Correctional Service Canada
Technical Services Branch
Electronics Systems

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Revision 3
15 April 2004

ELECTRONICS ENGINEERING STATEMENT OF WORK

PROCUREMENT & INSTALLATION OF ELECTRONIC SECURITY SYSTEMS

AUTHORITY

This Statement of Work is approved by Correctional Service Canada for the procurement and installation of all telecommunications and electronic security systems, subsystems, and equipment in Canadian penal 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

Prepared by:

Manager,
Electronics Systems Research

Approved by:

Director,
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15 Apr 04

RECORD OF REVISIONS

Revision	Paragraph	Comment
3	10.1 – Manuals and Drawings	Added equipment operating software
	10.4 – Documentation Format	Added equipment operating software

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ABBREVIATIONS

The following abbreviations are used in this specification:

ATP	Acceptance Test Plan
CM	Corrective Maintenance
COTS	Commercial-Off-The-Shelf
CSC	Correctional Service Canada
DA	Design Authority
DCR	Design Change Request
DES	Director, Engineering Services
DL	Deficiency List
FDR	Final Design Report
MRT	Mean Response Time
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
PDR	Preliminary Design Report
PM	Preventative Maintenance
PW&GSC	Public Works & Government Services Canada
QA	Quality Assurance
RFP	Request For Proposal
SOW	Statement of Work
STR	Statement of Technical Requirement

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

This Statement of Work (SOW) defines the work and responsibilities for the design, procurement, installation, test and integration of all telecommunications and electronic security equipment in CSC Institutions.

The SOW provides guidelines, procedures and responsibilities to the contractor and/or the project officer for the implementation of all telecommunications and electronic security systems in CSC facilities.

All work performed shall adhere to this SOW, CSC Specifications, Standards and Statement of Technical Requirements (STRs).

1.1 Commercial-Off-The-Shelf Equipment

The contractor 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.

1.2 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.

1.3 Equipment Procurement

Any ordering of equipment/material before the approval of the final 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 the preliminary design review.

1.4 Quantity of Equipment

The quantity and location of the equipment required for CSC institutions will be contained in the specification identified in the STR.

2.0 APPLICABLE DOCUMENTS

CSC Specifications, Standards and STRs are approved by the Director of Engineering Services (DES) for the procurement and installation of all telecommunications and electronic security systems in all CSC facilities. These documents promulgate DES policy and shall not be modified or changed without prior consultation and approval of the Director. The documents of the issue in effect will form part of the Request for Proposal (RFP) issued by the contract authority.

3.0 REQUIREMENTS

3.1 The contractor shall:

a. Design, procure or manufacture, install, test and document the installation of all electronic security and telecommunications systems in accordance with the CSC specifications, standards and STR;

b. Provide the operator and maintenance training in accordance with the CSC requirements;

c. Provide the maintenance support and spares in accordance with the CSC maintenance requirements;

d. Provide quality assurance (QA) to ensure equipment performance and reliability are in accordance to CSC requirements;

e. Provide warranty coverage to include spare parts provision and equipment repair;

f. Provide a program schedule to show all major elements from a contact award to completion of the warranty period and shall include anticipated time of occurrence, interrelationships between events, and time scale; and

g. Be responsible for the integration of the proposed system to any existing telecommunications and electronic security systems.

h. Provide a lightning protection system for the installation of all electronic security systems/equipment in the CSC facilities. As a minimum, surge suppression type lightning arrestors shall be required for all power, communications and antenna cables/wires entering or leaving a building.

4.0 SYSTEM DEVELOPMENT

The contractor shall design systems and equipment to meet all of the requirements stipulated in the applicable CSC specifications. The system design shall be modular and address the following criteria:

a. ease of operation and maintenance;

b. optimize and concentrate control functions and capabilities;

c. enhance the security of the working environment, extend staff capabilities to observe and control; and

d. minimize the number and types of display and control devices.

4.1 Preliminary Design

The preliminary design baseline shall be established by the review and approval of the preliminary design report (PDR) by the Design Authority (DA) or his designate. Specifications, drawings and the approved PDR shall make up the preliminary design baseline.

