Section 28 16 43
Perimeter Security Systems

FiberPatrol FP1100-X

Cut Immune Location Sensing Intrusion Detection System
Chain Link Fence and Mixed Applications

Architectural and Engineering Specifications

TECHNICAL SPECIFICATIONS
DIVISION 28 – ELECTRONIC SAFETY AND SECURITY
SECTION 28 16 43 - PERIMETER SECURITY SYSTEMS

PART 2 – PRODUCTS

2.01 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.

2.02 SYSTEM DESCRIPTION

A. The system shall be a fiber-optic intrusion detection system for promoting perimeter security.
B. The system shall incorporate a fence-mounted fiber-optic vibration sensor cable.
C. The system shall incorporate rack-mounted instrumentation (head end) located at an indoor equipment room.
D. The system shall incorporate a fiber-optic lead cable connecting the sensor to the head end.
E. Unless otherwise specified, a single sensor shall be deployed along the entire perimeter of the project site.
F. The system shall support mixed sensor installation modes including fence, wall, and buried perimeter within a single system.
G. The system shall require no mechanical, electrical or electronic components in the field.
H. The system shall require no electrical power in the field.
I. The sensor cable shall incorporate optional dark fibers for video and data communication.
J. The system shall be capable of monitoring changes in the optical signal resulting from the vibration of the sensor.
K. The system shall be capable of detecting vibrations associated with attempts to breach the site perimeter.
L. The system shall be capable of locating the point of intrusion.
M. The system shall be capable of detecting and locating multiple simultaneous intrusions.
N. The system shall be capable of detecting and locating a sensor cable cut.
O. In the event of sensor cable cut, the system shall retain detection and location ability in the entire contiguous portion of the sensor cable.
P. The system shall provide a PC-based operator interface with graphical alarm annunciation at the head end.
Q. The system shall be capable of communicating alarm information to local or remote recipients via computer network.
R. The system shall meet or exceed performance criteria provided by Fiber Patrol FP1100-X as manufactured by Optellios, Inc., 11 Penns Trail, STE 300, Newtown, PA 18940, U.S.A.

2.03 SYSTEM COMPONENTS

A. Field components shall include

1. Fiber-optic sensor cable
2. Fiber-optic lead cable
3. Sensor termination module(s)
4. Fiber-drop module(s) (optional)
5. Installation hardware

B. Head end components shall include

1. Sensor Controller module
2. Data Processor module
3. LCD / keyboard / touchpad module
4. Uninterrupted power supply (optional)
5. Equipment rack (optional)
6. Power and data cables
7. Fiber-optic patch panel
8. Fiber-optic patch cords
9. System interface software
10. Software drivers and components

2.04 SUBMITTALS

A. System data sheet
B. System shop drawings
C. System installation plan (after site survey)

2.05 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. The sensitivity of the sensor to the fence vibrations shall depend on the type and condition of the fence and on cable mounting.
3. By mounting the sensor cable on and in direct contact with chain-link fence, the motion and/or vibration of the fence shall be monitored.

B. Factors Affecting System Performance

1. System performance benchmarks are not fixed and may be influenced by factors related to the fence quality and integrity, fence environment, and sensor installation.
2. The following factors may contribute to elevated rates of nuisance alarms, especially in stormy weather conditions:
    a. Loose fence posts, braces, and trimmings
    b. Loose fence fabric
    c. Improper fence maintenance
    d. Loose signs and other materials on the fence
    e. Loose swing gates
    f. Vegetation around the fence
    g. Ground erosion around the fence
    h. Loose debris around the fence
    i. Loose or improperly installed sensor cable
    j. Other sources of motion and vibration at or around the fence line
3. The system shall have variable detection parameters that shall enable adjustments to the tradeoff between the system sensitivity and the confidence of detection.
4. System performance with respect to specific types of intrusion attempts shall depend on the exact nature, intensity, and duration of the intrusion, as well as the system detection settings.

C. 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.
3. Intruder's approach to the fence and intrusion attempts that do not result in direct contact with the fence, such as bridging and tunneling, shall not be detectable by the fence-mounted sensor alone.

