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Product Specifications

INTREPID™ SINGLE-PLATFORM PERIMETER INTRUSION DETECTION AND MONITORING SYSTEM

Purpose of document

This document is intended to provide performance specifications requirements for the INTREPID™ perimeter sensors and controller monitoring systems. This specification may be copied to form a generic procurement specification.

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Procurement Specifications
INTREPID™ Single-Platform Perimeter Intrusion Detection System

1.0 INTREPID™ Single-Platform Perimeter Intrusion Detection System

System Type: Perimeter Intrusion Detection System

Installation: By Contractor

Project: Sample "XYZ" Project

1.0 General

It is the intent of the **[XYZ Company]** to purchase a complete and operable outdoor perimeter detection control and monitoring system for the **[XYZ Facility]** as specified below and on referenced drawings and documents.

- 1.0.1 The following specifications are for a perimeter intrusion detection system with graphic controller.
- 1.0.2 The performance criteria required for this project shall meet or exceed that provided by the INTREPID™ system as manufactured by Southwest Microwave, Inc., Tempe, Arizona (480-783-0201).
- 1.0.3 The contractor shall provide all installation labor, hardware, and electronics for the system. After installation, the contractor shall secure the services of the manufacturer's technician to provide on-site technical assistance for installation inspection, testing, and training.
- 1.0.4 The contractor shall provide certification, as a part of the project submittals, that the controller and sensor manufacturer's on-site services will be provided as a part of this contract.
- 1.0.5 The contractor shall furnish a complete perimeter intrusion detection system with computer graphic alarm reporting and display system necessary for the audible and visual notification of all system activity.

1.1 System Description

The complete perimeter detection system shall consist of multiple sub-systems:

- INTREPID™ Graphic Control Module II System
- INTREPID™ MicroPoint™ II Fence Intrusion Detection System
- INTREPID™ MicroTrack™ II Buried Intrusion Detection System
- INTREPID™ MicroWave 330 Microwave Intrusion Detection System

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1.2 System Devices

The alarm communication network shall be capable of supporting the following network devices:

- **MicroPoint™ II Systems** from cable fence disturbance sensor systems, each processor shall be capable of protecting 400 meters with software alarm zones. An acceptable product that meets or exceeds these requirements is the MicroPoint™ II system Processor Module (PMII)
- **MicroTrack™ II Systems** from buried cable outdoor intrusion detection systems, each sensor module shall be capable of protecting up to 400 meters with software-controlled alarm zones. An acceptable product that meets or exceeds these requirements is the MicroTrack Processor Module (MTP II)
- **330 MicroWave Sensor** from volumetric microwave sensor systems, each processor shall be capable of protecting 400 meters, An acceptable product that meets or exceeds these requirements is the INTREPID™ Microwave 330 Microwave system.
- **Graphic Control Module II** is a dedicated, graphic system controller designed for large or multi-site facility with local or remote GUI-based alarm monitoring and control of INTREPID™ systems using the INTREPID™ Polling Protocol. The controller connects up to 32 devices and will handle up to 1024 zone records.
- **Control Module II** is designed to for mid-sized facilities a remote and provided alarm monitoring and control of the INTREPID™ systems using the INTREPID™ Polling Protocol. The controller connects up to 16 devices and will handle up to 256 zone records. This self-contained device contains a web browser for system configuration.
- **Relay Control Module II** is designed for smaller facilities with cost effective local control of the INTREPID™ systems using the INTREPID™ Polling Protocol. The controller connects all INTREPID™ devices together polling all the devices. It includes 8 relay output relays for zones assignment. This device will control up to 8 devices and will handle up to 21 zones.
- **Relay Output Module II** provides 8 or 16 relay outputs for use with INTREPID™ system using INTREPID™ Polling Protocol.
- **Alarm Input Module** is designed to accept up to 8 relay inputs from conventional sensors, auxiliary devices, and gate contacts which communicate on the INTREPID™ Polling Protocol.

1.3 Power for systems

All the system devices shall have the capability to operate over a voltage input from 10.5 to 60 VDC.

1.4 System Setup

1.4.1 The system shall have single a universal installation service tool to allow setup of all the intrusion sensors from a simple to use software tool which operates on a laptop computer.

