

Southwest Microwave, Inc.
9055 S. McKemy Street
Tempe, Arizona 85284 USA
(480) 783-0201 Fax (480) 783-0401

Product Specification

INTREPID MicroTrack Buried Cable Perimeter Intrusion Detection System

System Type: **INTREPID MicroTrack Buried Cable System**
Microwave Volumetric Sensors - (Gates / Rooftop)
Alarm Reporting with Graphic Map Display (Security Management System)

Installation: By Contractor

Project: Sample "XYZ" Project

1.0 General

- 1.1. It is the intent of the **[XYZ Company]** to purchase a complete and operable outdoor perimeter detection system for the **[XYZ Facility]** as specified below and on referenced drawings and documents.
- 1.2. The following specifications are for an integrated buried RF coaxial cable sensor system for outdoor perimeter intrusion detection, microwave detection for gate areas and a PC based Alarm Reporting system.
- 1.3. The performance criteria required for this project shall meet or exceed that provided by the INTREPID MicroTrack Buried Cable Sensor system as manufactured by Southwest Microwave, Inc., Tempe, Arizona (480-783-0201).
- 1.4. 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.
- 1.5. The contractor shall provide certification, as a part of the project submittals, that the sensor manufacturer's on-site services will be provided as a part of this contract.
- 1.6. The owner shall furnish an Alarm Reporting and Display system necessary for the audible and visual notification of all system activity. A printer shall provide a hard-copy printout of all system activity.

2.0 System Description

- 2.1 The complete perimeter detection system shall consist of two (2) primary sub-systems:
 - 2.1.1 INTREPID MicroTrack Buried Cable Intrusion Detection System,
 - 2.1.2 Microwave Intrusion Detection System, and

2.2 INTREPID MicroTrack Buried Cable Intrusion Detection System

- 2.2.1 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).
- 2.2.2 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 Processor and not in a centralized processor or computer.
- 2.2.3 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.
- 2.2.4 Each MicroTrack Processor (MTP) shall monitor up to two buried sensor cable sets for a total perimeter length up to 1,312 feet (400 meters).
- 2.2.5 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.
- 2.2.6 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.
- 2.2.7 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.
- 2.2.8 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.
- 2.2.9 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 subcell along the sensor cable. For each 673 feet (205 meters) long sensor cable set there are approximately 105 subcells, each 6.5 feet (2.0 meters) long.
- 2.2.10 The buried cable sensor system shall provide "Free Format Zoning", allowing zones to be established in software independent of the fixed MTP locations and sensor cable set lengths. Zones can be defined using the MicroTrack Installation / Service Tool setup software on a PC or via relay contacts.
- 2.2.11 The buried cable system shall support a Relay Control Module (RCM) with eight (8) relay inputs and eight (8) contact outputs. Each MTP can accommodate four (4) RCM's.
- 2.2.12 Each buried cable system shall be capable of providing up to 32 detection zones per MTP independent of the location of the MTP and the length of the sensor cable set(s) providing total cable length is 328feet (100m).

- 2.2.13 The length of each zone in the system shall not be restricted to the physical location of the fixed MTP'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.
- 2.2.14 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) To assist in patrol assessment, the entire length of any buried cable zone shall be visible from any point along that zone as viewed from the outside or perimeter road.
 - c) Buried cable zones shall not extend around corners in perimeter fencing.
- 2.2.15 The buried cable system shall be capable of being diagnosed and adjusted from a remote location using a modem or other remote access method.
- 2.2.16 The buried cable system shall conform to the radiation characteristics of F.C.C. Rules and Regulations, Part 15.

2.3 Microwave Intrusion Detection System

- 2.3.1 The microwave intrusion detection system shall provide protection for sliding gates, swing gates, rooftops that form part of the perimeter, or other areas not secured by the MicroTrack buried cable system.
- 2.3.2 Each ground based microwave zone shall consist of single or stacked (dual head) microwave links as recommended by the manufacturer, using separate transmitter and receiver stacks.
- 2.3.3 All microwave equipment shall be provided directly by the original equipment manufacturer. To insure engineering and application support, products that contain repackaged circuit board assemblies will not be acceptable.

2.4 Alarm Reporting / Display System

- 2.4.1 The Alarm Reporting/Graphic Display system shall communicate via RS485 or RS422 with the various MicroTrack Processors (MTP's) distributed around the perimeter.
- 2.4.2 Audible annunciation and visual indication for each alarm event will be provided by a monitor display in the control room.

3.0 Products - Buried Cable Sensor System

3.1 MicroTrack Cable

- 3.1.1 Sensor cable assemblies shall be available in lengths of 344 feet (105 meters) and 672 feet (205 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. Lead-in cable connectors and cable junctions shall be factory installed.

- 3.1.2 Sensor cable may be cut to length in the field. Buried sensor cable connections to MicroTrack Links (MTL) or MicroTrack Terminations (MTT) shall be made using screw-down terminal blocks embedded in an encapsulant compound then sealed in an enclosure. Standard electrical connectors (e.g., TNC or N-type) and heat shrinkable tubing shall not be used for buried cable connections.
 - 3.1.3 The system shall allow for adjusting the sensitivity of any section of the sensor cable to accommodate site conditions without the use of in-line attenuators or wires placed adjacent to the sensor cable.
- 3.2 MicroTrack Processor (MTP)
- 3.2.1 Detection processing shall be performed by the various MicroTrack Processors (MTP's) distributed around the perimeter. Each MTP shall provide processing for up to 1,312 feet (400 meters) of perimeter.
 - 3.2.2 Detection criteria shall reside in non-volatile memory in each respective MTP.
 - 3.2.3 Field locations of the MTP'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 PC, each MTP shall have the capability of retaining alarm until communication is restored.
 - 3.2.5 In addition to sensor alarms, each MTP shall provide for two (2) cable fault alarms, one (1) enclosure tamper alarm, and one (1) MTP fail alarm.
 - 3.2.6 MTP'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.
 - 3.2.7 MTP's shall operate within all specifications when continuously exposed to 95% relative humidity, non-condensing.
 - 3.2.8 MTP's shall be housed in a weather-tight NEMA 4 enclosure fitted with tamper switches.
 - 3.2.9 MTP's shall include devices to protect against lightning and electrostatic discharge.
 - 3.2.10 MTP's shall be powered directly with 10.5 to 60 Vdc.
 - 3.2.11 MTP's shall be communicated with RS232, RS422 or RS485.