D. Probability of Detection

1. The system shall generate and report an alarm with greater than 95% probability for an isolated breach attempt in quiet environment that involves direct and prolonged contact with the fence structure and results in the intruder's crossing of the fence 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 fence, such as the one attempted by quick climbing.
2. Other detected intrusion attempts shall be reported no later than one second after the fence breach is completed.
3. The time-to-detection shall generally depend on the type and intensity of the intrusion activity and the specific timing and sensitivity settings of the system.

F. Accuracy of Intrusion Location

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

G. Multiple Simultaneous Intrusions

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

H. False Alarms

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 electromagnetic and radio-frequency interference in the field.
2. The system shall be intrinsically 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.
4. 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 be capable of detecting and locating a sensor cable cut.
2. The cut location shall be determined and reported with an absolute accuracy of better than 100 feet (30 meters).
3. 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 head end.
4. The system shall support self-healing sensor ring architecture.

2.06 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 outer jacket of the cable shall be made of black UV-resistant medium-density polyethylene.
4. The outer jacket of the cable shall carry length identification markings as well as Optellios proprietary labels.
5. Internal cable construction shall include water-blocking materials and re-enforcement structures such as a strength member.
6. The outside diameter of the standard sensor cable shall be approximately 0.45”.
7. Cable shall be shipped to the installation site in one or several segments, subject to availability, unless otherwise specified at the time of ordering.
8. The sensor cable shall have a nominal lifetime of 20 years.
9. The standard sensor cable shall include no mechanical, electrically powered, conducting or emitting parts.

B. Optical Fibers

1. The fiber-optic sensor cable shall include communication-grade single-mode optical fiber strands.
2. General fiber-optic cable construction.
    a. Fiber strands shall be contained in gel-filled loose buffer tubes.
    b. The fiber-optic sensor cable shall be capable of housing up to 6 such tubes.
    c. Each buffer tube shall house 6 or 12 fiber strands.
3. Standard sensor cable construction.
    a. The sensor cable shall include 3 buffer tubes housing 6 fiber strands each.
    b. The sensor cable shall include 18 fiber strands total.
    c. One (1) tubes with 6 fibers shall be reserved for system operation.
    d. Two (2) tubes with 12 fibers shall be spare.

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.
2. Up to 54 dark fibers may be optionally added to the standard sensor cable.
3. The access to optional fibers shall be provided at
    a. Fiber drop-off enclosures at customer-specified perimeter locations.
    b. Fiber patch panel at the head end location.

D. Fiber-Optic Sensor Length

1. The system shall be capable of monitoring fiber-optic sensor cable with total length of up to 10 miles (16 kilometers).
2. Shorter sensor length may be recommended based upon the considerations of the type and condition of the carrying structure (e.g., fence), the prevailing weather conditions, and the amount of human, animal, and vehicle traffic.
3. Installations that require zigzagging of the sensor cable will have the maximum effective length of the protected perimeter reduced accordingly.

E. Fiber-Optic Sensor Layout

1. The system shall be capable of monitoring a single continuous fiber-optic sensor cable deployed in an open-loop or closed-loop configurations.
2. Special recommendations for more complex perimeter layouts shall be made following a site survey.

F. Environmental Specifications

1. The fiber-optic cables shall withstand operation temperatures between -40°F and +158°F (-40°C and +70°C).
2. The fiber-optic sensor cable shall operate within said temperature range without performance degradation.
3. The fiber-optic cables shall be shipped and stored within temperature range between -40°F and +167°F (-40°C and +75°C).

