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Product Specifications

INTREPID™ Model 390 Advanced Digital Microwave Transceiver

Purpose of document

This document is intended to provide performance specifications requirements for the INTREPID™ Model 390 Advanced Digital Microwave Transceiver perimeter sensor. This specification may be copied to form a generic procurement specification.

1.0 Perimeter Intrusion Detection Sensor	2
2.0 INTREPID™ Model 390 Advanced Digital Microwave Transceiver	3
3.0 Installation / Documentation / Services.....	5

Procurement Specifications
INTREPID™ Model 390 Advanced Digital Microwave Transceiver

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Sensor Type: Microwave Perimeter Intrusion Detection Sensor

Installation: By Contractor

Project: Sample "XYZ" Project

1.0 Perimeter Intrusion Detection Sensor

It is the intent of the [XYZ Company] to purchase microwave outdoor perimeter detection for the [XYZ Facility] as specified below and on referenced drawings and documents.

- 1.0.1 The following performance specifications are for a monostatic microwave perimeter intrusion detection sensor, consisting of both transmitter and receiver in a single enclosure.
- 1.0.2 Microwave sensor shall operate in K-Band to ensure inherent resistance to outside interference from airport landing systems, aircraft or marine radar, and other microwave intrusion systems.
- 1.0.3 Performance criteria required for this sensor shall meet or exceed that provided by the INTREPID™ Model 390 Advanced Digital K-Band Microwave Transceiver as manufactured by Southwest Microwave, Inc., Tempe, Arizona USA (+1-480-783-0201).
- 1.0.4 Contractor shall provide all installation labor, hardware, and electronics for the sensor. 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.
- 1.0.5 Contractor shall provide certification, as a part of the project submittals, and sensor manufacturer's on-site services will be provided as a part of this contract.

1.1 Sensor Description

- 1.1.1 Complete perimeter detection sensor shall consist of an advanced digital microwave transceiver that shall be capable of protecting between 15 to 61 meters (50 to 200 ft). An acceptable product that meets or exceeds these requirements is the Model 390 Advanced Digital Microwave Transceiver.

1.2 Sensor Capabilities

- 1.2.1 Microwave sensor shall be fully compatible with direct replacement of Model 380 Microwave Transceiver on existing installations.
- 1.2.2 Microwave sensor shall feature advanced digital signal processing for high probability of detection (Pd) and a low nuisance alarm rate (NAR)
- 1.2.2 Microwave sensor shall employ the following Security Protocols: TLS 1.2, supports X.509v3 Public Key Infrastructure Certificates.

Procurement Specifications

INTREPID™ Model 390 Advanced Digital Microwave Transceiver

- 1.2.3 Microwave sensor shall have the capability to operate over a common voltage input from 10.5 - 60 VDC or via POE (IEEE 802.3af, Class 1) without any required adapters or supplemental circuit boards.
- 1.2.4 Microwave sensor shall utilize the standard mounting brackets common with all Southwest Microwave sensors.

1.3 Sensor Setup

- 1.3.1 Microwave sensor shall have a secure embedded, Ethernet-based installation service tool, referred to as the Installation Service Tool (IST), for local or remote setup and control of microwave sensor parameters from an authorized PC or mobile device.
- 1.3.2 IST shall support TCP/IP network communications to simplify setup and enable real-time calibration in the field. Its function shall be to align and configure the detection parameters and network parameters of the Model 390 Transceiver. It shall also be used for diagnostics and servicing of the sensor, either locally or remotely.

1.4 Alarm Monitoring

- 1.4.1 Alarm monitoring for the sensor shall be handled in one of three ways:
 - Via on-board Form-C Relay Contacts
 - Via an Ethernet-based INTREPID™ POE system controller, without any required adapters or supplemental circuit boards.
 - Via high level interface (HLI) to Southwest Microwave's Perimeter Security Manager II Alarm Monitoring and Control System, or a compatible third-party Physical Security Information Management (PSIM) or Video Management System (VMS).

2.0 INTREPID™ Model 390 Advanced Digital Microwave Transceiver

- 2.0.1 Outdoor microwave intrusion sensor shall be Southwest Microwave's INTREPID™ Model 390 Advanced Digital K-Band Microwave Transceiver or approved equal, having a range of 15 to 61 meters (50 to 200 ft).
- 2.0.2 Microwave sensor shall be monostatic (transmitter and receiver in a single unit) and detect intrusions by transmitting microwave energy into the detection zone. Objects in the zone reflect energy back to the unit. If an object is moving, the Doppler effect will shift the frequency of its reflection, and the transceiver will generate an alarm when it detects this frequency shift in the reflected energy.
- 2.0.3 Microwave sensor shall include synchronization and addressing circuitry that enables simultaneous operation of up to 8 units without mutual interference.
- 2.0.4 Microwave sensor shall include staggered RF frequencies (Channel A and B) to minimize mutual interference between adjacent units.
- 2.0.5 Microwave sensor shall have a range of 15 to 61 meters (50 to 200 ft) and a beam width of 0.3 to 9.2 m (1 to 30 ft) based on range, site reflectivity and sensitivity setting.
- 2.0.6 Microwave sensor shall detect at minimum a 35 kilogram (77 lb) human - walking, running, hands and knees crawling or jumping. Rolling or prone crawling human or 30.5 cm (12 in) diameter metal sphere may be detected at a maximum range of 45.7m (150 ft) with flat terrain.

