

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

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**ELECTRONICS ENGINEERING
SPECIFICATION**

**PERIMETER INTRUSION DETECTION SYSTEM
CLOSED CIRCUIT TELEVISION SYSTEM
FOR USE IN
FEDERAL CORRECTIONAL INSTITUTIONS**

AUTHORITY

This Specification is approved by Correctional Service Canada for the procurement and Installation of Digital Field Switchers in Closed Circuit Television (CCTV) Systems in Canadian federal correctional institutions.

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ABBREVIATIONS

The following abbreviations are used in this specification:

CCTV	Closed Circuit Television
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
FDS	Fence Disturbance Detection System
FOV	Field of view
GFE	Government Furnished Equipment
MDS	Motion Detection System
MCCP	Main Communications and Control Post
PIDS	Perimeter Intrusion Detection System
PW&GSC	Public Works and Government Services Canada
RFP	Request for Proposal
SOW	Statement of Work
STR	Statement of Technical Requirements
TES	Terminal Equipment Space

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 Perimeter Intrusion Detection System (PIDS) Closed Circuit Television (CCTV) system for federal correctional institutions.

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 PIDS CCTV capability or replace existing obsolete equipment.

1.2 Purpose

The primary use of the PIDS CCTV system is to provide a surveillance and assessment capability for the staff in the Main Communications and Control Post (MCCP) of an institution with fenced and/or walled perimeters as follows:

1.2.1 Fenced Perimeters

For the standard double fence perimeter which uses a Fence Disturbance Detection System (FDS) sensor and the Motion Detection System (MDS) sensor, the CCTV coverage area is defined as the institution side of the inner perimeter fence fabric plus a minimum distance of 3 metres inside the inner perimeter fence and the complete area between the two fences. For a single fence perimeter, this coverage area is defined as the institution side of the inner perimeter fence fabric plus a minimum distance of 3 metres inside the inner perimeter fence.

1.2.2 Walled Perimeters

The CCTV coverage area is defined as the top and inside of the perimeter wall from a point 2 metres above the wall to a point 3 metres from the base of the wall. The target shall be in full view when positioned anywhere on top of the wall.

1.3 Commercial-Off-The-Self Equipment

The CCTV 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 console.

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 CCTV 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 CCTV equipment required for CSC institutions will be contained in the specification identified in the Statement of Technical 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 Procurement and Installation of Electronic Systems
ES/SOW-0102	Statement of Work for Quality Control of Electronic Systems Installations
ES/SPEC-0400	Specification for Perimeter Intrusion Detection Systems
ES/SPEC-0401	Specification for Perimeter Intrusion Detection System Integration Units
ES/SPEC-0403	Specification for Perimeter Intrusion Detection System Video Switchers
ES/SPEC-0404	Specification for Motion Detection Systems
ES/SPEC-0405	Specification for Fence Disturbance Detection Systems
ES/STD-0202	Standard for Monochrome, CCD Cameras
ES/STD-0204	Standard for Fixed/Zoom Lens
ES/STD-0205	Standard for Outdoor Enclosures
ES/STD-0211	Standard for Time Lapse Video Cassette Recorders
ES/STD-0212	Standard for Monochrome Video Monitors
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 PIDS CCTV system in accordance with the Specifications, Standards and Statement of Works specified in Section 2.0 of this specification.

3.1.1 **System Configuration**

The PIDS CCTV system shall consist of the elements in the quantities given in the STR. The system shall be of a modular design and it shall be possible at a future date to add more associated CCTV equipment to the basic installed complement without replacing the existing hardware.

3.1.2 **Period of Operation**

The PIDS CCTV system and all associated equipment shall be rated for and capable of 24 hours per day, seven days per week operation. Components of the system located outdoors shall be designed to operate over the range of temperature, wind, precipitation and humidity conditions expected on the site and as noted in this specification.

3.2 **System Requirements**

3.2.1 **Camera Siting**

The CCTV PIDS camera locations shall be chosen to provide full assessment for all sectors of the perimeter as described in the STR. The perimeter will be divided into zones, nominally two per side, unless the technology of the chosen intrusion alarm systems constrains this assignment.