G. Additional Fiber-Optic Cable Specifications

1.	Outside Diameter, 5 Tubes	0.44" (11.2 mm)
2.	Outside Diameter, 6 Tubes	0.47" (12.0 mm)
3.	Weight, 5 Tubes	52 lbs/kft (78 kg/km)
4.	Weight, 6 Tubes	62 lbs/kft (93 kg/km)
5.	Minimum Bend Radius, Static	10 x OD
6.	Minimum Bend Radius, Dynamic	20 x OD
7.	Tensile Rating, Installation	600 lbf (2700 N)
8.	Tensile Rating, Residual	180 lbf (800 N)
9.	Crush Resistance, Short Term	125 lbf/in (220 N/cm)
10.	Crush Resistance, Long Term	63 lbf/in (110 N/cm)
11.	Optical Loss @ 1550 nm	0.30 dB/km

2.07 SENSOR CABLE INSTALLATION

A. Chain-Link Fence Requirements

1. Chain-link fence construction shall conform to industry standards for security fences.
2. Fence shall be maintained and repaired in accordance with the industry standards.
3. Clearance area shall be at least 10' wide on each side of the fence.
4. Fence signage shall be reduced to the regulated minimum and securely attached to fence posts.
5. Gates shall be secured in closed position so as to eliminate any free movement.
6. Gates remaining open for extended time shall be secured in the open position.
7. Chain-link fence recommended for optimal fiber-optic sensor performance shall have
    a. Aluminum-oxide coated 9-gauge steel wire fabric, tensioned to 1000 lbs.
    b. Bottom rail with fabric twisted ends extending below it.
    c. No top rails. No intermediate-height rails in run sections.
    d. Reinforcement rails in brace sections installed at ¾ height.
    e. Fabric attached to posts and rails using 9-gauge galvanized steel wire ties at least every 15".
    f. 7-gauge hardened galvanized steel tension wire installed 6" to 8" below the top of the fabric.
    g. Intermediate-height tension wire(s) recommended.
    h. Fabric attached to tension wire(s) using 12-gauge galvanized steel wires ties at least every 15".
    i. No aluminum wire ties and no hog rings.
    j. Welded barb wire outriggers.
8. Chain-link fence shall pass the following fabric tension test
    a. Apply 50 lbs force pushing on the fence fabric at the mid-point of the section.
    b. Apply 50 lbs force pulling on the fence fabric at the mid-point of the section.
    c. Total range of fabric deflection shall not exceed 4".
    d. The test shall be repeated for at least 10 representative locations and for all suspect fence sections.

B. Fiber-Optic Sensor Cable Mounting

1. Sensor cable positioning
    a. The positioning of the sensor cable on the fence shall depend on the fence type, trim, height, and condition.
    b. Specific recommendations shall be made following the site survey.
    c. Unless otherwise specified, the following shall apply:
        i. The cable shall be mounted along the inside of the fence.

ii. The cable shall be mounted in a single straight horizontal line.
iii. The height of the cable shall be in the middle of the fence fabric.
iv. A minimum bend radius of 6" shall be maintained on all cable turns.

d. Special cable patterns shall be used around fence corners and brace posts for added sensitivity.

2. Sensor cable attachment
   a. The sensor cable shall be attached directly to the fence fabric.
   b. The cable shall be attached under manual tension.
   c. The cable shall be tied to the fence at wire crossing points.
   d. The cable shall be tied using standard cable ties.
   e. Unless otherwise specified, the cable shall be tied to the fence fabric
      i. At least every 24".
      ii. At least 12" away from fence posts on each side of the post.
      iii. At least every 45º on all cable turns.

3. Cable ties
   Depending on the prevailing local weather conditions, one of two types of cable ties shall be recommended for cable attachment:
   a. 3/16" (4.8mm) wide UV-stabilized nylon 6/6 cable ties
   b. 3/16" (4.8mm) wide stainless steel cable ties

C. Service Loops

1. Fiber-optic cable shall be looped and securely fastened to the fence at least every 1000' or where specified.
2. Extra cable in service loops shall be for the following purposes:
   a. Planned fence maintenance
   b. Planned fiber access points
   c. Cable restoration
3. Service loops shall
   a. hold approximately 30' of cable per spool,
   b. consist of 5 cable loops per spool,
   c. be approximately 24" in diameter.
4. Service loops shall be mounted on the bottom half of the fence, next to a fence post.