The contractor shall prepare and submit two (2) copies of the PDR to the Design Authority and one (1) copy to the Contract Authority at least ten (10) days prior to the PDR meeting. The PDR shall consist of:

a. performance specifications with functional block diagrams of the proposed system. The technical analysis and equipment performance data shall verify system requirements;

b. preliminary equipment layouts including control consoles and racks;

c. list of off-the-shelf equipment with part number, model number, manufacturer and the quantity of each item;

d. list of custom designed equipment with model number and the quantity of each item;

e. functional schematics for all custom designed equipment;

f. conceptual drawings for all custom designed equipment;

g. a proposed product assurance plan;

h. a proposed maintenance plan;

l. proposed sparing plan; and

j. proposed training plan.

4.2 **Preliminary Design Review**

The PDR meeting shall be convened by the contractor to review the PDR contents. The contractor shall provide the venue and all of the necessary facilities. The Design Authority will identify any portions of the PDR that are not acceptable to CSC.

4.3 **Final Design**

The final design baseline shall be established by the review and approval of the Design Authority of the final design report (FDR). It establishes the start of change control in equipment design and performance. The FDR shall consist of:

a. all elements of the preliminary design baseline;

b. control console mockups, ergonomics considerations, etc., as necessary;

c. drawings and operational descriptions for the custom designed equipment including interface specifications;

d. Installation drawings and instructions; and

e. availability model and analysis updates to reflect the final system design and hardware selection.

The FDR shall be prepared to good commercial practice. Two (2) copies shall be submitted to the Design Authority at least ten (10) working days before the FDR meeting.

4.4 **Final Design Review**

The final design review meeting shall be convened to review the contents of the FDR. The contractor shall provide the venue and all of the necessary facilities. All of the contractor's staff responsible for the system/equipment engineering shall be available.

4.5 **Design Change Control**

Design changes shall be in accordance with the following procedure:

4.5.1 **Type I.** Changes that affect cost, schedule, reliability, maintainability, or availability shall be submitted as a design change request (DCR).

Changes shall not be actioned until specifically directed in writing by the Design Authority through the Contract Authority.

4.5.2 **Type II.** Changes to correct a design error without affecting cost, schedule, reliability, maintainability, or availability shall not require a DCR.

Changes shall be reported to the Design Authority and the final design baseline shall be updated by the contractor. The Design Authority will review and acknowledge the change.

4.6 Design Change Request (DCR)

Type I changes shall be forwarded to the Design Authority through the Contract Authority on DCRs initiated by either the contractor or the Design Authority.

DCRs shall be reviewed and approved before implementation and shall include:

a. specification requirement being effected;

b. final design baseline element being changed;

c. description of the design change;

d. reason for the change;

e. impact on cost, schedule, reliability, maintainability and availability; and

f. trade-off recommendations.

4.7 In-Plant Testing

Details of in-plant tests are contained in the ES/SOW-0102, Statement of Work. In-plant tests shall be performed according to the Design Authority approved procedures.

Equipment with deficiencies as the result of the in-plant tests shall be subject to retest. The Design Authority reserves the right to add or modify tests.

5.0 SYSTEM INSTALLATION

The contractor shall be responsible for ensuring that sufficient site utilities are available. No work will be permitted at the site before the approval of the Design Authority. All installation activities shall be conducted in accordance with ES/SOW-0102, Statement of Work.

5.1 Schedule

The contractor shall provide a detailed work schedule for the installation activities. This schedule shall reflect the complete implementation plan by identifying the nature of the work to be performed and the area affected.

5.2 On-Site Inspections

Design Authority or an appointed CSC representative shall perform ongoing inspections of the contractor's activities. These inspections shall verify compliance with the project requirements, the quality of work performed and assess the contractor's progress in relation to the approved schedule. Installation deficiencies requiring corrective action will be brought immediately to the contractor's attention in writing.

5.3 On-Site Coordination

Design Authority shall be responsible for the appointment of an on-site CSC representative. This representative will handle all site related manners and will periodically inspect the installation.

When electronic system installations are part of a construction program or a major redevelopment that involves Public Works & Government Services of Canada, the electronic system installation contractor shall coordinate all activities with the relevant site manager and shall comply with this SOW.

5.4 Facility Criteria

The contractor shall provide the facility criteria data in the proposal. Details as to the power, cooling, space and/or other requirements relating to electronic security system installation at the site must be provided. Final facility criteria information must be provided as part of the FDR.