1.4.2 The universal installation tool will provide intuitive setup guided navigation and forward propagation to simplify setup and calibration.

1.4.3 The universal installation tool shall support serial or network communications for diagnostics of the system sensors devices both locally or remotely.

1.4.5 Zones will be defined using the INTREPID™ Controller setup software on a PC.

1.4.6 Controllers shall utilize Auto Discovery to confirm configuration of all devices.

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2.0 INTREPID™ Graphic Control Module II (GCM II)

INTREPID™ Graphic Control Module II (GCM II) is an alarm annunciation, control and communications system which allows users to monitor and control an entire network of security systems. The GCM II operates in conjunction with the INTREPID™ Polling Protocol II (IPP II) alarm communications network.

The alarm annunciation, control and communication system shall operate in a real-time multitasking operating system using a Linux controller platform. The system shall allow an operator to control and maintain a site's security system from a central location. Site information and alarm data shall be displayed on color-coded maps on a color monitor.

Alarm processing operations shall be performed using a mouse. All system events, operator actions and maintenance information shall be stored on the computer with output to a printer to maintain a permanent record of system activity.

The system shall provide, as an option, the capability of creating site-specific maps and databases that include the equipment and features of individual sites and security systems. The system shall be programmable for the unique alarm response requirements of each individual site.

The alarm signal communications network shall be designed specifically for security monitoring applications.

The network shall collect signals from the remote security sensors and deliver the signals to the centralized control facility via a serial data link. The network shall deliver test, maintenance, control and alarm response signals from the centralized control and maintenance facility to remote security devices. The network shall support dual data paths over RS422 copper wire or fiber optic cable.

Alarm polling protocol shall be an open architecture communication protocol network that is used to connect security sensors and other devices to a host alarm annunciation and control system. This network operates in conjunction with the INTREPID™ Polling Protocol II for all alarm annunciation, control and communication.

2.1 Alarm Reporting / Graphic Display System

2.1.1 The Alarm Reporting / Graphic Display system shall, as a minimum, consist of a controller, dedicated only to the reporting and display of perimeter security information and equipped with the necessary I/O hardware, color monitor, and three (3) button mouse.

2.1.2 The Alarm Reporting system shall provide control room personnel with the various alarm conditions through each of the following methods:

- 1.) Visual indication, on color monitor, of alarm location
- 2.) On-screen text providing precise alarm location
- 3.) Serial RS232, or RS422 communications output
- 4.) Relay Outputs

2.1.3 The field installed devices shall communicate all system activity to the central controller based Alarm Reporting system via a serial RS422 output. A communications protocol shall be used that allows the receiving equipment to acknowledge the successful reception of each message.

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- 2.1.4 The various devices shall provide to the central controller the precise location of a detected intrusion, tamper, or fail occurrence. The indication(s) shall remain on the display until cleared by operator action.
- 2.1.5 Intrusions or faults will be displayed with flashing red icons, indicating an alarm.
- 2.1.6 The controller shall have Autodiscover to verify all the devices on the network are identified and configured.
- 2.1.7 The controller system shall have user friendly Guided Navigation for simple setup and operation.
- 2.1.8 The GCM II shall support multiple languages choices.
- 2.1.9 A line drawing of the perimeter showing the various detection zones and major site landmarks shall be provided on the color PC graphics display. All Zones that are "armed and secure" shall appear as green lines.
- 2.1.10 The Monitor Display and Control software shall provide specific combinations of Zone "Acknowledge", "Reset", "Access", and "Secure". The available options at any given time are presented to the operator according to the current status of the system.
- 2.1.11 After an initial alarm, the display shall be capable of identifying the location of subsequent alarms and shall identify the fact that multiple zones are registering alarms.
- 2.1.12 Multiple attacks at different locations, even within the same zone, will be identified separately on the Alarm Reporting system.
- 2.1.13 The operator shall be capable of resetting each individual alarm.
- 2.1.14 Audible annunciation and visual indication for each alarm event will be provided by a monitor display in the control room.
- 2.1.15 All system activity shall be permanently recorded on an 8.5"x11" paper printer and shall be stored in the controller.
- 2.1.16 The perimeter fence zoning shall be established in the controller software. The zoning can be changed via software as required without a need for a change in hardware.
- 2.2.17 The controller shall be Linux based. The operator shall be able to configure and maintain the system, manage alarms, and monitor overall system performance
- 2.2.18 The controller shall have 1024 zone records and connect up to 32 devices.
- 2.2.19 The controller shall have alarm tagging and up to 256 user accounts.
- 2.2.20 The controller shall have relay alarm input and output devices which communicate over the common network and operate on the common power.