The Design Authority shall approve the siting of all PIDS CCTV cameras before installation can commence.

3.2.2 **Perimeter Lighting**

The PIDS CCTV cameras shall meet the requirements as specified in the Standard, ES/STD-0202 for monochrome CCD cameras. The existence of perimeter illumination levels less than the specified camera light sensitivity level, uneven distribution of light, or any other related lighting problems shall be identified to the Design Authority prior to system design.

3.2.3 Camera Mounting

Cameras and enclosures shall be mounted with sufficient height to ensure a clear view of the observed sector with minimal reduction of see-through ability by fence mounted wire fixtures at the extremes of the sector under observation. Camera mounting designs for guard towers and/or institution structures must be submitted to and approved by the Design Authority.

3.2.4 Tower and Camera Stability

All PIDS CCTV cameras mounted on camera towers shall be mounted such that under worst case wind conditions, i.e., 100 km/hour, the video displacement as viewed on a monitor shall not exceed five TV Lines.

3.2.5 Anti-Climbing Devices/Maintenance Foot Stand

Camera towers shall be equipped with climbing fixtures above the 3.1 m (10.0 ft.) level only. Where the contractor supplies an open structure tower, anti-climbing fixtures shall be attached from the 2.5 m (8.0 ft.) to 3.1 m (10.0 ft.) of the tower. If an open tower is provided, and it is necessary to provide visibility through the lower part then anti-climbing fixtures must be attached to the tower beginning at the 2.5 m (8.0 ft.) level. Anti-climbing devices must also be included inside the tower to prevent climbing through the center.

Camera towers shall be equipped with two (2) foot stands to provide a stable platform for maintenance personnel when working on either side of the camera. Safety harness hook up ring bolts shall be properly located at belt level when standing on the maintenance foot stands.

3.2.6 Interchangeability

Cameras, mounts, monitors and associated equipment shall be readily interchangeable wherever possible. All major components shall be of modular plug-in design.

3.2.7 Facilities

Power is available for this system at each institution through the internal wiring of the emergency power system on site.

3.2.8 Emergency System Start-Up

The emergency system consists of a diesel-powered generator with controls which sense commercial power failure and initiate diesel start-up. The elapse time to emergency power following mains (domestic) failure is typically 20 seconds.

Following a switch over to emergency power, and/or a return to commercial power from an emergency, the CCTV System shall revert automatically to normal service status.

The Design Authority will identify the locations of the emergency VAC power source in the STR.

The contractor shall be responsible for connecting all cameras, enclosures, and associated outdoor CCTV equipment to the institution's emergency VAC power supply. Each camera location, including the enclosure, shall be provided with its own circuit breaker.

Control of power to cameras and enclosures shall be exercised from the MCCP console via relay, small switches, and Class II circuits. The control switches shall be located inside the MCCP console, accessed from the back of the console.

The contractor shall provide the status of camera power on/off switches with form C contact closures to the PIDS Integration Unit (PIU).

3.2.9 **Wiper Control**

Control of camera enclosure wipers shall be exercised from the front panel of the MCCP console. The CCTV wiper control interface shall be capable of accepting a Form C contact closure to control each wiper.

3.2.10 **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.

Connectors provided on the ends of any cable must mate with the corresponding connector on the equipment. Adapters from one type of connector to another are not acceptable.

3.2.11 **Control Equipment**

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

3.2.12 Interface to Time Lapse Video Cassette Recorder

The contractor shall supply and install all necessary wiring and control equipment required to interface the PIDS CCTV system to the Time Lapse VCR described in ES/STD-0211, Standard.

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 CCTV Cameras

The PIDS CCTV cameras shall meet all the technical requirements as specified in Standard, ES/STD-0202. The contractor shall be responsible for mounting all cameras on camera towers, guard towers and/or buildings.

With many cameras being used simultaneously, an external synchronization source shall be provided to genlock all cameras to the same sync source to prevent video roll or jitter on the monitor during video switching.