5.5 Installation Design

The system installation design and planning shall make maximum use of existing ducts, conduits, and other cable routing facilities. Where this is not possible, the contractor shall design and install facilities in a manner acceptable to the Design Authority.

5.6 **Subcontractor Supervision**

The contractor shall provide an on-site supervision of all subcontractors. The subcontractors shall abide by the regulations of this Statement of Work and the conditions in the contract.

5.7 **System Checkout**

Before conducting the formal on-site testing for the CSC acceptance, the contractor shall conduct and document a system checkout to assure the system readiness for formal testing and on-line operations. The test sheets used for the system checkout shall be signed by a company representative and provided to the Design Authority at least seven (7) days prior to the scheduled date of the Acceptance testing. The Design Authority will verify readiness through review of the checkout report. The report may be used as reference during the formal witnessed testing for acceptance.

5.8 **As-Built Drawings**

Thirty (30) days after the system installation acceptance, the contractor shall deliver a complete set of equipment and installation as-built drawings for Design Authority's review and approval. Within thirty (30) days after CSC approval, two (2) complete sets of revised drawings shall be delivered to the Design Authority.

The contractor shall update these drawings throughout the warranty period by the design control procedures. Within thirty (30) days of completion of the warranty period, the contractor shall deliver one (1) set of final revised drawings reflecting all changes to the Design Authority. Upon final CSC approval, the contractor shall deliver two (2) sets of original prints of the final drawings.

6.0 SYSTEM ACCEPTANCE

System acceptance shall occur when the acceptance testing has been completed according to the ES/SOW-0102, Statement of Work and when all of the other requirements of the contract have been completed to the satisfaction of the Design Authority. A final acceptance certificate signed by the Design Authority shall certify the system acceptance.

On-site system acceptance testing shall not begin until all of the on-site iInstallation activities have been completed.

6.1 Acceptance Test Plans (ATPs)

The contractor shall provide ATPs for all system, subsystem and equipment tests for Design Authority review and approval. The requirements for the ATP are detailed in the ES/SOW-0102, Statement of Work.

6.2 System Testing

The contractor shall conduct the approved ATP and record the results. The Design Authority or an appointed CSC representative shall witness the tests.

6.3 Deficiency Lists (DL)

The contractor shall prepare and submit a list of deficiencies divided into three categories:

a. Visual/Mechanical,

b. Operational, and

c. Technical/Functional.

6.4 Technical Acceptance

Upon verifying that all of the deficiencies have been corrected, the Design Authority shall issue a letter of Technical Acceptance.

7.0 QUALITY ASSURANCE (QA)

The QA program shall include quality control and system tests/verification programs to verify that new design and off-the-shelf equipment requirements have been met. System tests/verification will be conducted by the contractor in-plant and on-site, and may be witnessed by the CSC representatives where appropriate. The system shall pass all tests before approval will be given to commence the operator and maintenance training programs and warranty period.

7.1 Quality Control Program

The contractor shall provide a description of their internal quality control programs for CSC review and approval. CSC reserves the right to audit and verify that all materials destined for use in CSC systems have been thoroughly inspected and that QA procedures are applied during production and testing.

7.2 System Test Program

The contractor shall prepare and provide the documents describing: number, type and details of equipment, subsystem and system tests for CSC review and approval. These documents must be approved before any formal testing and will consist of the following:

7.2.1 System Test Plan.

This plan shall contain the test philosophy, the tests to be conducted, the pass-fail criteria, the retest requirements, and the instructions for the validation and the sign-off of all final design baseline requirements.

Before witnessing these tests, the CSC representative will perform a visual and mechanical inspection to ensure that the system installation meets the requirements of ES/SOW-0102, Statement of Work.

7.2.2 Test Procedures. These procedures shall ensure that:

a. all equipment supplied meets the performance specification;

b. each subsystem meets the applicable performance requirements; and

c. the overall system meets the performance requirements.

d. test procedure contains the step sequence for each test to be conducted, and the expected results.

7.2.3 **Contractor Testing.**

All tests are conducted by the contractor and may be witnessed by an appointed CSC representative. Tests are conducted as stipulated in the approved plan and procedures. The contractor shall inform CSC at least five (5) working days before the test start date.