D. Gate Bypass

1. The sensor cable shall be buried across gates and other openings in the fence.
2. Overhead structures shall be alternatively used if present and factory approved.
3. The sensor cable shall be buried in conduit at least 12" deep.
4. Deeper burial shall be recommended for high-traffic or fast-traffic roadways and railroad tracks.
5. The ground entry points shall be protected by conduit extending at least 12" above ground.
6. The conduit path shall be offset to the inside of the fence line. The offset distance shall be determined by the following considerations:
   a. Extent of underground utilities
   b. Extent of gate post foundation
   c. Access space requirements for trenching equipment
7. Split conduit specifications:

a.	Material	Schedule 40 PVC
b.	OD	2.375"
c.	Section length	10'
d.	Weight	8.1 lbs
e.	90º elbow dimensions	11.5" x 11.5"
f.	90º elbow bend radius	9.5"
g.	Coupling sleeve length	6"

E. Gate Monitoring

1. Sensor cable may be optionally extended onto chain link swing gates. In this option,
   a. Sensor cable shall be mounted on the swing gate in a loop pattern.

   b. Cable crossing point shall be encased in a 24”-long open vertical conduit section.
   c. The above conduit section shall be mounted on the fence next to the gate post.
   d. The above conduit section shall be secured to the gate post using at least two stainless steel hose clamps.
   e. Sensor cable sections inside the conduit shall be encased in protective sleeves.
   f. The cable shall be buried across the gate as specified in §2.07.D.
2. The sensor extension shall be for the purpose of intrusion detection when the gate is in the closed position.
3. The system shall not be used as a primary gate sensor for access control purposes.
4. The system may generate alarms when the gate opens and closes.
5. Other types of gates shall be bypassed as specified in §2.07.D and shall not be monitored by the system.

F. Building Bypass

In the situations where the fence line is interrupted by a building or other such structure, the sensor cable shall be routed around or through the obstacle in one of the following ways:

1. Buried at the foot of the structure. Subject to the requirements of §2.07.D.
2. Securely attached to and around the side or over the top of the structure. Subject to factory approval.
3. Routed through the structure and securely attached inside. Subject to factory approval.

G. Fiber-Optic Sensor Termination

1. Both ends of the fiber-optic sensor shall be terminated with special termination modules.
2. The termination modules shall utilize passive fiber-optic components only.
3. The termination modules shall require no electrical power.
4. All fiber connections shall be permanent fusion splice connections.
5. The termination components shall be sealed inside outdoor-rated fiber-optic splice enclosure(s).
6. The termination enclosure(s) shall be mounted in a safe location inside the protected area
   a. The termination enclosure(s) shall be mounted next to a fence post and secured to the fence fabric.
   b. The bottom of termination enclosure shall be at least 12” above ground.
7. The termination enclosures shall only be opened by factory-trained and certified personnel. Unauthorized opening of the termination enclosures shall void any and all product warranties.
8. Termination enclosure specifications:
   a. Dimensions 14.75”x8.5”x3” (375x216x76mm)
   b. Weight, unloaded 4.0 lbs (1.8 kg)
   c. Maximum splice count 24

H. Fiber-Optic Lead Cable

1. The fiber-optic lead cable shall connect the fiber-optic sensor to the head-end equipment.
2. The lead cable shall be insensitive.
3. The lead cable may consist of an outdoor and an indoor sections as necessary.
4. The outdoor lead cable shall be of the same type as the sensor cable unless otherwise specified.
5. The length of the lead cable shall be less than 10 miles (16 kilometers).
6. The combined length of the sensor and lead fiber-optic cables shall be less than 10 miles (16 kilometers).
7. The lead cable shall be installed inside existing or specially added duct path.
8. Generally accepted or site-specific requirements pertaining to communication infrastructure shall apply to lead cable installation.
9. The outdoor end of the lead cable shall be connected to the sensor cable inside the near-end termination enclosure or a separate fiberoptic splice enclosure.
10. The indoor end of the lead cable shall be terminated inside the fiber patch panel installed in proximity to the head end equipment.