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3.0 MicroPoint™ II Fence Intrusion Detection System

- 3.0.1 The fence-mounted system shall utilize a microphonic sensing element, to detect vibrations from cut or climb over attempts to the fence fabric and subsequently identify the point of intrusion to within 10 feet (3m).
- 3.0.2 Each Processor Module II (PM II) shall monitor up to 1,312 feet (400m) of MicroPoint™ cable.
- 3.0.3 Detection and location of intrusions shall be performed by DTDR (Digital Time Domain Reflectometry) methodology. The DTDR function shall reside in the distributed PM II's and not in a centralized processor or computer.
- 3.0.4 The length of each zone in the system shall not be restricted to the physical location of the fixed PM II's but shall be variable between 3 meters and the maximum zone length as indicated elsewhere in the specifications or project drawings.
- 3.0.5 The fence sensor shall provide "Sensitivity Leveling" on a meter by meter basis which automatically compensates for fence variations making each meter of fence equally sensitive to intrusions.
- 3.0.6 Fence sensor zone configurations shall be based on the design criteria listed below.
 - 1.) Fence zones should not exceed 328 linear feet (100m) in length.
 - 2.) Fence zones shall not extend around corners in perimeter fencing.
- 3.0.7 The fence sensor shall employ Point Impact Discrimination, made possible by DTDR technology, which detects single location activity (climbing or cutting the fence) while rejecting other distributed environmental conditions (wind, rain, or thunder). The digital signal processing (DSP) shall utilize both temporal and spatial filtering.

3.1 Fence Sensor System

- 3.1.1 Intrusion of any zone shall be identified to within 10 feet (3m) of the attack.
- 3.1.2 Depending on the perimeter length and number of auxiliary devices, the MicroPoint™ II system shall be capable of providing power to the exterior PM II's without additional cabling. The manufacturer shall advise the contractor on this capability for this specific project.
- 3.1.3 The system shall allow for the de-sensitizing in software of any section of the sensor cable (gate areas, lead in cables, etc.) precluding the necessity for spliced non-sensitive cable.

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3.2 Processor Module II (PM II)

- 3.2.1 Detection processing shall be performed by the various Processor Modules II (PM II's) distributed around the perimeter. Each PM II shall provide processing for up to 1,312 feet (400m) of sensor cable.
- 3.2.2 Detection criteria shall reside in non-volatile memory in each respective PM II.
- 3.2.2 Field locations of the PM II's shall be determined by such factors as perimeter length, operational convenience, and physical security concerns with no regard to detection zoning.
- 3.2.4 In the event of a temporary loss of communication with the central controller, each PM II shall have the capability of storing system activity and upload same when communication is resumed.
- 3.2.5 MicroPoint™ II shall operate within specification at temperatures between - 40F (- 40C) and 159F (+70C) degrees ambient, continuously without assistance from cooling or heating apparatus.
- 3.2.6 MicroPoint™ II shall operate within all specifications when continuously exposed to 95% relative humidity, non-condensing.
- 3.2.8 The PM II's shall be provided in ABS UV stabilized plastic enclosures fitted with tamper switches.
- 3.2.9 The PM II's shall be capable of accepting contact-closure alarm inputs from auxiliary devices (ie, microwave, PIR, etc.) and provide alarm interface to the INTREPID™ controller.
- 3.2.10 The installation locations of the PM II's shall be governed by the 1,310 feet (400m) maximum distance of supported cable and is not governed by perimeter zoning.
- 3.2.11 The PM II's shall provide up to 150 mA at 12 VDC to auxiliary sensors.

