Architectural/Engineering Specification for a

Cut Immune, Location Sensing, Fence-Mounted Perimeter Intrusion Detection System

FiberLR™

Disclaimer

Senstar, and the Senstar logo are registered trademarks, and FiberLR are trademarks of Senstar Corporation. The information in this document is subject to change without notice. Senstar reserves the right to make changes to product design or manufacturing methods, as engineering progresses, or as other circumstances warrant.

Copyright © 2012. Senstar Corporation. All rights reserved.
<table>
<thead>
<tr>
<th>Part 1</th>
<th>General - Fence Mounted Perimeter Intrusion Detection System</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>System Summary</td>
<td>3</td>
</tr>
<tr>
<td>1.2</td>
<td>Submittals</td>
<td>3</td>
</tr>
<tr>
<td>1.3</td>
<td>Spares</td>
<td>3</td>
</tr>
<tr>
<td>1.4</td>
<td>Product Support</td>
<td>3</td>
</tr>
<tr>
<td>Part 2</td>
<td>Products – Fence Perimeter Intrusion Detection System</td>
<td>3</td>
</tr>
<tr>
<td>2.1</td>
<td>Perimeter Intrusion Detection System</td>
<td>3</td>
</tr>
<tr>
<td>2.2</td>
<td>Manufacturers</td>
<td>3</td>
</tr>
<tr>
<td>2.3</td>
<td>Regulatory Requirements</td>
<td>4</td>
</tr>
<tr>
<td>2.4</td>
<td>General</td>
<td>4</td>
</tr>
<tr>
<td>2.5</td>
<td>System Description</td>
<td>4</td>
</tr>
<tr>
<td>2.6</td>
<td>System Components</td>
<td>4</td>
</tr>
<tr>
<td>2.7</td>
<td>System Performance</td>
<td>5</td>
</tr>
<tr>
<td>2.8</td>
<td>Fiber-Optic Sensor</td>
<td>7</td>
</tr>
<tr>
<td>2.9</td>
<td>Gates and Lead Cable</td>
<td>7</td>
</tr>
<tr>
<td>2.10</td>
<td>System Sensor Unit</td>
<td>8</td>
</tr>
<tr>
<td>2.11</td>
<td>System Software</td>
<td>9</td>
</tr>
<tr>
<td>Part 3</td>
<td>Execution - Fence Mounted Perimeter Intrusion Detection System</td>
<td>11</td>
</tr>
<tr>
<td>3.1</td>
<td>Site Assessment</td>
<td>11</td>
</tr>
<tr>
<td>3.2</td>
<td>System Installation</td>
<td>11</td>
</tr>
<tr>
<td>3.3</td>
<td>System Calibration</td>
<td>11</td>
</tr>
<tr>
<td>3.4</td>
<td>Training</td>
<td>11</td>
</tr>
</tbody>
</table>
PART 1  GENERAL - FENCE MOUNTED PERIMETER INTRUSION DETECTION SYSTEM

1.1  SYSTEM SUMMARY
A  The contractor shall install a fence electronic perimeter intrusion detector. The system shall be used to protect the perimeter of the facility from unauthorized intrusions. The system shall consist of a sensor fiber optic cable and centralized sensor unit. The system shall detect intruders by processing electrical signals generated by the minute vibration of the sensor cable caused by the intruders. The system shall be integrated into the facility’s Security Management System.

1.2  SUBMITTALS
A  Contractor submittals to the facility owner (“Owner”) shall include the following as a minimum:

.1 System shop drawings
.2 System installation plan (after site survey)
.3 Site conditions report per article 3.1
.4 Configuration and calibration settings of the sensor unit after installation and calibration are complete per article 3.3
.1 All manufacturer-supplied calibration and operating software for the system

1.3  SPARES
A  The contractor shall deliver to the Owner spare system components consisting of:

.1 For each system component a minimum quantity of one or 10% of the number that comprise the system, whichever is greater

1.4  PRODUCT SUPPORT
A  The product shall carry a minimum one-year warranty from the date of purchase.
B  Any parts shown defective in workmanship or material during the warranty period shall be repaired, replaced or adjusted free of charge.
C  The supplier shall warrant that the product shall be supportable for a minimum of 10 years from date of purchase.

PART 2  PRODUCTS – FENCE PERIMETER INTRUSION DETECTION SYSTEM

2.1  PERIMETER INTRUSION DETECTION SYSTEM
A  The contractor shall supply a fence Perimeter Intrusion Detection System (PIDS). The PIDS shall detect intruders attempting to breach the perimeter.

