

# **Product Specifications**

## **Procurement Specifications MicroNet Perimeter Detection System January 2000**

System Type: **MicroNet Fence Sensor - (Primary Detection)**  
Microwave Volumetric Sensors - (Gates / Rooftop)  
PC Alarm Reporting with Graphic Map Display

Installation: By Contractor

Project: Sample "XYZ" Correctional Project

### **1.0 General**

- 1.1.0 It is the intent of the **[XYZ] Department of Corrections** to purchase a complete and operable outdoor perimeter security system for the **[XYZ Correctional Facility]** as specified below and on referenced drawings and documents.
- 1.2.0 The following specifications are for an integrated micro phonic coaxial sensor system for perimeter fence intrusion detection, microwave detection for gate areas and a PC based Alarm Reporting system.
- 1.3.0 The performance criteria required for this project shall meet or exceed that provided by the MicroNet system as manufactured by Southwest Microwave, Inc., Tempe, Arizona (480-783-0201).
- 1.4.0 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.
- 1.5.0 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.
- 1.6.0 The contractor shall furnish a PC based 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**

2.1.0 The complete security system shall consist of three (3) primary sub-systems:

- 1). MicroNet Fence Intrusion Detection System
- 2). Microwave Intrusion Detection System
- 3). PC Based Alarm Reporting / Display System

2.2.0 MicroNet Fence Intrusion Detection System

- 2.2.1. The fence-mounted system shall utilize a micro phonic sensing element, designed to detect vibrations from cut or climb over attempts to the fence fabric and subsequently identify the precise point of intrusion to within 3 meters.
- 2.2.2. Each Signal Control Unit (SCU) shall monitor up to 400 meters of MicroPoint cable.
- 2.2.3. Detection and location of intrusions shall be performed by DTDR (Digital Time Domain Reflectometry) methodology. The DTDR function shall reside in the distributed SCU's and not in a centralized processor or computer.
- 2.2.4. The DTDR processing within the SCU's shall provide for Free Format Zoning, allowing zones to be established in software independent of the fixed SCU locations.
- 2.2.5. The length of each zone in the system shall not be restricted to the physical location of the fixed SCU's but shall be variable between 3 meters and the maximum zone length as indicated elsewhere in the specifications or project drawings.
- 2.2.6. 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.
- 2.2.7. Fence sensor zone configurations shall be based on the design criteria listed below:
  - 1.) Fence zones should not exceed 200 linear feet in length.
  - 2.) To assist in patrol assessment, the entire length of any fence zone shall be visible from any point along that zone as viewed from the outside or perimeter road.
  - 3.) Fence zones shall not extend around corners in perimeter fencing.
- 2.2.8. 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.

#### 2.3.0 Microwave Intrusion Detection System

- 2.3.1. The microwave intrusion detection system shall provide protection for sally port sliding gates, rooftops that form part of the perimeter, or other areas not secured by chain link fencing.
- 2.3.2. Each ground based microwave zone shall consist of stacked (dual head) microwave links, 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.

#### 2.4.0 Alarm Reporting / Display System

- 2.4.1. The Alarm Reporting/Graphic Display system shall communicate via RS232, RS485 or RS422 with the various Signal Control Units (SCU's) distributed around the perimeter.

- 2.4.2. Communication between the exterior SCU's shall be provided via the actual fence mounted sensor cable using FSK, precluding the need for additional signal cables around the perimeter.
- 2.4.3. Audible annunciation and visual indication for each alarm event will be provided by a CRT display in the control room. The CRT shall indicate a flashing dot along the zone identifying the exact location (within 3 meters) of the intrusion.
- 2.4.4. All system activity shall be permanently recorded on an 8.5"x11" paper printer and shall be stored on the hard drive.
- 2.4.5. The perimeter fence zoning shall be established in the PC software and downloaded to each respective SCU. The zoning can be changed via software as required without a need for a change in hardware.

### **3.0 Products - Fence Sensor System**

#### **3.1.0 MicroNet Sensor Cable**

- 3.1.1. Intrusion of any zone shall be identified to within 3 meters (10ft) of the attack. Multiple attacks at different locations, even within the same zone, will be identified separately on the PC Alarm Reporting system.
- 3.1.2. Depending on the perimeter length and number of auxiliary devices, the MicroNet Sensor cable shall be capable of providing power to the exterior SCU'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 of any section of the sensor cable (gate areas, lead in cables, etc.) precluding the necessity for spliced non-sensitive cable.

