ELECTRONIC ENGINEERING STANDARD

FOR THE

PIDS PA SWITCHER

FOR USE IN FEDERAL CORRECTIONAL INSTITUTIONS

AUTHORITY

This Specification is approved by the Correctional Service Canada for the procurement and installation of a Security Patrol System in Canadian federal correctional institutions.

Recommended corrections, additions or deletions should be addressed to the Design Authority at the following address:

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TABLE OF REVISIONS

Revision	Paragraph	Comment
0	1st. Draft	This document has been created to ensure that CSC can purchase a PIDS PA Switcher to replace the legacy units currently installed.
1		
2		

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TABLE OF ABBREVIATIONS

Abbreviation	Expansion
API	Application Programming Interface
ATP	Acceptance Test Procedure
BIFMA	Business & Industrial Furniture Manufacturers Association
CA	Contract Authority
CCDA	Command Control and Data Acquisition
CCTV	Closed Circuit Television
CD	Commissioner's Directive
CER	Common Equipment Room
COTS	Commercial-Off-The- Shelf
CSA	Canadian Standards Association
CSC	Correctional Service Canada
DCMS	Door Control and Monitoring System
DES	Director Engineering Services
EIA	Electronic Industries Association
FAAS	Facility Alarm Annunciation System
FAR	False Alarm Rate
FDS	Fence Disturbance Detection System
FIU	FAAS Interface Unit
GFE	Government Furnished Equipment
IVRMS	Inmate Voice Recording and Management System
IP	Internet Protocol
MCCP	Main Communications and Control Post
MDS	Motion Detection System
MTBF	Mean Time Between Failure
MTTR	Mean Time to Repair
NAR	Nuisance Alarm Rate
NTP	Network Time Protocol
PA	Public Address
PC	Personal Computer
Pd	Probability of Detection
PIDS	Perimeter Intrusion Detection System
PIU	Perimeter Intrusion Detection System Integration Unit
PLC	Programmable Logic Controller
RFP	Request for Proposal
RTEO	Regional Technical and Engineering Officer
PPA	Portable Personal Alarm
PPAL	Portable Personal Alarm Locatable
SCC	Security Control Centre
SIO	Security Intelligence Officer
SOW	Statement of Work
STR	Statement of Technical Requirements

Abbreviation	Expansion
TCP/IP	Transport Control Protocol/Internet Protocol
TER	Telecommunications Equipment Room
UPS	Uninterruptible Power Supply
V&C	Visits and Correspondence
VDU	Video Display Unit
VIRS	Visits Intercept and Recording System
VMS	Video Management System

TABLE OF DEFINITIONS

#	Term	Example	Description	Function
1	Administrative User Interface		Monitor and Software that supports task specific User Interaction for System Administrators, located in a secure area	Provides Administrative Personnel with the ability to map enrolled users to the functional domains that they are allowed to access and change
2	Application	Cell Call Management, PA Management	Software that is used to deliver Application Support functionality for a sub-system	Software that provides the Operator Interface and supporting logic that allows a sub-system (Control Domain) to be managed
3	CCTV Monitor	PIDS or Range CCTV Monitor	Computer Monitor Hardware	Displays CCTV images for Operator viewing
4	Client		Rack mounted computer located in a secure area away from a Control Post or Control Desk.	Runs software and supports one or more Application
5	Configuration Data	Site floor plans showing quantity of cameras, doors, cells etc. Camera locations. Number of User Interfaces required in a Post.	Site and System specific information typically supplied by CSC that defines how a sub-system Application is to be set-up for a site, location within a site, or post.	The configuration data provides the information that a sub-system application requires to tailor it to meet site, location within a site, or post user requirements.
6	Configuration User Interface		Monitor and Software that supports task specific User Interaction, located in a secure area	Allows suppliers or qualified personnel to add, delete and modify Application Configuration
7	Contract Authority		Public Works and Government Services Canada (PW&GSC) is responsible for all contractual matters associated with the system design and implementation.	
8	Contractor		The company selected as the successful bidder.	
9	Control Console	MCCP Console, Living Unit Control Post Console	Console, typically located in a Control Post. Serves as the physical support infrastructure for Operator User Interfaces	Contains User Interfaces or Control Panels used by staff to execute their management responsibilities and interact with the Domains over which they have Control
10	Control Desk	Living Unit Control Desk	Desk, typically located in a Control Post or Office. Serves as the physical support infrastructure for Operator User Interfaces	Equipped with User interfaces used by staff to execute their management responsibilities and interact with the Domains over which they have Control