2.2  MANUFACTURERS
A  The FiberLR™ system from Senstar Corporation (www.senstar.com) meets the requirements stated herein for a fence mounted PIDS and shall be the basis of design.
2.3 REGULATORY REQUIREMENTS
A The system shall comply with applicable FCC and CE regulations.

2.4 GENERAL
A All equipment and materials used shall be standard components, regularly manufactured, and regularly utilized in the manufacturer’s system.
B All systems and components shall have been thoroughly tested and proven in actual use.
C All systems and components shall be provided with the availability of a technical support phone number from the manufacturer. The phone number shall allow for immediate technical assistance for either the dealer/installer or the end user.
D All systems and components shall be provided with an explicit manufacturer warranty.

2.5 SYSTEM DESCRIPTION
A The system shall be a fiber-optic intrusion detection system for providing perimeter security.
B The system shall incorporate a fence mounted fiber-optic vibration sensitive cable.
C The system shall incorporate a rack-mounted sensor unit located at an indoor equipment room.
D The system shall require no conductive, electrical, or electronic components in the field.
E The system shall require no electrical power in the field.
F The sensor cable shall incorporate optional dark fibers for video and data communication.
G The system shall be capable of monitoring changes in the optical signal resulting from the vibration of the sensor.
H The system shall be capable of detecting vibrations associated with attempts to breach the site perimeter.
I The system shall be capable of locating the point of intrusion.
J The system shall be capable of detecting and locating multiple simultaneous intrusions.
K The system shall be capable of detecting and locating a sensor cable cut.
L In the event of sensor cable cut, the system shall retain detection and location ability in the portion of the sensor cable contiguous to the sensor unit.
M The system shall provide a PC-based operator interface with graphical alarm annunciation at the sensor unit.
N The system shall be capable of communicating alarm information to local or remote recipients via computer network.

2.6 SYSTEM COMPONENTS
A Field components shall include
1 Fiber-optic cable
2 Sensor termination module(s)
3 Splicing enclosures
4 Installation hardware

B Sensor unit components shall include
1 Controller module
2.7 SYSTEM PERFORMANCE

A Detection Principles
.1 The system shall sense the changes in the optical signal resulting from the minute motion of the fiber strand(s) within the fiber-optic sensor cable.
.2 By mounting the sensor cable on and in direct contact with the fence its motion and/or vibration shall be monitored.
.3 The system shall be capable of being calibrated to function optimally on different types of metal fencing.

A Detectable Intrusions
.1 Intrusion attempts, wherein the intruder comes into direct contact with the fence, including posts and braces, shall be detectable.
.2 Such intrusion attempts shall include direct climbing, cutting, spreading, and lifting of the fence or fence fabric.

B Fence Compatibility
.1 The system shall provide the specified detection performance when installed on different types of metal fencing including but not limited to chain-link, expanded mesh, and welded mesh.

C Fiber-Optic Sensor Length
.1 The system shall be capable of monitoring fiber-optic sensor cable with total length of up to 16 kilometers (10 miles) including the active sensing section and the lead-in section.

D Probability of Detection
.1 When the system is installed according to the manufacturer’s directions the system shall generate and report an alarm with greater than 95% probability for an isolated breach attempt that involves direct and prolonged contact with the fence or wall structure or ground surface and results in the intruder’s crossing of the fence sensor line.
.2 Such breaches shall include those attempted by direct climbing, cutting, spreading, and lifting of the fence or fence fabric.
E  Time to Detection
   .1 The system shall be capable of generating an alarm within one second from the onset of an attempted breach that involves an aggressive contact with the system, such as the one attempted by quick climbing.
   .2 Other detected intrusion attempts shall be reported no later than one second after the breach is completed.

F  Accuracy of Intrusion Location
   .1 The location along the fiber-optic sensor cable of an isolated intrusion attempt shall be determined and reported with an absolute accuracy better than 8 meters (25 feet) in 95% of detected intrusion attempts for a standard installation.
   .2 The system shall support up to 30 virtual detection zones per kilometer of sensor length (50 zones per mile).

G  Multiple Simultaneous Intrusions
   .1 The system shall be capable of detecting and locating multiple simultaneous intrusions.
   .2 Simultaneous intrusions separated by 45 meters (150 feet) or more, shall be reported as separate intrusion events.
   .3 The system shall be immune to defeat by an overwhelming disturbance.

