

**Correctional Service Canada
Technical Services Branch
Electronics Systems**

**ES/SPEC-0402
Revision 2
8 March, 2002**

**ELECTRONICS ENGINEERING
SPECIFICATION**

**PIDS PUBLIC ADDRESS SYSTEM
FOR USE IN
FEDERAL CORRECTIONAL INSTITUTIONS**

AUTHORITY

This Specification is approved by the Correctional Service of Canada for the procurement and Installation of Perimeter Intrusion Detection System (PIDS) Public Address (PA) systems in Canadian federal correctional institutions.

Recommended corrections, additions or deletions should be addressed to the Design Authority at the following address: Director, Engineering Services, Correctional Service of Canada, 340 Laurier Avenue West, Ottawa, Ontario, K1A 0P9

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8 Mar 02

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ABBREVIATIONS

The following abbreviations are used in this specification:

CER	Common Equipment Room
COTS	Commercial-Off-The- Shelf
CSA	Canadian Standards Association
CSC	Correctional Service Canada
DES	Director Engineering Services
EIA	Electronic Industries Association
GFE	Government Furnished Equipment
MCCP	Main Communications and Control Post
PA	Public Address
PIDS	Perimeter Intrusion Detection System
RFP	Request for Proposal
SOW	Statement of Work
STR	Statement of Technical Requirements

DEFINITIONS

The following definitions are used in this specification:

Design Authority	Director, Engineering Services (DES) - Correctional Service Canada (CSC) is responsible for all technical aspects of the system design and implementation.
Contract Authority	Public Works and Government Services Canada (PW&GSC) is responsible for all contractual matters associated with the system design and implementation.
Contractor	The company selected as the successful bidder.
Project Officer	A CSC employee or a contracted person designated by DES to be responsible for the implementation of the project.
Off-the-shelf	Equipment currently on the market with available field reliability data, manuals, engineering drawings and parts price list.
Custom Equipment	Equipment designed and/or manufactured specifically for a specific contract.

1.0 INTRODUCTION

1.1 General

This specification defines the essential technical and functional requirements of the Correctional Service Canada (CSC) for the procurement and installation of a Public Address (PA) system to be used in conjunction with the Perimeter Intrusion Detection System (PIDS) in federal correctional institutions.

1.2 Purpose

The PIDS Public Address System provides the Main Communication and Control Post (MCCP) operator with one-way voice access into each zone of the PIDS-protected perimeter. The operator will use this system to communicate with intruders detected and observed by the PIDS system.

The system described herein would be applicable to new institutions to be constructed. It could also be retrofitted into existing institutions whenever it becomes necessary to add a perimeter Public Address capability or replace existing obsolete equipment.

1.3 Commercial-Off-The-Shelf Equipment

The PIDS PA system shall use commercial off-the-shelf (COTS) equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. New equipment designs shall be restricted to unique interfaces and common control consoles.

1.4 Technical Acceptability

The Correctional Service Canada (CSC) operational environment is unique for its diversity of locations, climate exposures and the physical restrictive construction techniques of penal institutions. Maintaining national security, the safety of staff and offenders alike is CSC's commitment to the government and public. Electronic security systems operating in this unique environment shall maintain very high standards of dependability and reliability.

The CSC Engineering Services Division has established technical specifications and equipment standards for specific electronic security systems which are based on very specific and restrictive operational performance criteria as detailed in its Electronic Engineering Standard. Technical acceptability of these systems means that the equipment complies with the pertinent CSC specifications and standards.

The technical acceptance process shall involve system and subsystem evaluation in accordance with the applicable CSC specifications in one of CSC facilities or may be tested in a CSC facility to verify the effectiveness of the proposed technologies when subjected to the restrictive operational environment.

CSC shall also verify in depth any of the system technical specifications called up. CSC may, when it deems necessary, request the supplier to arrange for a full site demonstration. CSC may rely on manufacturer's test results for specific areas of the specification where an independent test facility has conducted the test, and the facility is deemed acceptable to CSC.