#	Term	Example	Description	Function
11	Control Domain	Cell Call, Guard Tour, Public Address	A group of Physical and Virtual devices or objects, often supported by specialized hardware and software, that performs a set of related functions	Collect information, or activate capabilities in their operational domain
12	Control Panel	PACP, Fire Alarm	Hardware and Software device that provides an Operator Interface (I/O device), located in a Control Post	Allows Operators to manage one or more Domain
13	Control Post	Living Unit Control Post/MCCP	Room or area, typically located in a secure area in an institution	Room used by staff to execute their management responsibilities and interact with the Domains over which they have Control
14	Custom Equipment		Equipment designed and/or manufactured specifically for a specific contract.	
15	Design Authority		Director, Electronic Security Systems (DES) Correctional Service of Canada (CSC) is responsible for all technical aspects of the system design and implementation.	
16	Device	CCTV Camera, Managed Door, Call Origination Device	A specialized device, typically consisting of hardware and software	Provides data collection or activate functions associated with a specific system or sub-system
17	Enrolment User Interface		Monitor and Software that supports task specific User Interaction, located in a secure area	Allows Designated Personnel to enroll and delete Users from the Command, Control and Data Acquisition System.
18	Maintenance User Interface		Monitor and Software that supports task specific User Interaction, located in the CER or Maintenance Service Provider Office	Provides Maintenance Personnel with the ability to interact with one or more Systems to carry out their day to day tasks to troubleshoot and maintain Systems and Subsystems
19	Notification	Notification that a door is opened, or a door is closed, or a sensor is in alarm	A notification is a message that can be shown on a User Interface and/or logged in a database that represents a change in state or a command initiated by an operator.	

#	Term	Example	Description	Function
20	Off-the Shelf		Equipment currently on the market with available field reliability data, manuals, engineering drawings and parts price list.	
21	Operator User Interface	PIDS Display, Door Control and Monitoring System Display	Computer Monitor and Software that supports User Interaction (I/O device)	Provides an Operator with the ability to interact with one or more Systems to carry out their day to day tasks at a Control Console or Control Desk
22	Project Officer		A CSC employee or a contracted person designated by DES to be responsible for the implementation of the project.	
23	Reporting User Interface		Monitor and Software that supports task specific User Interaction, located in a secure area	Provides Management Personnel with the ability to access preconfigured reports and to create custom reports
24	Server	Network Video Recorder	Rack mounted computer that runs software and is located in an equipment room such as a CER or TER	Runs software that is used to deliver services that support Command and Control Applications to connect to sub-systems
25	State		The state of a device as reported to a sub-system or system	This is a logical representation of the state of a device that is being monitored or managed
26	Sub-system	Cell Call, Guard Tour	A group of Physical and Virtual devices or objects, often supported by specialized hardware and software, that perform a specific set of related functions	Collects information, or activates capabilities in their operational domain
27	System	PIDS	A group of Physical and Virtual devices or objects, often supported by specialized hardware and software, including devices from sub-systems that perform a more general set of related functions	Collects information, or activates capabilities in their operational domain
28	Touch Screen User Interface	Door Control and Monitoring System User Interface	Typically an LCD Monitor with touch screen technology	Allows an Operator to view and interact with the Systems presented on the Monitor

#	Term	Example	Description	Function
29	Workstation		Rack mounted computer located in a secure area away from a Control Post or Control Desk	Runs software that is used to deliver Command and Control Capabilities

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1 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 Perimeter Intrusion Detection System (PIDS) Public Address Switcher to be used in conjunction with the PIDS Public Address system 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 uses the PA system to communicate with intruders detected and observed by the PIDS system.

The PIDS PA switcher is a functional element of the PDS PA System and it would be applicable to both new installations and upgrades of obsolete equipment. It could also be retrofitted into existing institutions whenever it becomes necessary to add a perimeter Public Address capability, including the switcher, or replace existing obsolete equipment.

1.3 Commercial-Off-The-Shelf Equipment

The PIDS PA switcher must use commercial off-the-shelf (COTS) equipment and proven designs to the maximum extent possible. All new equipment must meet the specified lifespan requirements.

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 must 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 may 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 will 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 Quantity of Equipment

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

2 REFERENCES

2.1 Specifications, Standards, and Statements of Work

The following documents of the issue in effect on the date of the Request for Proposal (RFP) form a part of this specification to the extent defined 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.
TM-8045-001-00C	Starcom Communications Protocol Version 2.0.
ES/SPEC-0402	Specification for PIDS PA system
EIA-310-C	Electronic Industry Association Standard for Racks, Panels and Associated Equipment
	As Built Drawings, wiring schematics, and manuals for the current PIDS PA Switcher

3 REQUIREMENTS

3.1 General

a. The contractor must design, supply, install, test and provide documentation and maintenance training for a PIDS Public Address switcher in accordance with the Standards, Specifications and Statements of Work specified in Section 2.0.
b. 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.
c. A design objective is to minimize the amount of serial connectivity associate with the PIDS PA switcher integration into the PIDS PIU and FAAS FIU.