H  False Alarms
   .1 The false intrusion alarms generated due to occurrences other than sensor cable motion / vibration shall be limited to less than one such alarm per month of continuous operation.

I  Nuisance Alarms
   .1 The system shall be immune to nuisance alarms and performance degradation originating from the following:
      a. electromagnetic and radio-frequency interference in the field
      b. ambient temperature changes
      c. motion of nearby objects or vegetation that are not striking the fence
      d. motion of surface or ground water
      e. sunrise/sunset
      f. seismic vibration caused by nearby vehicular or rail traffic
      g. acoustic or magnetic effects
      h. snow
      i. fog
   
   .2 The system shall be capable of rejecting nuisance alarms due to moderate non-localized environmental disturbances such as wind or rain.
   .3 The system shall be capable of rejecting low-level localized or semi-localized disturbances such as those created by small animals or nearby vehicle traffic.
The system shall employ adaptive filtering algorithms to minimize the rate of environmental alarms induced by stormy weather.

J Cable Cut
.1 The system shall support self-healing sensor ring architecture.
.2 The system shall be capable of detecting and locating a sensor cable cut.
.3 The cut location shall be determined and reported with an absolute accuracy of better than 30 meters (100 feet).
.4 In the event of a sensor cable cut, the system shall retain detection and location ability in the portion(s) of the sensor cable that remain connected to the system sensor unit.

2.8 FIBER-OPTIC SENSOR

A Fiber-Optic Sensor Cable
.1 The sensing element of the system shall be an outdoor-grade fiber-optic cable.
.2 The sensor cable shall be rated for aerial and duct installations according to the accepted industry standards.
.3 The sensor cable shall have a nominal lifetime of 20 years.

B Sensor cable compatibility
.1 The system shall be capable of operation on communication-grade single-mode optical fiber cables.

C Optional Data and Video Links
.1 The fiber-optic sensor cable may optionally include communication-grade single-mode and/or multi-mode fiber strands to be used for data and video communication.

D Fiber-Optic Sensor Layout
.1 The system shall be capable of monitoring a continuous fiber-optic sensor cable deployed in a linear or closed-loop configuration.

E Environmental Specifications
.1 The fiber-optic cables shall withstand operation in temperatures from -40°C to 70°C (-40°F to 158°F) without performance degradation.

2.9 GATES AND LEAD CABLE

A Gate Monitoring
.1 Sensor cable may be optionally extended onto swing gates.

B Fiber-Optic Lead Cable
Architectural & Engineering
Specification for FiberLR™

.1 The fiber-optic lead cable shall connect the fiber-optic sensor to the sensor unit equipment.
.2 The lead cable shall be insensitive.
.3 The lead cable may consist of outdoor and indoor sections as necessary.
.4 The lead cable may be of the same type and may be continuous to the sensor cable.
.5 The length of the lead cable shall be less than 16 kilometers (10 miles).

2.10 SYSTEM SENSOR UNIT

A Sensor unit Components
.1 The sensor unit components shall include
   a. Controller module
   b. Processor module
   c. Slide-out LCD / keyboard / touchpad drawer (console)
   d. Fiber-optic patch panel
.2 The sensor unit components shall be designed for standard 19”-wide rack.
.3 The data processor module shall include the following or similar:
   a. Two 500 GB 7,200 RPM SATA Hard Disk Drives in a Raid 1 configuration
   b. 550 W redundant universal power supply
   c. Built-in dual 10/100/1000base-T Ethernet interface
   d. Two RJ45 connectors
.4 The acoustic noise of the sensor unit shall be less then TBD dB (A)
.5 The power consumption of the sensor unit shall be less than 325W

B Sensor unit Environmental Specifications
.1 The sensor unit equipment shall operate in the temperature range of 10°C to 35°C (50°F to 95°F).
.2 The sensor unit equipment shall operate in relative humidity of 20% to 80%, non-condensing.
.3 The sensor unit equipment shall withstand a storage temperature range of -20°C to 70°C (-4°F to 158°F).
.4 The sensor unit equipment shall withstand shipping and storage in relative humidity of 5% to 85%, non-condensing.

