Physical Security Technologies for Correctional Facilities
Intelligent. Innovative. Integrated.
PHYSICAL SECURITY TECHNOLOGIES FOR CORRECTIONAL FACILITIES

Agenda

About Senstar
Security Challenges
Application Solutions
Senstar Products
System Integration
Q&A
Overview

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

<table>
<thead>
<tr>
<th>PIDS Facts</th>
<th>VMS Facts</th>
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</thead>
<tbody>
<tr>
<td>35+ years experience</td>
<td>18+ years experience</td>
</tr>
<tr>
<td>50,000+ km of installed sensors</td>
<td>25,000 VMS deployments</td>
</tr>
<tr>
<td>World-wide service and support</td>
<td>World-wide service and support</td>
</tr>
<tr>
<td>World’s largest privately owned PIDS test facility (harsh environment)</td>
<td>Leader in intelligent video management solutions</td>
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</tbody>
</table>
ABOUT SENSTAR

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
Senstar has over 35 years of extensive experience in securing correctional facilities around the world. Our equipment is used at:

- All Canadian federal facilities
- Over 90% of all US federal facilities
- Numerous US state and private facilities (Florida, Tennessee, Nebraska, and Michigan)
- Other countries: Germany, Mexico, Brazil and UK
CORRECTIONAL FACILITIES

Security Challenges
SECURITY CHALLENGES

Corrections Unique Security Needs

• Physical security barriers such as fences are mostly to keep people in

• These physical security barriers also mitigate contraband ingress from the outside

• Dual physical barriers are used around the facility to create a sterile area between the fences

• Physical barriers up to 14' in height need to be monitored along its entire height

• Multi-layered security approach is always incorporated

• Correctional officers need immediate, precise information to quickly respond to security incidents in large facilities
SECURITY CHALLENGES

Corrections Security Concerns

• Government regulations
• Budgetary concerns
• Riot prevention
• Overcrowding concerns
• Sites with differing security requirements such as Minimum, Low, Medium, Max and Super Max
• Contraband concerns
• Reliability and training concerns
CORRECTIONAL FACILITIES

Application Solutions
APPLICATION SOLUTIONS

Perimeter and Sterile Area

Requirement

- Regulatory compliance
- Public safety
- Protection against escape attempts
- Protection against contraband smuggling

Site characteristics

- Fenced and double fenced (sterile area)
- Extended height (12 to 14 feet), with razor wire on top, bottom, and/or sides
- Heavy use of outdoor lighting
- Multi-layered approach

FlexZone
Fence-mounted locating sensor:
- Scalable for any size of perimeter

FiberPatrol FP400 or FP1150
Fence-mounted fiber optic sensor:
- Non-conducting, lightning immune

OmniTrax
Buried locating volumetric sensor:
- Covert, low vulnerability to defeat

X-Field
Free-standing electromagnetic field sensor:
- Narrow detection zone, up to 7.3 m (24 ft)

UltraWave
Bi-static microwave volumetric sensor

Symphony VMS
Scalable, affordable video management with built-in analytics:
- Outdoor people and vehicle tracking
- PTZ auto-tracking
- Crowd Detection
- PIDs mapping & alarm
### Sally Port

#### Requirement
- Regulatory compliance
- Public safety
- Protection against escape attempts
- Protection against contraband smuggling

#### Site characteristics
- Mix of technologies required
- Multi-layer approach
- Swinging and/or sliding gate types

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#### FlexZone
Fence-mounted locating sensor:
- Effective and affordable
- Easy to install on existing fence

#### Wireless Gate Sensor (WGS)
- Effective and affordable
- Effective with all gate types

#### UltraWave
- Bi-static microwave sensor
- Stackable
- Use multiple pairs for overlapping coverage

#### Symphony VMS
Scalable, affordable video management with built-in analytics:
- Outdoor people and vehicle tracking
- PTZ auto-tracking
APPLICATION SOLUTIONS

Gate Protection

| Requirement | • Regulatory compliance  
|             | • Public safety  
|             | • Protection against escape attempts |
| Site characteristics | • Mix of technologies required  
| | • Multi-layer potential  
| | • Swinging or sliding gate types |

**FlexZone**
Fence-mounted locating sensor:
• Most effective with swing gates

**Wireless Gate Sensor**
• No infrastructure required at gate  
• Effective with all gate types  
• Easy to install, minimal maintenance

