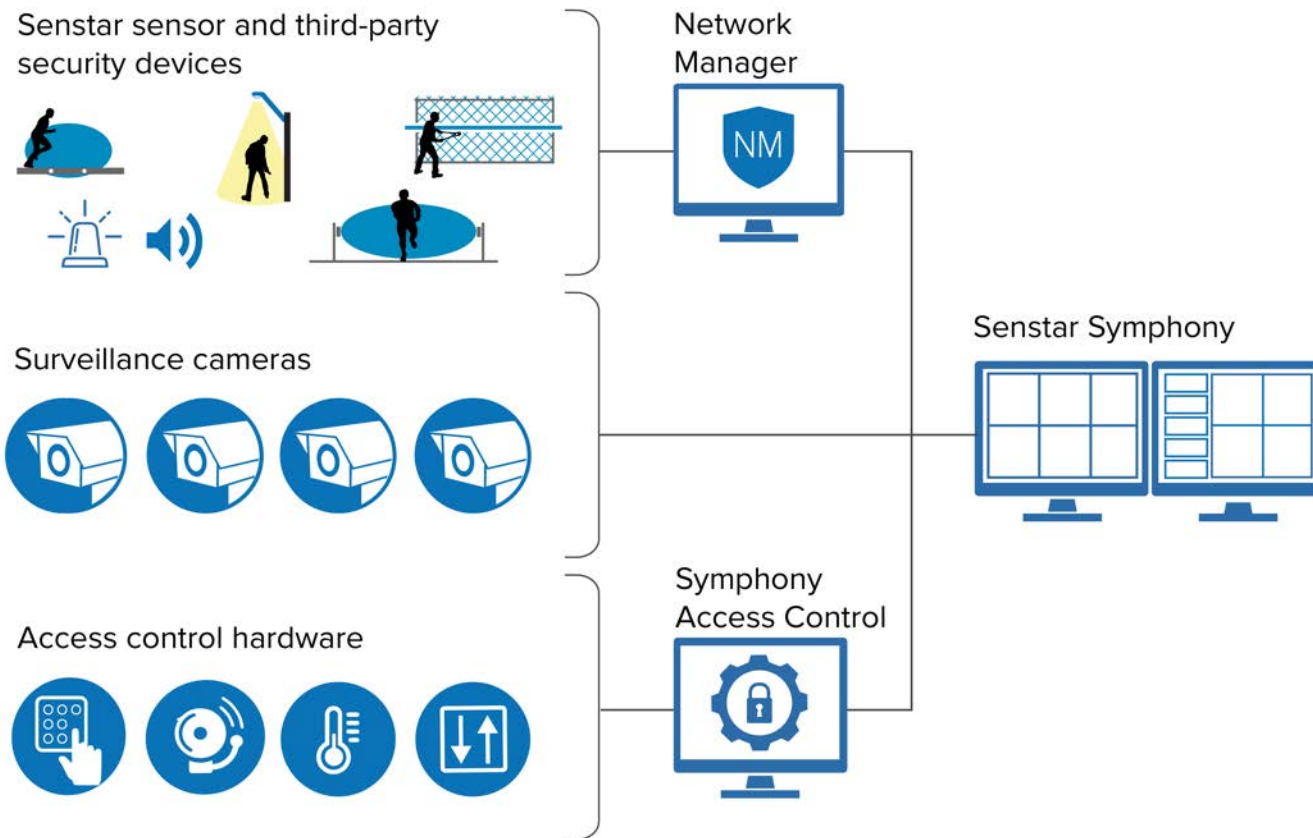
Symphony Integration

- Symphony integrates alarms from all sources (intrusion sensors, video analytics and access control events) alongside live video from regular and thermal cameras

- Zone alarms are graphically shown on a map as lines, with the precision location of the alarm being displayed (when supported by sensor)

- Each event may be linked to multiple cameras, maximizing operator assessment capabilities.

- Bidirectional communications enable automated and manual control over sensor and camera I/O interfaces.