It is the supplier's responsibility to make new developments in products available to CSC for evaluation. Equipment qualification is an ongoing process and can be initiated at any time by a vendor. Any vendor can have access to the CSC specifications and standards. Any new development or products should be submitted to the CSC Engineering Services Division, Technical Authority in a suitable time frame prior to any tendering process to allow for an acceptable evaluation period. The evaluation period may take up to sixteen (16) months.

1.5 Equipment Procurement

Any ordering of equipment/material before the approval of the PIDS PA system design report will be undertaken at the contractor's own risk. The Design Authority may authorize the procurement of certain long lead items at, or shortly after a preliminary design review of the proposed system.

1.6 Quantity of Equipment

The quantity and location of the PIDS PA equipment required for CSC institutions will be contained in the specification identified in the Statement of Requirements (STR).

2.0 **APPLICABLE DOCUMENTS**

The following documents of the issue in effect on the date of the Request for Proposal (RFP) shall form a part of this specification to the extent specified herein.

ES/SOW-0101	Statement of Work for Electronic Systems for Correctional Service of Canada Institutions.
ES/SOW-0102	Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
ES/SPEC-0005	Specification for Main Communications and Control Post Integration Consoles
ES/SPEC-0401	Specification for Perimeter Intrusion Detection System Integration Units
EIA-310-C	Electronic Industry Association Standard for Racks, Panels and Associated Equipment

3.0 **REQUIREMENTS**

3.1 **General**

The contractor shall design, supply, install, test and provide documentation and training for a Perimeter Intrusion Detection System Public Address system in accordance with the Standards, Specifications and Statements of Work specified in Section 2.0.

3.1.1 **System Configuration**

The PIDS Public Address system elements shall be deployed zone by zone at the perimeter of the institution corresponding to the alarm and detection zones of the PIDS system. The system shall consist of the following elements in quantities to be determined by the contractor as required to support this requirement.

- a. PIDS Public Address Switcher consisting of:
 - a zone selector panel;
 - a microphone; and
 - test tone generator.
- b. Loudspeaker assemblies, one or more per zone, consisting of:
 - loudspeaker and matching transformer;
 - horn; and
 - mounting fixture.
- c. Common equipment (amplifiers, power supply, etc.)
- d. Interconnecting wire, cable, conduits, ducts, junction boxes, etc.

3.1.2 **System Capacity**

The number of loudspeaker assemblies and the number of zones served by each shall be as specified in the STR. The system shall be of a modular design and it shall be possible at a future date to add more associated equipment to the basic installed complement without requiring the existing hardware.

3.1.3 **Period of Operation**

The system and all associated equipment shall be rated for and capable of 24 hours per day, seven days per week operation.

3.2 **System Requirements**

3.2.1 **Wires, Cables, Conduits, Ducts**

The contractor shall supply all necessary terminations, cross connection cabinets, conduits, wire and cabling and any other items that may be required for the satisfactory completion of the specified system. All installation workmanship shall be performed in accordance with ES/SOW-0102, Statement of Work and all applicable national, provincial, and local electrical codes.

A wiring diagram shall be supplied in the Installation section of the Maintenance Manual to detail where module connections terminate and how wires are routed and terminated.

Conduits, cables, ducts, trays, etc. may be either Government Furnished Equipment (GFE) or supplied and installed by the contractor depending on the particular institution. The determination will be made by the Design Authority and will be identified in the STR.

3.2.2 **Control Equipment**

The maximum feasible amount of common control equipment (power supplies, logic boards, amplifiers, etc.) shall be located in Terminal Equipment Spaces (TES) and Common Equipment Room (CER) provided for the purpose. These areas will be identified in the STR. It is preferred that only equipment such as control panels, etc., which the operator must access directly, should be located in the Control Posts.

3.2.3 **Interface to Data Logger**

The contractor shall supply and install all necessary wiring and control equipment required to interface the system to the PIU Data Logger described in ES/SPEC-0005, Specification.

3.3 **Design Requirements**

3.3.1 **General**

To the maximum practical extent, off-the-shelf equipment should be selected for use in the system. New designs should be restricted to common interface areas, control panels and consoles, or unique devices for which an off-the-shelf item does not exist.

A design objective is to minimize the number of wires required between all elements of the system.

A space-diversity approach to system planning shall be employed to ensure that loss of one interconnection routing does not impair the operational capability of the complete system.