**UltraWave**
Bi-static microwave volumetric sensor  
• Works in all weather conditions
## APPLICATION SOLUTIONS

### Guard/CO Duress

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Site characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regulatory compliance</td>
<td>• Distributed receivers</td>
</tr>
<tr>
<td>• Guard/Corrections Officer (CO) safety</td>
<td>• CO allocated transmitter</td>
</tr>
<tr>
<td>• Protection from CO attack from inmate</td>
<td>• Computer/software monitors receivers</td>
</tr>
<tr>
<td>• Protection for CO health distress issue</td>
<td>• Duress event notifies response force</td>
</tr>
</tbody>
</table>

### PAS

Personal Alarm System for Emergency Response
- Ultrasonic based system
- Location to nearest room

### Flare

Real-Time Locating System
- RF-based system (protected RF bands)
- Location to within 6 m (20 ft)
- No interference with other RF electronics
CORRECTIONAL FACILITIES

Senstar Products
SENSTAR PRODUCTS

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)
SENSTAR PRODUCTS

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)
**SENSTAR PRODUCTS**

**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
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)
Main Features
• Fence or free-standing pole mounting
• Dual 4-wire or 5-wire zones (A&B)
• Zone lengths: Up to 150 m (500 ft)
• Detection height (fence-mounted): Up to 7.3 m (24 ft) (10-wire, A&B stack)
• Detection width: Less than 0.5 m (20 in) (walk-up detection of 35 kg (77 lb) person)

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 (<6W)

Networking Specs
• RS-422 and fiber communication card options
• Common integration interfaces (API, ASCII, or I/O)
SENSTAR PRODUCTS

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
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)
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)
Flare

Description
• Real-time RF locating system
• Uses protected frequencies
• Locates to within ±6 m (20 ft)
• Distributed RF receivers
• PoE based technology

Key Benefits
• High integrity system
• Optimized for reliability within correctional environments
• Lower total cost of ownership
• Easy to install and maintain
• Proven technology performance
SENSTAR PRODUCTS

Flare Technical Details

Main Features
• Detects and locates distress alarms to within ±6 m (20 ft)
• Protected RF bands (guaranteed delivery)
• Low sensor density requirement
• Maintenance free and self-testing
• Flexible sensor unit placement

Environment Specs
• Weather: –20 to 60 °C (–4 to 140 °F)
• Rugged enclosure, NEMA Type 4X (IP65)

Electrical Specs
• Sensor Unit (SU)
  – Low power (<1.5W)
  – PoE support
• Personal Protection Device (PPD)
  – 9V alkaline battery (CR2025 compact version)

Networking Specs
• Communications over PoE
• Dedicated Ethernet infrastructure
SENSTAR PRODUCTS

StarNet 2

Description

• Feature-rich Security Management System (SMS) optimized for intrusion detection systems
• Map-based interface displays precise intrusion location
• Deployed in a wide variety of markets, including corrections, government, and utilities

Key Benefits

• Works out of the box with all Senstar sensors
• Easy to use, minimal operator training
• Granular controls
• Rules-based engine
• Integrates with Symphony and other video management software
• Runs on standard PC hardware
SENSTAR PRODUCTS

StarNet 2 Technical Details

Operator Features
- Graphical display of alarm event locations
- Alarm acknowledge, reset, mask and transfer functions
- Alarm escalation
- Event checklists and incident notes
- Full-screen, password-protected exit
- Up to 64 operator workstations per server
- Manual control of hardware commands

Security Management Features
- Bi-directional communication with all Senstar sensors
- Monitor/manage all sensor control points (zone alarms, diagnostic events, inputs, relay outputs etc)
- Support for Senstar Alarm Logic Engine

Site Configuration Features
- Point and click sensor placement
- Multi-point and icon sensor indicators
- Up to 128 picture-maps
- Alarm priorities, workflows, and procedures
- Customizable sensor labels and colors

Sensor Monitoring
- Display key sensor information
- Ranging sensor support

VMS Integration
- Integrates with Symphony/third-party VMS
- Link sensors to specific cameras

Administration Features
- User roles and access control
- Organization-specific customizations (priorities, routing, workflows)