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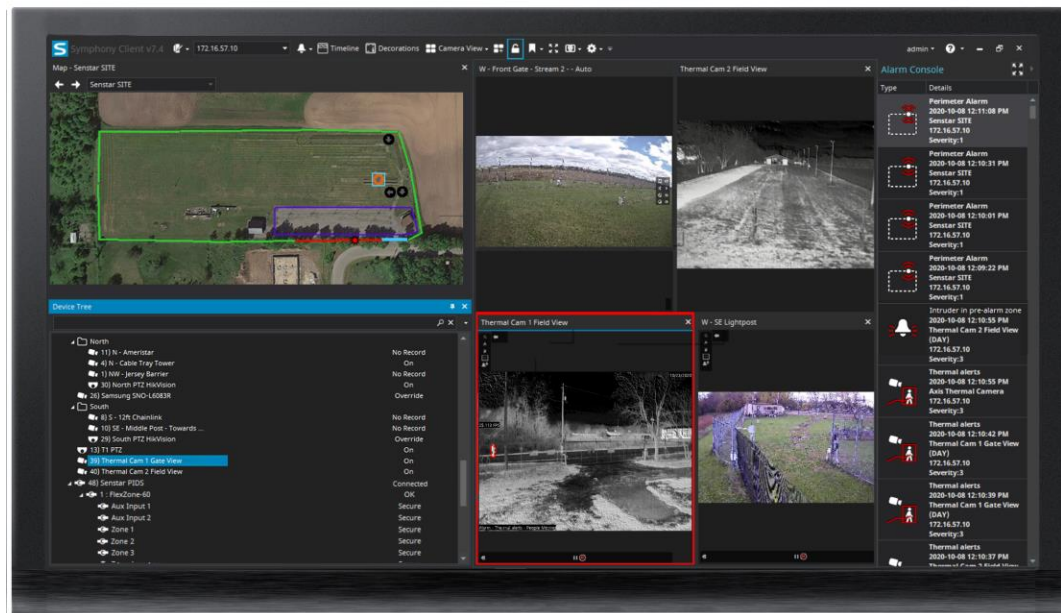
Benefits of Integrating PIDS with VMS and Video Analytics

Immediate assessment is critical for a fast, effective response. Integrating perimeter sensors with the VMS and analytics provides several benefits:

- Track persons and vehicles outside and inside the perimeter

- Use "pre-alarm" events to direct PTZ cameras before intrusion occurs

- Automatic camera call-up using zone/location information

- Combine perimeter sensor and video analytic events to reduce nuisance alarm rate

- Use perimeter sensors to improve post-incident analysis (fence data + intelligent video search)

Multiple technologies may be used together as part of a multilayered approach. In this example, a people tracking analytic is applied to a video stream from a thermal camera and works in combination with a fence-mounted sensor.

*Outdoor People and Vehicle Tracking analytic*

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Third-Party Integrations

Senstar has extensive experience integrating with a wide range of third parties. For information on a specific integration, including the products supported (e.g. Senstar PIDS, Symphony VMS, video analytics) and the scope of features, contact Senstar.

Looking to the Future – A Deeper Integration

- "Sensor fusion" – integrating sensor technologies to receive the advantages of both while avoiding their disadvantages

- Goal: achieve a high probability of detection while maintaining a low nuisance alarm rate or low vulnerability to defeat