7.2.4 **Test Reports.**

The contractor shall submit final copies of the test results for CSC review and approval within ten (10) working days of the completion of the testing. Two copies of the report shall be submitted and shall include:

a. a summary description of the tests;

b. test results consisting of completed test procedures verified by a CSC representative;

c. incident reports, including analysis and corrective action; and

d. results of any retest.

8.0 TRAINING

The contractor shall develop, document and conduct training for both the operational and the technical staff. The training shall be conducted on-site at the institution in the period designated by the schedule.

8.1 Classroom Training

Classroom lectures and demonstrations will be conducted on-site to train operations staff in the use and technical personnel in the maintenance of the systems.

8.2 Training Documentation

The contractor shall develop and deliver a complete training plan to the Design Authority for comments and approval. This plan must be submitted to CSC at least thirty (30) days in advance of the training date to allow for CSC review. As a minimum, the training material shall contain:

a. training plans for CSC operations trainers and technical personnel;

b. manuals for each student to add notes;

c. training aids; and

d. student materials.

Training material shall be provided in the language that is dominant at the site (French in Quebec). Sufficient copies of all student materials shall be provided by the contractor at the beginning of the training course to assure one copy for each student. CSC shall stipulate the number of staffs who are to be trained. Upon approval by the Design Authority, two (2) copies of all material shall be delivered to CSC.

9.0 MAINTENANCE and SPARES

The contractor shall provide maintenance and spares support plans according to the ES/SOW-0102, Statement of Work for the Design Authority approval. These plans shall be submitted according to the schedule.

9.1 Maintenance Plan

The maintenance plan shall describe the philosophy, the Preventive Maintenance (PM) procedures and schedules, the Corrective Maintenance (CM) methods and response times, Mean-Time-To-Repair (MTTR) for all systems. The plan shall recommend tools, jigs and test equipment, and detail the recommended manning method for the system. Issue of the final maintenance support plan will be contingent on Design Authority approval.

9.2 Spares Plan

The spares plan shall list the required spares and recommended quantities. The quantity recommendations shall be supported by system availability and reliability analysis and available experience data. The bidder shall identify spare parts and components by their original manufacturer's code, cross-referenced to the equipment vendor's part number.

9.3 Spares List

The spares list shall identify the following:

a. the spare parts and the subassemblies with the recommended quantities;

b. the cross-reference listings between the vendors and the original manufacturer's codes;

c. the unit and extended prices for stocking; and

d. the expected life or the annual consumption of each part.

The contractor shall maintain the spares plan through to the end of the warranty period, and shall ensure that any changes because of approved design changes are incorporated in the spares list.

9.4 Test Equipment

The contractor shall provide a list of test equipment required for the on-site maintenance of the system within thirty (30) days from Design Authority's acceptance of the final design.

10.0 DOCUMENTATION

All final documentation in hard-copy format shall be in a 3-ring binder with all foldout pages having reinforced ring holes.

10.1 Manuals and Drawings

The following items make up the final documentation requirements:

a. Operator Manual,

b. Maintenance Manual,

c. Installation As-built Drawings,

d. Equipment As-built Drawings, and

e. Equipment Operating Software.

The contractor shall prepare and submit all manuals and drawings to the Design Authority for review and approval. The manuals and drawings will be approved when all changes have been satisfactorily incorporated. All drawings must be produced with AUTOCAD (latest available version)

10.2 List of Equipment

The contractor shall provide a list of equipment itemizing the location, quantity, model number, serial number and revision level of all installed equipment.

10.3 Baseline Measurements

The contractor shall provide a copy of the final test results. These results will be used as a reference baseline measurement for monitoring system degradation over time.

10.4 Documentation Format

All manuals, documentation including as-built drawings, lists of equipment and baseline measurements shall be submitted as per the following schedule:

- One (1) hard-copy version of all documentation.

- One (1) electronic version of all documentation in a ‘read-only’ format on a 3½ inch diskette medium; suitable for duplication without any special requirements.

- One (1) electronic version of all documentation in a full 'read-write' format to serve as a master of the documents and drawings.

- all software requirements to access the electronic versions of the documentation.

- One (1) CD containing the equipment operating software.