C Sensor unit Reliability and Maintainability
.1 The Sensor unit shall have a predicted mean time between failures (MTBF) of greater than tbd hours when calculated per Telcordia Reliability Prediction Procedure, Parts Count Method, at 70°C.
2.11 SYSTEM SOFTWARE

A Modes of Operation
.1 The system Software Interface (SI) shall support the following general modes of operation:
   a. Standalone
   b. Interfaced via Network Manager for further integration to third-party security management systems and to μtraLink I/O Modules

B Functionality
.1 SI shall support the following functions:
   a. Hardware monitoring and control
   b. Sensor signal processing and analysis
   c. Event detection and alarm generation
   d. Basic alarm management
   e. Event and alarm logging
   f. Detection zone definition and configuration
   g. Adjustment of detection parameters
   h. Local operator interface
   i. Remote interface

C Secure System Access
.1 SI shall require a valid password at start-up and shutdown time.
.2 SI shall provide at least three access levels:
   a. Operator level for routine operation
   b. Supervisor level for advanced system monitoring, configuration, and troubleshooting
   c. Installer level for advanced configuration and troubleshooting

D Hardware Monitoring and Control
.1 SI shall monitor the operating status of system components.
.2 SI shall alert local and remote operators of any detected system component failure.

E Graphical Alarm Display
.1 SI shall incorporate an image depicting the protected site with a schematic perimeter overlay.
.2 Each new alarm shall be annunciated by
   a. Flashing notification message
   b. Location marker displayed on the site image
   c. Audible alert
.3 The site image and alarm location marker shall be provided for visual reference only.
Subject to availability, the site image shall be one of the following:
   a. Satellite photo
   b. Aerial photo
   c. Map
   d. Schematic

F  Alarm Management

.1 SI shall maintain complete information on all alarms for 24 hours or until the alarm is cleared.
.2 Alarms shall be cleared by local or remote operator or automatically in 24 hours after alarm generation.
.3 Until cleared, the alarm information shall be compiled in a scrollable multi-column table.
.4 The maintained information shall include
   a. Unique alarm ID number
   b. Time label
   c. Event duration
   d. Event status
   e. Event strength
   f. Event location
.5 Operator shall be able to
   a. Select any of the alarms from the list
   b. Enter text notes regarding the cause of the alarm and the mitigation measures
   c. Clear the alarm
.6 Operator notes as well as the alarm clearing event shall be recorded in the event log.

G  Alarm Location Formats

.1 The primary format of the alarm location shall be the linear position along the sensor cable
.2 It shall be possible to express the alarm location in either meters or feet
.3 Secondary location formats shall be derived from the primary measure using appropriate calibration tables.
.4 Secondary location formats shall require corresponding mapping of the perimeter fence line.
.5 It shall be possible to provide secondary alarm location formats including:
   a. Software-defined zones
   b. Latitude and longitude (GPS) coordinates

H  Event Logging

.1 SI shall maintain and display an event log, including alarms, system notifications, and user actions.
.2 The logs shall be periodically saved to the hard drive.
.3 A new set of log files shall be generated every 24 hours at midnight.

I Standard Remote Interface
.1 SI shall incorporate an ASCII text-based input/output interface for integration to third party alarm management software products.
.2 The interface shall utilize custom XML formatting.
.3 Standard communication modes shall include
   a. TCP/IP server
   b. TCP/IP client

J Network Manager
.1 The system shall include interface software compatible with Senstar’s Network Manager to provide communications between the sensor unit and third-party security management systems.
.2 The system’s interface software shall provide a TCP/IP-based interface for communicating alarms and status data to and from security management systems. The system supplier shall furnish complete documentation of this interface to facilitate integration with security management systems.

PART 3 EXECUTION - FENCE MOUNTED PERIMETER INTRUSION DETECTION SYSTEM

3.1 SITE ASSESSMENT
A Before installation begins, the installation contractor shall provide a report to the Owner documenting any site conditions that may prevent the system from operating satisfactorily. Examples of such conditions include excessively loose fence fabric and objects such as signs and tree branches hitting the fence.

3.2 SYSTEM INSTALLATION
A The system shall be installed in accordance with the manufacturer’s recommended procedures as defined in the manufacturer’s Product Guide for the system.

3.3 SYSTEM CALIBRATION
A The installation contractor shall calibrate the system in accordance with the manufacturer’s recommended procedures as defined in the manufacturer’s Product Guide. The installation contractor shall submit to the Owner the calibration and configuration settings for the system.

3.4 TRAINING
A The installation contractor shall train the Owner’s maintenance personnel in the calibration and system maintenance procedures as given in the manufacturer’s Product Guide.