2.08 SYSTEM HEAD END

A. Head End Components and Installation

1. The head end components shall include
    a. Sensor controller module
    b. Data processor module
    c. Slide-out LCD / keyboard / touchpad drawer (console)
    d. Fiber-optic patch panel
2. The head end components shall be designed for standard 19”-wide rack.
3. The rack shall not be included unless specially ordered.
4. The rack shall have at least 22” depth clearance with rear access for module interconnects and unimpeded air circulation.
5. The rack shall have at least 2” of clearance in front of the mounting rails.
6. The head end equipment shall require
    a. 7RU contiguous rack space for modules only
    b. 9RU contiguous rack space for modules with patch panel and console
7. The head end equipment shall be mounted at least 12” above floor level.

B. Head End Mechanical Specifications

1.	Width	19” (482 mm)
2.	Depth w/o cables	19” (482 mm)
3.	Depth w/ cables	22” (559 mm)
4.	Height, Processor Module	4 RU – 7” (178 mm)
5.	Height, Controller Module	3 RU – 5.25” (134 mm)
6.	Height, Console	1 RU – 1.75” (45 mm)
7.	Height, Console	1 RU – 1.75” (45 mm)
8.	Weight, Processor	43 lbs (19.5 kg)
9.	Weight, Controller	26 lbs (11.8 kg)
10.	Weight, Console	23 lbs (10.5 kg)
11.	Weight, Patch Panel	11 lbs (5 kg)

C. Head End Fiber Connections

1. Fiber-optic lead cable shall be connected to the sensor controller module via a fiber patch panel and a set of fiber patch cords.
2. Standard fiber patch panel shall have the following characteristics:
    a. compatible with standard 19”-wide rack, 1RU high
    b. designed to hold up to 12 fiber-optic splices
    c. splice access via front-end slide-out tray
    d. front- and rear-end patch cord access
    e. rear-end lead cable access
3. Fiber patch panel shall be mounted in the rack space adjacent to the head end equipment.
4. Optionally, fiber patch panel can be wall-mounted in an accessible location within 6’ from the cabinet containing the head end equipment.

D. Data Processor Module

1. The system shall be controlled by the software running on the data processor module.
2. The data processor module shall be PC-based.
3. The data processor module shall include the following or similar:
    a. 1.86 GHz Intel Nehalem CPU
    b. 3.0 GB DDR3-1333 ECC RAM
    c. Two 500 GB 7,200 RPM SATA HDD – Raid 1
    d. DVDRW drive
    e. 550 W redundant universal power supply
4. The data processor module shall operate under Microsoft Windows XP Professional 2002 SP3 operating system or similar.
5. The data processor module shall provide a network connection with the following features:
    a. Built-in dual 10/100/1000base-T Ethernet interface
    b. Two RJ45 connectors
    c. Connection via standard CAT5 cable

E. Optical Characteristics

1. Active optical components shall be contained in transmitter and receiver modules.
2. The fiber-optic inputs and outputs shall be of the FC/APC type.
3. All optical components shall be either fiber-based or sealed fiber-pigtailed devices.
4. Sensor controller module shall incorporate a Class IIIb infra-red laser.
    a. The laser shall operate in the 1550 nm wavelength band.
5. No free-space laser beams shall be present during normal operation.
6. System optical power margin shall be no less than 6 dB.

F. Head End Power Requirements

1. Head end equipment shall require
    a. 100 to 240 Volts AC, 50 / 60 Hz electrical power line.
    b. Four (4) power outlets.
    c. Maximum of 325 W of electrical power.
2. An uninterrupted power supply (UPS) and/or a stand-by power generator is recommended for continuous system operation.
3. The UPS shall not be included unless specially ordered.