10.5 **Operator Manuals**

The contractor shall provide CSC approved manuals to support the operation of the system in the format as outlined in section 10.4 of this specification. These manuals shall be prepared to the best commercial standards. Photo copies shall not be accepted. All hard-copy versions shall be on paper stock 8 ½" x 11" and shall be presented in a 3-ring binder. The manuals shall comply with the following format and content requirements:

a. title page;

b. revision notice page, lined, with columns for revision numbers, dates and initials;

c. table of contents;

d. warnings and cautions;

e. introduction - general information including a description of equipment or system and summary of capabilities;

f. theory of operation including an explanation of all major system components;

g. detailed description and use of all user accessible computer screens; and

h. block diagrams.

A hard copy draft version of the manual(s) shall be submitted for CSC approval on or before the date given in the schedule. Upon acceptance and approval by the Design Authority, a total of two copies shall be provided for use during the warranty period. The contractor shall update these manuals through the warranty period and provide revision bulletins to record manufacturers' recommended modifications, etc. during the life of the equipment.

Within thirty (30) days of the warranty expiry date the contractor shall submit one (1) set of final, updated manuals for CSC approval. Following the final CSC approval, the required number of sets of operator manuals shall be delivered to the Design Authority in the format as specified in section 10.4 of this Statement of Work.

10.6 **Maintenance Manuals**

The contractor shall provide CSC approved manuals to support the maintenance of the system in the format as outlined in section 10.4 of this specification. These manuals shall be prepared to the best commercial standards. Photo copies shall not be accepted. All hard-copy versions shall be on paper stock 8 ½" x 11" and shall be presented in a 3-ring binder. The manuals shall comply with the following format and content requirements:

a. title page;

b. warranty page - explaining the warranty period and expiry dates;

c. revision notice page, lined, with columns for revision numbers, dates and initials;

d. table of contents;

e. introduction - general information including a full description of equipment or system, technical summary, specifications and detailed block diagrams;

f. theory of operation including a detailed explanation of all circuits and parts;

g. alignment and test procedures;

h. repair procedures including step by step fault finding or fault localizing;

I. block diagrams;

j. circuit schematics (clear, easy to read, foldout type);

k. complete parts list;

l. mechanical drawings, chassis layout illustrations and wiring data lists; and

m. drawings including as-built and as-installed drawings.

A hard copy draft version of the manual(s) shall be submitted for CSC approval on or before the date given in the schedule. Upon acceptance and approval by the Design Authority, a total of two copies shall be provided for use during the warranty period. The contractor shall update these manuals through the warranty period and provide revision bulletins to record manufacturers' recommended modifications, etc. during the life of the equipment.

Within thirty (30) days of the warranty expiry date the contractor shall submit one (1) set of final, updated manuals for CSC approval. Following the final CSC approval, the required number of sets of maintenance manuals shall be delivered to the Design Authority in the format as specified in section 10.4 of this Statement of Work.

11.0 PROJECT PROVISIONS

11.1 Monthly Progress Reports

The contractor shall submit monthly progress reports. These reports shall report the activities for the previous period. One (1) copy shall be delivered to the Design Authority and one (1) copy to the Contract Authority by the fifth (5th) day of each month. A review meeting may be required.

Monthly reports shall contain the following:

a. summary of the month's activities;

b. scheduled shortfalls and rescheduled dates;

c. problem areas and proposed solutions;

d. review of next month's activities;

e. summary of meetings held during the month; and

f. cash flow forecast.

11.2 Monthly Review Meetings

Review meetings shall be held at the contractor's premises, Design Authority's office, Contract Authority's office, or the site depending on the need. The contractor shall make the design staff members available upon request by the Design Authority.

11.3 Maintenance Support

During the training period, the contractor shall provide maintenance support. This support is expected to be not less than on-site coverage during the normal working day.

11.4 **Shipment and Delivery**

Contractor shall be responsible for the shipment and delivery of equipment and materials to the site. Packing, crating, and shipment of equipment shall be to good commercial practice, and any damage to, or loss of equipment shall be repaired or replaced to the satisfaction of CSC. The contractor must properly label all shipments to assure correct identification and disposition on arrival at the site, as specified in ES/SOW-0102, Statement of Work.

12.0 SYSTEM AVAILABILITY

All elements of customed and off-the-shelf equipment shall be designed to operate in a highly reliable fashion, consistent with available technology, with a minimum of system downtime due to scheduled and unscheduled maintenance. System availability will be achieved when each of the included subsystems availabilities have been proved as required.