- Existing systems use Boolean or time-based logic, next-generation systems to process data via fusion engine:
  - Pattern recognition
 - Artificial intelligence
  - Multi-sensory approach
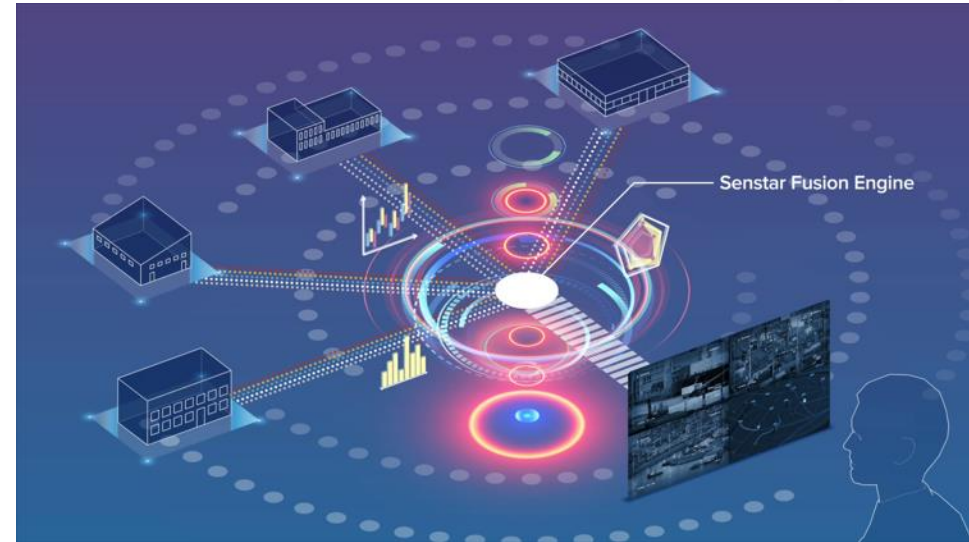
Senstar has the unique capability to fuse sensor and video analytic data over a common platform.

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Senstar Common Operating Platform

Senstar is uniquely situated in the industry to provide a fully integrated common operating platform.

- Single vendor accountability
- Reduced training and IT costs
- Integration = situational awareness
- Fusion = intelligent data processing
- Centralized device management
- Common security infrastructure
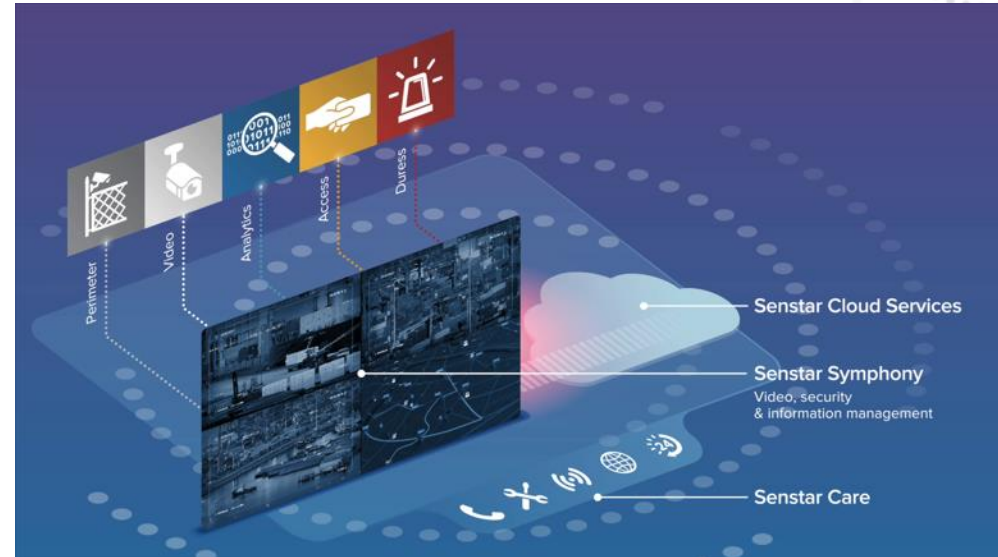
Senstar customers benefit from world-class hardware and software, including open interfaces and platforms, while avoiding risks and complexity

Key Points

- Senstar's product range and relevant industry experience make us a uniquely capable partner in securing airports, inside and out

- Multiple technologies can be used together to improve capabilities

- Integrated solutions improve event assessment and response capabilities

- Leverage security investment to obtain business intelligence and operational efficiencies