3.3.2 **Wiring Supervision**

Wiring shall be supervised in all system modes. An alarm shall occur if any system wiring is cut or shorted to other wires or if the system devices are tampered with by unauthorized people or environmental conditions.

3.3.3 **Speaker Locations**

Speakers shall be located to provide complete coverage of the assigned zones.

3.3.4 **Speaker Output**

At any point in the assigned zone, the voice output shall be intelligible in the presence of the highest level of background audio interference normally encountered at that point (e.g., high wind, etc.)

3.3.5 **PA Switcher**

The PIDS PA Switcher shall be controlled by the PIU processor. The switcher shall enable the selection of a one-way voice path to each perimeter zone on a mutually exclusive basis. The zone selected shall be visible on the front panel of the PIDS PA switcher.

The PIDS PA switcher shall meet the following requirements:

- a. equipped with an adjustable test tone generator;
- b. capacity for up to 15 perimeter zones;
- c. installed in an Electronic Industries Association (EIA) standard 19" equipment rack;
- d. equipped with connectorized inputs/outputs; and
- e. system alarm outputs for power supply failure, loop continuity failure, and switching relay failure.

3.3.6 **Microphone**

The microphone shall be co-located with the PIDS Public Address Control Panel, and shall be used to communicate with the selected zone. The microphone shall be equipped with an integral push-to-talk switch which will permit the operator to open the voice path to the selected zone. The microphone shall be a hand-held type and attached to the PIU console via a spring clip retainer.

3.3.7 **Speaker Mounting**

The speakers shall be installed outdoors and shall be rugged, weatherproof units capable of satisfactory operation under the environmental conditions of this specification. The speaker units and their mountings shall exhibit high resistance to damage or destruction due to deliberate, physical abuse. The contractor shall submit a sample of the unit he proposes to use for approval prior to proceeding with procurement of these parts. Speakers shall be mounted so as to be unreachable without climbing aids such as ladders, etc. Speakers shall be mounted on the outside of the inner perimeter fence.

3.3.8 **Matching Transformer**

The matching transformer shall be part of the speaker assembly and shall have a number of selectable taps to permit on-site selection of the proper power level to be delivered to each speaker. The taps shall be provided with a secure cover to inhibit unauthorized adjustment.

3.3.9 **Interchangeability**

Speakers and associated equipment shall be readily interchangeable. Where feasible, all major components shall be of modular plug-in design.

3.3.10 **Facilities**

Power for this system is available at each institution from the domestic source through the Emergency Power Distribution System. The latter system consists of a diesel-electric set which typically requires twenty (20) seconds to take over the load on sensing failure of the domestic source.

3.3.11 **System Performance on Switch over**

The PIDS PA system shall incur no failure or damage directly attributable to switch over of power sources as described in this specification. On completion of a switch over action, this system shall provide normal system operation.

3.3.12 Sabotage, Tampering and Survivability

Elements of the system must operate in areas exposed to inmate access and shall have high resistance to damage, destruction, or conversion to other uses (including weapons). All interconnecting service must be secure against tampering or improper eavesdropping interference.

3.3.13 Power Failure

Loss or restoration of primary power to the system shall not produce spurious annunciations or outputs to the data logger. When power is returned after a power failure, the system shall resume normal operation without operator action.

3.3.14 System Failure

A system failure shall be deemed to have occurred when any required annunciation is not produced or when any required control function cannot be performed.

3.3.15 Human Factors

Elements of the system which are used directly by staff or inmates (i.e., control panels, etc.) shall conform with accepted principles of good human factors design.

3.3.16 Existing Equipment

In most installations, control elements of the system will share console space with other electrical/electronic equipment such as door controls, lighting controls, etc. and will be operated by the same staff member. In such cases it is important that effort be made to coordinate the functional and operational design of the system according to accepted human engineering principles to ensure a uniform appearance and commonality of a layout to assist the operator in the performance of his duties.

3.3.17 Control Panels

Mounting space within control posts is usually limited and the problem of determining a suitable equipment mounting location is minimized if the control panels are small. Therefore, the designer should make maximum possible use of control devices which combine two or more functions into a single unit.