12.1 Common Facilities

Where units or subsystems are integrated into common facilities no single failure of a component, assembly subassembly, or subsystem shall result in the failure of any other subsystem; nor result in reduced capacity or quality of performance of other subsystems or parts of it.

12.2 Single Point of Failure

The system shall be designed such that no failure of a single component, unit, subassembly or subsystem will result in failure of the next higher hierarchical elements of that subsystem or the system.

12.3 Availability Model

The bidder's technical proposal shall include a complete model and analysis of the availability of each subsystem and of the complete system being offered. This analysis shall include both MTBF and MTTR calculations and shall treat the Mean-Response-Time (MRT) as zero. This availability analysis may be based on either:

a. summation of failure rates of the individual components; or

b. the bidder's documented experience with the same equipment operating in a similar physical environment.

In either case, the source of all failure-rate shall be clearly shown.

The contractor shall maintain the availability model and analysis up-to-date throughout the contract period. A statement of impact of the proposed change would have on the availability model and analysis shall be submitted with all Type I DCRs.

12.4 Availability

Availability is the probability that the system, or subsystem will meet operational performance requirements at all time. Time includes the operating time, the active repair time and the administrative and logistic time. To calculate this availability, the contractor must include all of the pertinent factors such as:

12.4.1 **Mean Time Between Failure (MTBF)**.

The total operating time of the equipment divided by the total number of failures of that equipment.

12.4.2 **Mean Time To Repair (MTTR).**

The repair time divided by the number of failures.

12.4.3 **Mean Response Time (MRT).**

The time to respond to a call for service divided by the number of calls.

12.5 **Expected Life Duration**

This is the time during which the equipment is expected to provide useful service, without an unusual amount of service and without becoming obsolete.

13.0 INTERFERENCE

13.1 Interference to the System

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 are as follows:

13.1.1 CB transceivers at 1 metre or more;

13.1.2 VHF and UHF transceivers at 1 metre or more;

13.1.3 Other radio frequency transmitting, receiving and re-distribution equipment at 5 metres or more; and

13.1.4 Personal computer and/or computer work stations at 5 metres or more.

13.2 Interference by the System

The system shall not interfere with any standard electronic equipment used at the institution, any commercial TV or radio equipment at a minimum distance of 5 metres, or any other electronic security systems at a distance of 1 metre or more.

14.0 LIGHTNING PROTECTION

Surge suppression-type lightning arrestors shall be installed to protect all power, communications and antenna cables or wires entering or leaving a building.

These arrestors must be installed where the cable enters the building i.e. not in the CER or other equipment room.

Correctional Service Canada
Technical Services Branch
Electronics Systems

ES/SOW-0102
Revision 6
1 May, 2008

ELECTRONICS ENGINEERING STATEMENT OF WORK

QUALITY CONTROL FOR PROCUREMENT AND INSTALLATIONS OF ELECTRONIC SECURITY SYSTEMS

AUTHORITY

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

Prepared by:

Manager,
Electronics Systems Research

Approved by:

Director,
Engineering Services
18 Aug 06

RECORD OF REVISIONS

Revision	Paragraph	Comment
3	5.1 - Design Considerations	Tabletop or wall mount power supplies/transformers
4	3.1.1 - Wiring/Cabling Methods	Wiring/cable access
	3.2.1 - AC Wiring	Power outlet strip
		Separate circuit breakers connected to opposite phases of the AC feed
	3.2.2 - AC Power Connections	Power connections via flexible armoured cable
5	Abbreviations	Additions
	1.4 – Manufactured Equipment	Approval of custom equipment
	1.5 – Commonality of Equipment	Add security screws
	3.1.1 – Wiring and cabling	Single conductor wire only on IDC connectors
		Identification of conductors
	3.1.2 – Cable/Wiring Labelling	Acceptable labelling
	3.2.1 – AC Wiring	Mounting of power strips
	3.3.4 - Labelling	Acceptable labelling of racks, boxes, etc.
	5.1 – Design Considerations	DIN rail power supplies preferred
6	2.1 – Environmental Conditions	Expand airborne containments
	2.6 – Finish Application	Change finish material definition
	2.2.2 - Plastic	Remove last sentence
	3.1.1 – Wiring/Cabling Methods	Change “Hydro Codes” to “Electrical Authority”
	3.3.2 - Enclosures	Add requirement to meet IP64