3.3 MicroPoint Cable Fence Intrusion Detection System

- 3.3.1 The Fence Sensor Cable shall be attached at 9" intervals to the chain-link fabric with UV resistant cable ties at a mounting height determined by the manufacturer for this project.
- 3.3.2 The MicroPoint™ II cable shall be capable of being cut on site during installation to any length up to a maximum of 656 feet (200m).
- 3.3.3 The "Sensitivity Leveling" function (as described in paragraph 2.2.6) shall be calibrated with the use of system software and automatically calibrated for every 1 meter of cable.
- 3.3.4 The partitioning of the perimeter fence into detection zones shall be established in software after installation of the system and in consideration of site conditions. Other considerations for zoning shall include the reduction of nuisance alarms and providing assessment advantages for patrol personnel. The proposed zoning shall be reviewed by the owner for approval.

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- 3.3.5 The MicroPoint™ II system shall utilize a distributed switching power network that provides dc power to all the modules without the use of separate power supplies. The configuration shall permit the use of a central UPS AC power supply for the entire system.

- 3.2.7 The system input power shall be capable of accepting standard DC voltage power supplies of 12, 24 or 48 VDC power. The system shall allow for DC power input from 10.5 to 60 VDC.

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4.0 INTREPID™ MicroTrack™ II Buried Cable Intrusion Detection System

- 4.0.1 The buried cable system shall be designed to detect intruders within the invisible electromagnetic field created around and between two parallel buried cables, and subsequently identify the precise point of intrusion to within 10 feet (3 meters).
- 4.0.2 The buried cable system shall detect and locate intruders using ultra wide-band Frequency Stepped Pulse Code Modulated (FS/PCM) technology in conjunction with Multi-Segment Target Analysis (MSTA). The FS/PCM and MSTA functions shall reside in the distributed MicroTrack™ II Processor and not in a centralized processor or computer.
- 4.0.3 The buried cable system shall detect and locate intruders crossing or walking within the invisible detection field while rejecting small animals and environmental conditions such as wind, rain, snow, seismic or magnetic effects.
- 4.0.4 Each MicroTrack™ II Processor (MTP II) shall monitor up to two buried sensor cable sets for a total perimeter length up to 1,312 feet (400 meters).
- 4.0.3 The installation locations of the MTP II's shall be governed by the 1,310 feet (400 meters) maximum distance of supported cable and is not governed by perimeter zoning.
- 4.0.5 The buried cable system shall operate in and under a wide variety of burial medium including dry ground, frozen ground, snow covered ground and moisture saturated ground, as well as concrete and asphalt.
- 4.0.6 The buried cable system shall detect walking intruders with a weight of 75 pounds (34 kg) with a Probability of Detection (Pd) of 99% at a 95% confidence level.
- 4.0.7 The buried cable system shall have a velocity response ranging from 0.1 feet/sec to 50 feet/sec (0.03 meters/sec to 15 meters/sec) for detecting intruders moving through the detection field.
- 4.0.8 The buried cable system shall not detect small animals weighing 22 pounds (10 kg) or less with Probability of Detection (Pd) of 5% at a 95% confidence level.
- 4.0.9 Buried cable system shall operate at frequencies below 25Mhz to assure detection field follows bends or has a minimum of 2 meter radius in the sensor cable to fit site terrain.
- 4.0.9 The buried cable system shall provide "Sensitivity Leveling™" which automatically and directly compensates for burial medium variations equalizing sensitivity to intrusions along its entire length. Sensitivity Leveling™ is a calibration technique which sets thresholds for each and every cell along the sensor cable. For each 673 feet (205 meters) of sensor cable set there are approximately 105 subcells, each 6.5 feet (2.0 meters) long.
- 4.0.10 The buried cable system shall support "Free Format Zoning™", allowing zones to be established in software independent of the fixed MTP locations and sensor cable set lengths.
- 4.0.11 Each buried cable system shall be capable of supporting up to 100 detection zones per MTP II independent of the location of the MTP II and the length of the sensor cable set(s) providing total cable length of 328 feet (100m).