4.0 Products - Microwave Detection Units

- 4.1 The bistatic microwave units shall have a range of 10 feet (3m) to 600 feet (183m) and a beam diameter of 2 feet to 40 feet (0.6m to 12.2m) depending on link length, antenna pattern element and sensitivity setting.
- 4.2 The bistatic microwave units shall detect at minimum an 75 pound (34kg) human - walking, running, hands and knees crawling, jumping, rolling or prone crawling (30 cm diameter metal sphere) at a target velocity of 0.1 ft/sec to 50 ft/sec (3 cm/sec to 15 m/sec)

- 4.3 The bistatic microwave units shall have field adjustable sensitivity control by means of an internal potentiometer. Require no special adjustment tools.
- 4.4 The bistatic microwave units shall have an output power of 10 milliwatts peak, 5 milliwatts average, and shall be square wave modulated.
- 4.5 The bistatic microwave units shall operate at a carrier frequency of X-band (10.525 GHz +15 MHz) and have four selectable modulation frequencies at 3.0, 4.5, 7.5, 10.5 kHz \pm 3%.
- 4.6 The bistatic microwave system shall incorporate an X-band, mechanically tuned GaAs FET transistor 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.
- 4.7 The bistatic microwave system shall operate on an input voltage of 10.5 to 14 Vdc and current draw of 20 mA (transmitter) and 20mA (receiver).
- 4.8 The bistatic microwave system shall provide alarm indication by relay contacts. Contact rating 2 amps at 28 Vdc. (Form C)
- 4.9 The bistatic microwave system 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.
- 4.10 The bistatic microwave system shall have a diameter of 10.6 inch (27cm), depth of 8.8 inch (23 cm) 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.
- 4.11 The bistatic microwave system shall have a temperature rating of -40°F to +150°F (-40°C to +66°C) and a relative humidity rating of 0 to 100%.
- 4.12 The bistatic microwave system shall provide an internal and external alignment, sensitivity adjustment, and input power indication that may be displayed and monitored without removing radome cover.

5.0 Products - Alarm Reporting / Graphic Display System

- 5.1 Integrated Security Management System. The Security Management System shall be designed to support a single site, yet powerful enough to manage a multi-site network. The Security Management system shall consist of workstation PCs connected to multiple third party systems via a network connection. The workstation PCs shall be installed with software that provide a graphical user interface with touch screen control to provide an integrated system enabling monitoring, control and interaction of multiple systems.
- 5.2 Security Management Application. The security management application shall allow the user to control and monitor CCTV, digital video recording, intruder alarms, paging systems, perimeter detection, utilizing an intuitive and easy to use graphical user interface.
- 5.3 Graphics. The security management system (SMS) shall be operated via a hierarchical graphical user interface (GUI) controlled by a touch screen monitor or mouse.

- 5.4 Alarms. The Alarm review application shall allow the operator to instantly view live alarm events, retrieve stored alarm video, and create customized reports all from a single screen, without interfering alarm monitoring.
- 5.5 Integrated Applications. The overall main graphic shall provide a number of application buttons (filters) to allow the operator to select icons relative to a particular integrated application. These shall be displayed on the appropriate graphic. It shall also be possible to display any other application icon on any graphic. It shall be possible to import any icon easily and simply.
- 5.6 Workstation PC. The PC workstation shall provide a Windows based user interface. The operator shall be able to configure and maintain the system, view live and recorded video from both local and remote sites, manage alarms, and monitor overall system performance.

6.0 Installation / Documentation / Services

6.1 General

- 6.1.1 Contractor shall confirm the necessary documentation to confirm that the system is installed in accordance with on-site requirements and manufacturer's installation instructions. All wire hook-up shall be performed by the contractor.
- 6.1.2 After installation of the system, the contractor shall make provisions for a manufacturer's technical representative to perform final on-site inspection and training, coordinated with the owner or owner's representative.
- 6.1.3 The installation locations of the MTP's shall be governed by the 1,310 feet (400 meters) maximum distance of supported cable and is not governed by perimeter zoning.

6.2 INTREPID MicroTrack Buried Cable Intrusion Detection System

- 6.2.1 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.
- 6.2.2 The sensor cable shall be capable of being cut on site during installation to any length up to a maximum of 673 feet (205 meters).
- 6.2.3 The sensor cable shall be of identical construction and dimensions from end to end so repairs do not require analysis of damaged cable
- 6.2.4 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.
- 6.2.5 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.
- 6.2.7 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.

- 6.2.8 The system shall support serial communication to allow remote modem diagnostics.
 - 6.2.9 The sensor cable shall be field repairable if damaged by replacing the damaged section with a spare sensor cable section and a splice kit consisting of screw-down terminals, encapsulant compound and an enclosure.
- 6.3 Microwave Intrusion Detection System
- 6.3.1 Contractor shall supply the manufacturer with details of site conditions and fence construction in the areas where microwave will be utilized. Manufacturer shall provide recommendations for the mounting post locations based on this information.