G. Optional Console Specifications (Typical, Subject to Availability)

1.	LCD dimension	15”
2.	Resolution	up to 1024 × 768 (XGA)
3.	Brightness	250 cd/m^2
4.	Contrast	400:1
5.	Video input	VGA
6.	Keyboard	PS/2
7.	Touch Pad	PS/2

H. Head End Environmental Specifications

1. The head end equipment shall operate between +50°F and +95°F (+10°C and +35°C).
2. The head end equipment shall operate in relative humidity of 20% to 80%, non-condensing.
3. The head end equipment shall be shipped and stored within temperature range between -4°F and +158°F (-20°C and +70°C).
4. The head end equipment shall be shipped and stored in relative humidity of 5% to 85%, non-condensing.

2.09 SYSTEM SOFTWARE

A. Modes of Operation.

The system software interface (Fiber Patrol Software Interface or FPSI) shall support the following general modes of operation:

1. Standalone
2. Interfaced to Fiber Patrol Remote Alarm Management System (FPRAMS)
3. Interfaced to third-party alarm management system (subject to separate software development terms and conditions).

B. Functionality.

FPSI shall support the following functions:

1. Hardware monitoring and control
2. Sensor signal processing and analysis
3. Event detection and alarm generation
4. Basic alarm management

5. Event and alarm logging
6. Detection zone definition and configuration
7. Adjustment of detection parameters
8. Local operator interface
9. Remote interface

C. Secure System Access

1. FPSI shall require a valid password at start-up and shutdown time.
2. FPSI 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. FPSI shall monitor the operating status of system components.
2. FPSI shall alert local and remote operators of any detected system component failure.

E. Graphical Alarm Display

1. FPSI 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
3. The site image and alarm location marker shall be provided for visual reference only.
4. Subject to availability, the site image shall be one of the following:
    a. satellite photo
    b. aerial photo
    c. map
    d. schematic
5. The quality and fidelity of the image shall be subject to availability.
6. Integration of a site image shall require detailed mapping of the perimeter, performed at the time of system installation and calibration.

F. Alarm Management

1. FPSI 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
    a. shall be the linear position along the sensor cable
    b. may optionally match the length marks printed on the cable
    c. shall be expressed in feet, unless otherwise specified at the time of ordering

2. Secondary location formats shall be derived from the primary measure using appropriate calibration tables.
3. Secondary location formats shall require corresponding mapping of the perimeter fence line.
4. Optionally available secondary alarm location formats shall include
    a. latitude and longitude (GPS) coordinates
    b. software-defined zones

H. Event Logging

1. FPSI 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. FPSI shall incorporate ASCII text-based input/output interface for integration with FP RAMS and 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
4. The maximum connection bandwidth requirement shall be 100 kBytes/sec.
5. FPSI remote interface shall support broadcast and query modes.
6. In the broadcast mode, the alarm information shall be continuously sent to the recipient.
7. In the query mode, the recipient shall request the alarm information strings.
8. The remote recipient shall be able to clear alarms and query/set select system parameters.

J. Custom Remote Interface Capabilities

1. The alarm data format and communication mode may optionally be customized to fit the requirements of third-party monitoring products.
2. Custom interface development shall be subject to separately defined terms and conditions.
3. A limited list of custom interface capabilities includes
    a. Hardware input/output
        i. RS-232
        ii. Relays
    b. Network-based input/output
        i. E-mail (SMTP, SOAP) messages
        ii. Instant messaging (SMS)

2.10 PRODUCT AVAILABILITY

A. The system as described herein is manufactured by

Optellios, Inc.
11 Penns Trail
STE 300
Newtown, PA 18940
U.S.A.
phone: 1.267.364.5298
fax: 1. 267.364.5357
email: info@optellios.com

2.11 WARRANTY AND SERVICE

A. The system shall be free of defects in workmanship and material under normal operating conditions for a period of one year from the date of shipping.

B. Any parts shown defective in workmanship or material during the warranty period shall be repaired, replaced or adjusted free of charge.

C. The system shall be supported with service and replacement parts available for a period of 5 years from the date of shipping.

D. Warranty and general service shall be provided by

Optellios, Inc.
11 Penns Trail
STE 300
Newtown, PA 18940
U.S.A.
phone: 1.267.364.5298
fax: 1. 267.364.5357
email: info@optellios.com

END OF SECTION