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- 4.0.12 The length of each zone in the system shall not be restricted to the physical location of the fixed MTP II's and the sensor cable set lengths, but shall be variable between 10 feet (3 meters) and the maximum zone length as indicated elsewhere in the specifications or project drawings.
- 4.0.13 Buried cable system zone configurations shall be based on the design criteria listed below:
- a) Buried cable zones should not exceed 50 linear feet (15 meters) in length for optimum CCTV assessment.
 - b) Buried cable zones shall not extend around corners in perimeter fencing.
- 4.0.14 The buried cable system shall conform to the radiation characteristics of F.C.C. Rules and Regulations, Part 15 and CE Regulations EN 60950-1, EN 300-330-1, EN 300-330-1-7.2, EN 300-330-1-7.4.3 and EN 300-330-1-8.2.

4.1 INTREPID™ MicroTrack™ II Cable

- 4.1.1 Sensor cable assemblies shall be available in lengths of 360 feet (110 meters) and 689 feet (210 meters), which includes 16 feet (5 meters) for detection field startup, and have 66 feet (20 meters) of non-sensitive (non-leaky) lead-in cable to connect to the MTP II. Lead-in cable connectors and cable junctions shall be factory installed.
- 4.1.2 Sensor cable may be cut to length in the field. Buried sensor cable connections to or MicroTrack™ Terminations (MTT) or MicroTrack™ In-line Terminations (MTI) shall be made with factory provided kits. Standard electrical connectors (e.g., TNC or N-type) and heat shrinkable tubing shall not be used for buried cable connections.

4.2 MicroTrack™ II Processor (MTP II)

- 4.2.1 Detection processing shall be performed by the various MicroTrack™ II Processors (MTP II's) distributed around the perimeter. Each MTP II shall provide processing for up to 1,312 feet (400 meters) of perimeter.
- 4.2.2 Detection criteria shall reside in non-volatile memory in each respective MTP II.
- 4.2.3 Field locations of the MTP II's shall be determined by such factors as perimeter length, operational convenience, and physical security concerns with no regard to detection zoning.
- 4.2.4 In the event of a temporary loss of communication with the central PC, each MTP II shall have the capability of retaining site data until communication is restored.
- 4.2.5 MTP II's shall operate within specification at temperatures between -40°F and 159°F (40°C and +70°C) ambient, continuously without assistance from cooling or heating apparatus.
- 4.2.6 MTP II's shall operate within all specifications when continuously exposed to 95% relative humidity, non-condensing.
- 4.2.7 MTP II's shall be housed in a weather-tight NEMA 4 enclosure fitted with tamper switches.

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4.2.8 MTP II's shall include devices to protect against lightning and electrostatic discharge.

4.2.10 MTP II's shall be powered directly with 10.5 to 60 VDC.

4.2.11 MTP II's shall be communicate RS422 for alarm network and RS232 for setup.

4.3 INTREPID™ MicroTrack™ II Buried Cable Intrusion Detection System

4.3.1 The sensor cable shall be buried to a depth not exceeding 9 inches (23 cm) in soil, and as determined by the manufacturer for concrete and asphalt for this project.

4.3.2 The sensor cable shall be capable of being cut on site during installation to any length up to a maximum of 689 feet (210 meters).

4.3.3 The sensor cable shall not be graded and will be of identical internal construction and dimensions from end to end so repairs do not require analysis of damaged cable

4.3.4 The Sensitivity Leveling™ function (as described in paragraph 2.2.9) shall be calibrated with the use of system software and automatically calibrated for every subcell along the cable.

4.3.5 Partitioning of the perimeter area into detection zones shall be established in software after installation of the system and in consideration of site conditions. Other considerations for zoning shall include the reduction of nuisance alarms and providing assessment advantages for patrol personnel. The proposed zoning shall be reviewed by the owner for approval.

4.3.6 The buried cable system input power shall be capable of accepting standard DC voltage power supplies of 12, 24 or 48 VDC power. The system shall allow for DC power input from 10.5 to 60 VDC.

4.3.8 The sensor cable shall be field-repairable if damaged by replacing the damaged section with a spare sensor cable section and a splice kit with encapsulating compound and an enclosure.