#### **3.2.0 Signal Control Unit (SCU)**

- 3.2.1. The detection processing shall be performed by the Signal Control Units (SCU's) distributed around the perimeter. Each SCU shall provide processing for up to 400 m (1,312 ft.) of sensor cable.
- 3.2.2. Detection criteria and zoning boundaries shall reside in non-volatile memory in each respective SCU.
- 3.2.3. The field locations of the SCU'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 SCU shall have the capability of storing system activity and upload-stored data when communication is resumed.
- 3.2.5. A "Fail Alarm" (distinct from the intrusion and tamper alarms) will be provided by the SCU under conditions of power failure, cable fault, or component failure.
- 3.2.6. All the modules shall operate within specification at temperatures between - 40C (- 40F) and +70C (159F) ambient, continuously, without assistance from cooling or heating apparatus.

- 3.2.7. All modules shall operate within all specifications when continuously exposed to 95% relative humidity, non-condensing.
- 3.2.8. The SCU's shall be provided in NEMA 4 enclosures fitted with locks and tamper switches.
- 3.2.9. The SCU's shall be capable of accepting contact-closure alarm inputs from auxiliary devices (i.e., microwave, PIR, etc.) and provide alarm interface to the central control room display.
- 3.2.10. The SCU's shall provide up to 150 mA at 12 Vdc to auxiliary sensors.

#### **4.0 Products - Microwave Detection Units**

- 4.1.1. 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.
- 4.1.2. The bistatic microwave units shall detect at minimum an 80 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 (3cm/sec to 15m/sec)
- 4.1.3. The bistatic microwave units shall have field adjustable sensitivity control by means of an internal potentiometer. Shall require no special adjustment tools.

#### **5.0 Products - Alarm Reporting / Graphic Display System**

- 5.1.1. The Alarm Reporting / Graphic Display system shall, as a minimum, consist of a desktop computer (PC), 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.
- 5.1.2. 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 CRT, of alarm location
  - 2). On-screen text providing precise alarm location
  - 3). Contact closure output
  - 4). Serial RS232, RS485 or RS422 communications output
- 5.1.3. The field installed Signal Control Units (SCU's) shall communicate all system activity to the central PC based Alarm Reporting system via a serial RS-232 output. The output signal shall be of a format capable of reception by standard, asynchronous, serial data equipment. Communication speed shall be 19.2 Kbps. A communications protocol shall be used that allows the receiving equipment to acknowledge the successful reception of each message.
- 5.1.4. The various Signal Control Units shall provide to the central PC the precise location of a detected intrusion, tamper or fail occurrence. The indication(s) shall remain on the display until cleared by operator action.
- 5.1.5. Intrusions or faults will be displayed with flashing red dots, indicating the actual location within each zone.

- 5.1.6. A line drawing of the perimeter, showing the 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.
- 5.1.7. When an alarm occurs, the display indicates the exact location (within 3 meters) of the intrusion within the zone by a flashing red dot.
- 5.1.8. The CRT Display and PC Control software shall provide three "soft keys". The three (3) keys shall provide specific combinations of Zone "Acknowledge", "Reset", "Access", and "Secure". The available "soft key" options at any given time are presented to the operator according to the current status of the system.
- 5.1.9. After an initial alarm, the display shall be capable of identifying the precise location of subsequent alarms and shall identify the fact that multiple zones are registering alarms.
- 5.1.10. The operator shall be capable of resetting each individual alarm.

## **6.0 Installation / Documentation / Services**

### **6.1.0 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-ups shall be performed by the contractor.
- 6.1.2. 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.
- 6.1.3. The installation locations of the SCU's shall be governed by the 400-meter (1,310 feet) maximum distance of supported cable and is not governed by perimeter zoning.

### **6.2.0 MicroNet Fence Intrusion Detection System**

- 6.2.1. 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.
- 6.2.2. The MicroPoint cable shall be capable of being cut on site during installation to any length up to a maximum of 200 m (656ft).
- 6.2.3. The "Sensitivity Leveling" function (as described in paragraph 2.2.6) shall be calibrated with the use of the MicroPoint Pointer and automatically calibrated for every 1 meter of cable.
- 6.2.4. 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.
- 6.2.5. The 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.

6.2.6. 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.

6.2.7. The system shall support serial communication to allow remote modem diagnostics.

#### 6.3.0 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.

#### 6.4.0 PC Based Alarm Reporting / Display System

6.4.1. The MicroNet system shall be installed and calibrated on site using a PC computer with the Southwest Microwave Windows 95 based software. No special equipment other than a common voltmeter shall be required to record system parameters or to carry out calibration.

6.4.2. The PC Alarm Reporting System individual components shall be installed in accordance with on-site requirements and manufacturer's installation instructions.

6.4.3. The system shall be capable of displaying sensitivity and threshold settings at the control PC providing both a graphic display and hard copy output of the system calibration status.

6.4.4. The system shall be capable of verifying the operation of the SCU, MLU and cable communications using the test target function. The test target function is available to the maintenance personnel and is not available to the operator. The test target when fired returns a 66db response that verifies that the communications across the above units is working properly.