Procurement Specifications

INTREPID™ Model 390 Advanced Digital Microwave Transceiver

- 2.0.7 Microwave sensor shall detect a target with a velocity ranging from 0.06 m/sec to 8.0 m/sec (0.2 ft/sec to 26 ft/sec).
- 2.0.8 Probability of detection (Pd) shall be 0.99% minimum on 77-pound (35kg) upright walking or hands and knees crawling target.
- 2.0.9 Microwave sensor shall utilize an embedded browser-based installation service tool with graphic display, referred to as the Installation Service Tool (IST), to set up and control sensor parameters either locally or remotely with a laptop PC or mobile device.
- 2.0.10 Performance monitoring of the sensor shall be achievable with IST via the TCP/IP network connection or via Southwest Microwave's RM83 Performance Monitor and Test Set using an external MS Connector.
- 2.0.11 Microwave sensor shall have the following methods for communication of alarms: Standard relay alarm outputs (SPDT-Form C, 2 amps @ 28VDC), Ethernet-based INTREPID™ POE system controller or high level interface (HLI) to Southwest Microwave's Perimeter Security Manager II Alarm Monitoring and Control System, or a compatible third-party Physical Security Information Management (PSIM) or Video Management System (VMS).
- 2.0.12 Microwave sensor shall include an adjustable Range Cutoff (RCO) circuit that rejects all microwave targets beyond a preselected range, thereby eliminating alarms caused by large objects outside the RCO point. RCO shall provide continuous adjustment from 50 feet (15.2 m) to 200 feet (60.9 m). Typical RCO distance will be +/- 10% for a human-sized target and +/- 20% for a vehicle.
- 2.0.13 Microwave sensor shall have a patented Zero-Range Suppression (ZRS) circuit serving as a near-field filter to reduce the amplitude of close-range targets, preventing nuisance alarms caused by rain, vibration, birds and windblown objects.
- 2.0.14 Microwave sensor shall feature Self-Supervision, whereby antenna blockage (spoofing) shall cause constant alarm, a remote test function checks entire transceiver circuit, and slave units alarm upon loss of sync.
- 2.0.15 Microwave sensor shall operate at a carrier frequency of K-band (24.125 GHz) and fully comply with F.C.C. Rules and Regulations Part 15.
- 2.0.16 Microwave sensor shall incorporate a K-band cavity stabilized fundamental GUNN oscillator as the signal source, illuminated by a parabolic reflector with a rear-entry dielectric feed.
- 2.0.17 Microwave sensor shall have an output power of 32 milliwatts peak at 24.125 GHz.
- 2.0.18 Microwave sensor shall operate on input power of 10.5 - 60 VDC, with current draw of 164mA at 12 VDC, 85mA at 24 VDC, and 48mA at 48 VDC or IEEE 802.3af, Class 1 (POE).
- 2.0.19 Microwave sensor shall have 2 tamper switches that protect against unauthorized removal of the radome (SPDT-Form C, 2 amps at 28 VDC). 1 switch shall report in hardware and 1 switch shall report in software.
- 2.0.20 Microwave sensor shall include the following on-board LED Indicators: Power On, Target Alarm, Master Sync Mode, Receive Detect, PLL Lock, Communications.
- 2.0.21 Microwave sensor shall have a diameter of 27 centimeters (10.6 in), depth of 23 centimeters (8.8 in) and weight of 2.04 kilograms (4.5 lbs). All electronics and antennas should be mounted to a rugged metal baseplate and enclosed in an ABS weatherproof, UV resistant radome.

Procurement Specifications

INTREPID™ Model 390 Advanced Digital Microwave Transceiver

- 2.0.22 Microwave sensor shall be hardened to operate within specification at temperatures between -35°C to + 66°C (-30°F to + 150°F) ambient, without assistance from cooling or heating apparatus.
- 2.0.23 Microwave sensor shall operate within all specifications when continuously exposed to 0 - 100% relative humidity.
- 2.0.24 Microwave sensor circuit board shall have a minimum 1 mm heavy duty conformal coating and metal baseplate shall be epoxy coated to enable reliable operation in high humidity and corrosive atmospheres. Critical areas of the sensor circuit board shall be protected with metal shield cans to enhance physical protection and EMI / RFI resistance.
- 2.0.25 Microwave sensor shall have an optically isolated RJ-45 connector supporting 10/100 Base-T ports for:
- Local sensor setup / configuration and maintenance using the embedded, browser-based Installation Service Tool (IST)
 - Remote sensor administration and maintenance using the embedded, browser-based Installation Service Tool (IST)
 - Sensor alarm monitoring using Southwest Microwave INTREPID POE System Controller or third-party HLI.

3.0 Installation/Documentation/Services

- 3.0.1 Contractor shall provide the necessary documentation to confirm that the sensor is installed in accordance with on-site requirements and manufacturer's installation instructions. The contractor shall perform all wire terminations.
- 3.0.2 After installation of the sensor, the contractor shall make provisions for manufacturer's technical representative to perform final on-site inspection and installation verification.
- 3.0.3 Contractor performing installation shall be factory certified by Southwest Microwave on INTREPID™ microwave sensors.
- 3.0.4 The supplier shall provide three (3) years warranty from date of purchase with an additional two (2) years available at no cost with registration of the project installation.
- 3.0.5 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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