TABLE OF CONTENTS

ABBREVIATIONS

The following abbreviations are used in this specification:

AC	Alternating Current
ATP	Acceptance Test Procedure
BER	Beyond economical repair (repair cost in excess of 60% of replacement cost)
CER	Common Equipment Room
COTS	Commercial -of-the-Shelf
CSC	Correctional Service Canada
CSA	Canadian Standards Association
DC	Direct Current
DA	Design Authority
DES	Director, Engineering Services
EIA	Electronic Industries Association
EMT	Electrical Metallic Tubing
IDC	Insulation Displacement Connector
ISO	International Standards Organization
PCB	Printed Circuit Board
PVC	Polyvinyl Chloride
QA	Quality Assurance
RFP	Request For Proposal
STR	Statement of Technical Requirements

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The following definitions are used in this specification:

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Project Manager	A CSC employee and/or a contracted person designated by DES to be responsible for the implementation of the project.
Project Officer	A CSC employee and/or a contracted person designated by DES to provide technical and/or engineering services in support of the project.
Contractor	The company selected as the successful bidder.
Off-the-shelf	Equipment which is commercially, complete with field reliability data, manuals, engineering drawings and parts price list.
Custom Equipment	Equipment designed and/or manufactured specifically for a specific contract.

APPLICABLE DOCUMENTS

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

CSA STANDARD C22.1-1986	Canadian Electrical Code - Part 1 Safety Standard for Electrical Installations
EIA STANDARD EIA-310-D	Racks, Panels and Associated Equipment
CSA STANDARD C22.2	Canadian Electrical Code - Part II
EIA RS-406/IPC-C--405A	Connectors, Electric, Printed Wiring Boards

Any other applicable industrial safety and control standards governing specific aspects for equipment and/or installations.

1.0 INTRODUCTION

1.1 General

This document defines the quality control requirements for the design, installation, testing and acceptance of telecommunications and electronic security systems in all Correctional Service Canada (CSC) facilities.

1.2 Scope

This specification has been developed to ensure high standards for the installation of electronic systems. It defines workmanship standards which may not be fully covered in subsidiary specifications. All contractor's documentation and installation procedures shall meet this specification for equipment reliability, maintainability, longevity, appearance and operational use.

1.3 Off-The-Shelf Equipment

The contractor shall provide commercial off-the-shelf (COTS) equipment wherever possible. COTS equipment shall meet or exceed the manufacturing standards as listed in this specification.

1.4 Manufactured Equipment

Where COTS equipment is unavailable or unsuitable for a specific application, the contractor may manufacture or arrange for the manufacturing of a particular item to suit the requirements. Manufactured equipment shall meet or exceed the best commercial equipment manufacturing standards. Approval of the final design, appearance and ergonomics of all custom manufactured equipment shall rest with the DES, Project Manager or CSC delegate.

1.5 Commonality of Equipment

The contractor shall provide commonality of hardware components within the design parameters ie. switch locks, racks, panels, security screws, etc. All equipment, if appropriate shall be interchangeable.

2.0 MATERIAL AND EQUIPMENT REQUIREMENTS

2.1 Environmental Conditions

All materials and equipment which is used in CSC installations shall be equal to, or better than the standards established in the original equipment and shall be chosen with due consideration being given to the intended use, safety, retention of appearance, maintainability and durability under rugged operating conditions. These materials shall be suitable to perform over the following environmental ranges:

a. **Indoor Equipment**

Temperature: 0° C to 40° C; and
Humidity: 20% to 95% non-condensing.

b. **Outdoor Equipment**

Temperature: -40° C to +50° C; and
Humidity: 0 to 100%, condensing.

Outdoor equipment shall operate reliably and not be damaged by combinations of direct exposure to the sun, wind, rain, lightning, hail, snow and ice as may be expected to occur at each institution location.

Complete assemblies of indoor equipment shall be resistant to liquid spills, airborne contaminants (dust, pollen and water droplets), shock and vibration.

2.2 Materials

2.2.1 Metals

Metals used shall be either corrosion resistant or be suitably treated to resist corrosion in all potential atmospheric conditions, including tear gas, to which the installation may be subjected.