3.3.3 CCTV Monitors

The PIDS CCTV monitors shall meet all the technical requirements as specified in Standard, ES/STD-0212. The contractor shall be responsible for mounting these monitors either in the MCCP console or on the walls or ceiling in the MCCP. Wall and/or ceiling mounting structure shall be the responsibility of the CCTV contractor and shall be approved by the Design Authority. The requirement for ceiling and/or wall mounted monitors shall be included in the STR.

3.3.4 Camera Enclosures

The PIDS CCTV camera outdoor enclosures shall meet all the technical requirements as specified in the Standard, ES/STD-0205. The contractor shall be responsible for mounting all camera enclosures on camera towers, guard towers and/or buildings.

3.3.5 **Camera Lenses**

The PIDS CCTV camera lenses shall meet all the technical requirements as specified in Standard, ES/STD-0204. The contractor shall be responsible for mounting all camera lenses on the cameras.

3.3.6 **Time Lapse Video Cassette Recorders**

The PIDS Timer Lapse VCRs shall meet all the technical requirements as specified in Standard, ES/STD-0211. The contractor shall be responsible for providing and installing all VCRs in appropriate VCR racks in the MCCP.

3.3.7 **Video Sequential Switcher**

The Video Switcher for the PIDS CCTV system shall meet all the technical requirements as specified in Specification, ES/SPEC-0403.

3.3.8 **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.

3.3.9 **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.

3.3.10 **Power Failure**

When power is returned after a power failure, the system shall resume normal operation without operator action and shall automatically start from a "no-calls-present," cleared condition with no cells disabled.

3.3.11 **System Failure**

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

3.3.12 **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.

3.3.13 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.

3.4 Operational Requirements

3.4.1 System Resolution

Under normal night-time perimeter lighting conditions, specified in paragraph 3.1.4 of this specification, each camera and monitor combination (including interconnecting cable and video switcher identified in paragraph 3.1.8 of this specification) shall retain the camera's resolution rating. The VCR is excluded from this requirement.

3.4.2 Target Resolution

A circular target object measuring 47.8 cm (18.8 in.) in diameter shall be resolved with a minimum of 5 TV Lines when viewed at the farthest extreme of the required field of view (FOV). If the target is to be viewed through one or more layers of fence fabric, the minimum resolution becomes 10 TV Lines.

3.4.3 System Synchronization

The PIDS CCTV system shall be designed such that when the perimeter cameras are connected to the MCCP monitors through the Video Sequential Switcher as specified in the Specification, ES/SPEC-0403, no tearing, rolling or distortion shall be observed on the monitor when sequencing or manually switching from one camera to another.

3.4.4 Video Stability

The video image displayed on each monitor shall be stable, free of roll, jitter and tearing. There shall be no degradation of this requirement when the system operates through a video switcher. There shall be a minimum RF isolation of 40 dB between any pair of video circuits.

3.5 Environmental Requirements

The PIDS CCTV system shall operate over the indoor and outdoor environmental conditions as specified in the Standards and Specifications listed in Section 2.0 of the specification. The contractor may meet these requirements through the use of suitable environmental enclosures.

Any associated CCTV equipment installed outdoors, i.e. video line, amplifiers, sync distribution amplifiers, etc.; which is rated as indoor equipment, shall be installed in heated enclosures.

The contractor shall provide lightning protection on all cables and terminal equipment which are installed indoors and outdoors. Towers and cameras shall be grounded via a buried grounding rod.

3.6 Power Requirements

The PIDS CCTV system shall use VAC power within the limits specified in the Standards and Specifications listed in Section 2.0 of the specification.

3.7 Installation Requirements

The PIDS CCTV 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. The installation shall include all necessary labour, wire, cable, camera towers, conduit, trenching, site preparation, power supplies, amplifiers, cameras, lenses, enclosures, monitors, videocassette recorders, and control panels for operation in the institutional environment.

3.8 Documentation Requirements

All final system documentation shall be provided 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.

5.0 **DELIVERY**

Delivery requirements for the PIDS CCTV 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 PIDS CCTV 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 PIDS CCTV system electrically powered elements shall meet the applicable Canadian Safety Association (CSA) standards.