Site Integration
- Email notifications
- Serial or TCP/IP-based ASCII messaging to third-party systems
SENSTAR PRODUCTS
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 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
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)

<table>
<thead>
<tr>
<th>Analytic</th>
<th>Description</th>
<th>Applications</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera Tampering</td>
<td>Detects if video has been compromised through view obstruction or position-altering</td>
<td>Detecting camera tampering</td>
<td></td>
</tr>
<tr>
<td>Signal Loss</td>
<td>Detects if analog video input is one solid color, which may indicate signal loss</td>
<td>Detecting video loss with analog cameras/encoders</td>
<td></td>
</tr>
<tr>
<td>Outdoor Tracking</td>
<td>Robust outdoor person and vehicle tracking for dynamic outdoor environments. Unlike simple motion detection, analytic compensates for weather, shadows, and small objects. <em>Can be used a trigger for active deterrent devices, including the Senstar LM100 and 2-way intercoms</em></td>
<td>Tripwire, alarm zone, loitering, and people counting for outdoor environments</td>
<td></td>
</tr>
<tr>
<td>Auto-PTZ</td>
<td>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</td>
<td>Alarm trigger</td>
<td></td>
</tr>
</tbody>
</table>
## Senstar Analytics (2 of 2)

<table>
<thead>
<tr>
<th>Analytic</th>
<th>Description</th>
<th>Applications</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left and Removed Item Detection</td>
<td>Detects left/removed items based on user-defined min/max object size</td>
<td>Detecting left or removed objects</td>
<td><img src="image1.png" alt="Example Image" /></td>
</tr>
<tr>
<td>ALPR</td>
<td>Detects and captures license plates</td>
<td>License plate detection</td>
<td><img src="image2.png" alt="Example Image" /></td>
</tr>
<tr>
<td>Face Recognition</td>
<td>Detects faces and compares against allow/disallow lists</td>
<td>Two-factor authentication processes for access control</td>
<td><img src="image3.png" alt="Example Image" /></td>
</tr>
</tbody>
</table>
SENSTAR PRODUCTS

NVR Hardware

E-Series Description
• Compact, fanless server appliance
• Ideal for retail stores, gas stations, and restaurants

R-Series Description
• Dell enterprise-grade hardware
• Mini-tower, 1U and 2U form factor options
• Scalable solutions with high availability, hot-swappable components and server redundancy

Key Benefits
• Validated hardware for optimal performance with comprehensive 3-year warranty
• Simplifies ordering and support
• Different hardware options based on requirements
• Dell on-site support for R-series hardware
SENSTAR PRODUCTS

Thin Client

Description
• Network video display appliance
• Decodes and displays up to 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
**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
CORRECTIONAL FACILITIES

System Integration Options
SYSTEM INTEGRATION OPTIONS

PIDS Example: Standalone System

I/O connections to alarm panel and local security devices

FlexZone or FP400 Processor

Sensor cable
SYSTEM INTEGRATION OPTIONS

PIDS Example: Networked System

- Alarm Display System (SMS, VMS, or PSIM)
- Ethernet (API/ASCII)
- Network Manager
- Ethernet Switch or media converter (SNIU/Mini-SNIU/Moxa)
- Other Senstar sensors
- Silver Network
- Senstar LM100 Gateway
- I/O connections to local security devices
- Senstar LM100 luminaires
- RS-485 (2-wire)
- 24–48 VDC
- Low-voltage cabling
SYSTEM INTEGRATION OPTIONS

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).

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

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
SYSTEM INTEGRATION OPTIONS

PIDS + VMS + Senstar Access Control

Senstar sensor and third-party security devices

Surveillance cameras

Access control hardware

Network Manager

Senstar Symphony

Symphony Access Control
SYSTEM INTEGRATION OPTIONS

Symphony Integration – Alarm Console

- Sensor alarms in Symphony are displayed alongside video analytic and access control events.
- Each event may be linked to multiple cameras and graphically displayed on a site map, maximizing operator assessment capabilities.
- Bidirectional communications enable automated and manual control over sensor and camera I/O interfaces.
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.
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.
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.
Q&A

Key Points

- Senstar has extensive experience in protecting correctional facilities
- Senstar’s portfolio is unmatched in the industry
- Multiple technologies can be used together to improve capabilities
- Solid integrations improve time-critical event assessment and response capabilities