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5.0 INTREPID™ MicroWave 330 Digital Microwave Sensor System

- 5.1 Outdoor microwave intrusion sensors shall be Southwest Microwave's INTREPID™ MicroWave 330 Digital Microwave sensors or approved equal having a maximum range of 800 feet (244m).
- 5.2 The devices shall be bi-static and detect intrusion by sensing changes (increase and decrease) in the amplitude of the received signal. An automatic gain control (AGC) circuit shall be incorporated which will adjust the receiver gain, as needed, for various distances from the transmitter and adjust the gain for changes in path loss, such as rain, snow, fog, etc.
- 5.3 The microwave sensor shall have six transmitter and receiver modulation frequencies shall be available to minimize interference between adjacent units.
- 5.4 The microwave sensor shall have a range of 100 feet (30.5m) to 800 feet (244m) and a beam diameter of 2 feet to 22 feet (0.6m to 6.7m) depending on link length, antenna pattern element and sensitivity setting.
- 5.5 The microwave sensor shall detect at minimum an 77 (35kg) pound human - walking, running, hands and knees crawling, jumping, rolling or prone crawling (30cm diameter metal sphere) at a target velocity of 0.1 ft/sec to 50 ft/sec (30mm/sec to 15m/sec)
- 5.6 The microwave sensors shall have field adjustable sensitivity control by means of an internal potentiometer. Require no special adjustment tools.
- 5.7 The microwave sensors shall have digital signal processing of alarm signals and multiple algorithms to fit various site conditions.
- 5.8 The microwave sensor shall utilize a software universal installation tool with graphic display to control sensor parameters with a Laptop PC. Remote adjustment will be available via TCP/IP connection while the sensor is operating.
- 5.9 The microwave sensor shall provide a separate path alarm report when received signal changes by a preset level to show a signal strength changes in the detection field.
- 5.10 The microwave sensor shall have a sync feature to allow connection of up to 16 units and an optional sync wire to reject mutual interference. Any sensor can be designated as the master.
- 5.10 The microwave sensors shall have an output power or 20dBm peak EIRP, average, and shall be square wave modulated.
- 5.11 The microwave units shall operate at a carrier frequency of K-band (24.162 GHz +15 MHz)
- 5.12 The microwave sensor shall incorporate a K-band, mechanically-tuned Gunn Diode oscillator as the signal source, illuminated by a parabolic reflector with a rear-entry dielectric feed. The system shall conform to radiation characteristics of F.C.C. Rules and Regulations, Part 15. and CE EN300 440.
- 5.13 The microwave sensor shall operate on an input voltage of 10.5 to 60 VDC.

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- 5.14 The microwave sensor shall provide alarm indication by relay contacts. Contact rating 2 amps at 28 VDC (Form C) SPDT.
- 5.15 The microwave sensor shall have a RS422 port for remote communication of alarms using the INTREPID™ Polling Protocol II.
- 5.16 The microwave sensor shall have a tamper switch that protects unauthorized removal of radome. Indication shall be by contacts - one normally open, one normally closed and one common. Contact rating 10 amps at 28 VDC.
- 5.17 The microwave sensor shall have a diameter of 10.6 inch (27cm), depth of 8.8 inch (23cm) and weight of 4.5 lbs. (2.04) kg). All electronics and antennas should be mounted to be a rugged metal baseplate and enclosed in an ABS, UV resistant radome.
- 5.18 The microwave sensor shall a temperature rating of -40° F to +150° F (-40° C to +66°C) and a relative humidity rating of 0 to 100%.
- 5.19 The microwave sensor shall have a RS232 port for local setup using the Universal Installation Setup Tool II.

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6.0 Installation/Documentation/Services

- 6.1 Contractor shall confirm the necessary documentation to confirm that the system is installed in accordance with on-site requirements and manufacturer's installation instructions. The contractor shall perform all wire hook-ups.
- 6.2 After installation of the system, the contractor shall make provisions for manufacturer's technical representative to perform final on-site inspection and training, coordinated with the owner or owners representative.
- 6.3 Contractor shall supply the manufacturer with details of site. Manufacturer shall provide recommendations for the mounting post locations based on this information.
- 6.4 The supplier shall provide technical support and warrant that spare parts and assemblies shall be available for a minimum of 10 years.

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