3.2 Functional

The PIDS Public Address system is deployed zone by zone at the perimeter of the institution corresponding to the alarm and detection zones of the PIDS system. The PA Switcher must consist of a:

a. 19" rack mounted chassis, no more than 1 RU in height
b. A switch matrix, controlled by outputs from the PIDS PIU using the Starcom over IP protocol, that allows the output of a PA amplifier to be directed to anyone of up to 16 speaker zones in a mutually exclusive fashion, over copper pairs running around the perimeter of an institution.
c. An input that monitors the state of a Press-To-Talk (PTT) switch on a microphone that directs the PA Switcher to enable the transmission of the audio output from the PA Amplifier and direct it the output selected by the PIDS PIU.
d. A current loop sensor that monitors the continuity of a copper pair running around the perimeter of an institution to be monitored for continuity, shorts, and intermittent transients (indicative of tampering), providing a notification to the PIDS PIU using the Starcom over IP Protocol.
e. A test tone generator that can be activated from a command received from the PIDS PIU using the Starcom over IP Protocol, based upon the PIDS CCTV Sector currently selected.
f. Ethernet connectivity to the PIDS PIU over CAT6 cable using the Starcom over IP Protocol.
g. be equipped with connectorized inputs/outputs as follows;
   i. Inputs .... microphone – 5 pin XLR female
   ii. Outputs ..- speaker outputs must match the connector type (Female 37 Pin Type D) and pinout of the current switcher (wiring schematics to be provided).
h. Provide system alarm outputs for power supply failure, loop continuity failure, and switching relay failure using the Starcom over IP protocol.

3.3 Integration

a. The PA switcher must be form fit and function, except as specified above, with the current PIDS PA switcher.
b. A wiring diagram must be supplied in the Installation section of the Maintenance Manual to detail where module connections terminate and how wires are routed and terminated.
c. Detailed guidelines for the replacement of the existing PIDS PA Switcher with the unit described in this document must be provided; including the instructions for updating the

PIDS and FAAS configuration to replace the existing four output connectivity with connectivity provided using Starcom over IP.

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

3.4 Data logging

The PIDS PA switcher must communicate with the PIU Data Logger described in ES/SPEC-0005, using Starcom over IP protocol.

It must specifically provide for:

a. The provision of a notification to the PIDS PIU, when the PTT switch is selected or released.
b. The provision of a notification to the PIDS PIU when the Test-Tone Generator is selected or unselected.
c. The provision of a notification to the PIDS PIU when there are alarm outputs for power supply failure, loop continuity failure, and switching relay failure.

3.5 Mechanical

All indoor signal processing and distribution equipment must be mounted in standard Electronic Industry Association (EIA) 19 inch racks.

3.6 Environmental

The PIDS PA Switcher must comply with all requirements of this specification over the following environmental ranges:

a. temperature $0\square$C to $50\square$C; and
b. humidity 0% to 95% Non Condensing.

3.7 Power

The PIDS PA Switcher must use VAC power within the following limits:

a. Voltage: 120 VAC ±10%;
b. Frequency: 60 Hz ±1.5%;
c. 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 must not cause damage to the unit; and
d. Power: power consumption must not exceed 50 watts.

3.8 Interference

The performance of the PA switcher must not be affected by the presence or use of standard CSC electronic equipment. The system must operate correctly at the following limits:

a. CB transceivers at 1 metre or more;
b. VHF or UHF Transceivers at 1 metre or more;
c. Commercial radio and/or television receiving and distribution equipment at 5 metres or more; and
d. Personal computer and/or computer work stations at 5 metres or more.
e. The operation of the PIDS PA switcher must not interfere with any standard electronic equipment used at the institutions

3.9 Safety

The PA Switcher must be CSA approved.

3.10   Documentation

a. The PA Switcher must be supplied with documentation which will be a Copyright Released item for the documentation delivered in support of the system.
b. The documentation must be in accordance with the ES/SOW-0101, Statement of Work.

3.11   Training

Maintenance training on the system must be in accordance with the ES/SOW-0101, Statement of Work.

3.12   Period of Operation

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

4 FUNCTIONALITY

4.1 Control

a. The PIDS PA Switcher must be controlled by the PIU.
b. The switcher must enable the selection of a one-way voice path to each perimeter zone on a mutually exclusive basis.
c. PA Control

   i. the Perimeter Intrusion Detection System Integration Unit (PIU) must control the PIDS PA. In the event of a perimeter alarm condition, the output of the PIDS PA must be automatically switched to the perimeter sector being assessed by the CCTV system.
   ii. the output of the PA must be switched on a sector by sector basis under alarm conditions.
   iii. the PIDS PA must provide the MCCP operator one way voice communication to an alarmed sector.
   iv. Must allow for either voice or test-tone transmission, as selected by the MCCP operator.
   v. the activation of the PA must be under the control of the operator using the push-to-talk switch on the microphone.
   vi. the activation and actual use of the PIDS PA (either voice or test tone) must be logged by the PIU data logger.

d. System Performance on Power Switch over

   i. the PIDS PA system must incur no failure or damage directly attributable to switch over of power sources as described in this specification.
   ii. on completion of a switch over action, this system must provide normal system operation.

5 QUALITY ASSURANCE

5.1 General

a. The product Quality Assurance level must be provided as detailed in the ES/SOW-0101, Statement of Work.

b. Product on site acceptance tests

   i. During the system check out, the contractor must measure PIDS PA system sound levels as follows:

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

      b. directly in front of speakers; and

      c. the midpoint between two (2) speakers

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

5.2 Delivery

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