The system shall use EIA standard display and control panels. The design of the display and control panel shall be in accordance with the ES/STD-0802, Standard.

3.4 Functional Requirements

3.4.1 PA Control

The Perimeter Intrusion Detection System Integration Unit shall control the PIDS PA. In the event of a perimeter alarm condition, the output of the PIDS PA shall be automatically switched to the perimeter sector being assessed by the CCTV system. The output of the PA shall be switched on a sector by sector basis under alarm conditions. The PIDS PA shall provide the MCCP operator one way voice communication to an alarmed sector. The activation of the PA shall be under the control of the operator using the push-to-talk switch on the microphone. Only the activation and actual use of the PIDS PA shall be logged by the PIU data logger.

3.4.2 PA Control Panel

The contractor shall provide a PIDS PA controls panel in the operator console. The panel shall contain a microphone input and test tone generator to permit access to and testing of the PIDS PA system on a sector by sector basis.

3.5 Environmental Requirements

The amplifier, microphone and speaker equipment shall comply with all requirements of this specification over the following environmental ranges:

3.5.1 Indoor Equipment

- temperature 0°C to 50°C; and
- humidity 0% to 95% Non Condensing.

3.5.2 Outdoor Equipment

- temperature -40°C to +55°C; and
- humidity up to 100% Condensing.

In addition, outdoor equipment shall continue to operate in full compliance with all parts of this specification and shall not be damaged by any of the following conditions in any combination:

- exposure to direct sunlight;
- any amount of frost;

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- wind velocity up to 100 Km per hour;
 - rain;
 - snow;
 - hail stones up to 2 cm in diameter;
 - ice buildup to a thickness of 2 cm; and
 - any air-to-ground or ground-to-air lightning strikes outside a 1 Km radius.

3.6 Power Requirements

The system shall use VAC power within the following limits:

- 3.6.1 Voltage: 120 VAC \pm 10%;
- 3.6.2 Frequency: 60 Hz \pm 1.5%;
- 3.6.3 Transients: up to 5 times nominal voltage for up to 100 msec durations. Changes in the input power or any fluctuations within the above limits shall not cause damage to the unit; and
- 3.6.4 Power: power consumption shall not exceed 100 watts.

3.7 Installation Requirements

The system shall be installed at the site in accordance with the ES/SOW-0101, Statement of Work and the ES/SOW-0102, Statement of Work.

3.8 Documentation Requirements

All final system documentation shall be provided with a Copyright Release for the documentation delivered in support of the system. The documentation shall be in accordance with the ES/SOW-0101, Statement of Work.

3.9 Support Requirements

The system maintenance and spares support shall be provided in accordance with the ES/SOW-0101, Statement of Work.

3.10 **Training Requirements**

Operator training and maintenance training on the system shall be in accordance with the ES/SOW-0101, Statement of Work.

4.0 **QUALITY ASSURANCE**

4.1 **General**

The system Quality Assurance programme shall be provided as detailed in the ES/SOW-0101, Statement of Work.

All on-site installation work, test plans and system acceptance testing shall be conducted in accordance with the ES/SOW-0101, Statement of Work.

4.2 **System Check Out**

During the system check out, the contractor shall measure PIDS PA system sound levels as follows:

For each speaker, measure the test tone & voice sound levels between the perimeter fences at two locations:

- directly in front of speakers; and
- the midpoint between two (2) speakers

The contractor shall record the sound level readings and submit the test results to the Design Authority.

4.3 **Final Acceptance Test Procedures**

The Design Authority will repeat the system check out tests with the contractor, using the same sound level metre that was used for the system check out.

5.0 **DELIVERY**

Delivery requirements for the system documents, drawings, plans, manuals, etc. (where applicable) shall be in accordance with the ES/SOW-0101, Statement of Work.

Delivery requirements of the system equipment shall be in accordance with the ES/SOW-0102, Statement of Work.

6.0 **INTERFERENCE**

Performance of the system shall not be affected by the use of standard electronic equipment used at the institution. Distance limits of standard electronic equipment shall be in accordance with ES/SOW-0101, Statement of Work.

7.0 **SAFETY**

All system electrically powered elements shall meet the applicable Canadian Safety Association (CSA) standards.