For the connection of copper to a cadmium or galvanized surface, effective "wiping" of the copper surface shall be considered satisfactory protection.

No cut galvanized fitting shall be used without protection equal to or greater than the original galvanized surface. All parts shall be free from burrs and sharp edges.

Metal which has been cut, scraped, or drilled shall be properly treated (primed and painted) to retain a uniform appearance.

2.2.2 **Plastic**

Plastic materials must be stable and shall retain their original shape and finish over the range of operating environmental conditions specified in 2.1

No material shall be used that softens or hardens within the storage environment in a way which is detrimental to its suitability as replacement parts for existing equipment.

Metal screws shall not be threaded into plastic materials.

2.2.3 **Natural Rubber**

The use of natural rubber is prohibited.

2.2.4 **Wood**

The use of wood or wood products is not acceptable.

2.3 **Toxic Materials**

Materials capable of producing harmful toxic effects under any operating condition, equipment malfunction, or accidental cause shall not be used.

2.4 **Flammable Materials**

Materials, used either for electrical insulation or mechanical purposes which are combustible or capable of causing an explosion, shall not be used.

2.5 **Fungus and Insect Supporting Materials**

Materials capable of providing a nutrient medium for fungus or insects shall not be used.

2.6 **Finish Application**

Finish shall be applied to all surfaces where consideration of appearance and protection against corrosion, toxicity, and other deterioration exists.

Application of finish shall not impair equipment performance, and will maintain uniformity in outward appearance.

Finish materials must be scratch resistant, not react to normal cleaning products and applied so as to last at least ten years.

3.0 INSTALLATION REQUIREMENTS

3.1 Wiring and Cabling

Prior to the installation, all wires and cables shall be tested in accordance with the manufacturer's instructions and shall meet all performance parameters.

Wire and cable harnesses shall be neatly formed and clamped in position. If brackets, forms or clamps are required, these shall be the responsibility of the contractor.

All wires and cables shall be stranded. Single conductor type wires are not acceptable except when such cables are specified to terminate on an IDC type connector. This does not apply to coaxial cables with single centre conductors.

Electrical tape, masking tape, or its equivalent shall not be used on wires, cables or any installed equipment.

3.1.1 Wiring/Cabling Methods

Three (3) or more individual wires or cables which are located in one(1) cable run shall be formed into a cable harness, properly dressed, supported and securely tied with flat lacing twine or equivalent.

Wires and cables which are installed by the contractor external to consoles, equipment racks, pull boxes and junction boxes shall be contained in securely mounted conduit or cable tray systems.

Plastic PVC conduits may be used in underground installations unless otherwise specified at time of bidder's conference.

A rigid steel conduit shall be used in indoor, security sensitive areas and outdoor above-ground applications.

Signal and 120 VAC power wiring shall not be run in the same conduit, cable tray, or raceway; and shall be separated in accordance with the local Electrical Authority.

Wire splicing in cable runs shall not be permitted. All cable runs shall be continuous. If continuous cable runs are not possible, terminal block configurations are acceptable provided they are approved by the Design Authority.

Cross-connects installed on BIX. or similar blocks, must not pass across the face of the block, but must be carried around the block, so as not to impede access to the connections.

BIX, or similar, blocks are to be used for solid wire only. Stranded wires are not to be directly terminated on BIX, or other IDC terminations.

Wires in multi-conductor cables which terminate on connectors, and which are not being used, must be twisted around the cable in a neat fashion. They are not to be cut off.

Wires in multi-conductor cables which terminate on BIX or similar IDC connector blocks, and which are not being used, must be punched down on the block. They are not to be cut off.

All conductors on IDC and any other type of terminal block will be identified with a cable marker and cross referenced in the as-built drawings.

Rectangular slots shall be cut in the computer floor, underneath any cabinets, racks, and consoles, for the running of cables. These slots must constitute at least 1/2 of the available floor area. Sharp edges on the computer floor shall be supplied with suitable protection to eliminate possible nicks, tears or wear in cable insulation sheaths. Individually drilled holes for the purpose of carrying cables from the under floor to the inside of the cabinet, rack or enclosure are not permitted.

3.1.2 **Cable/Wiring Labelling**

The contractor shall label all cables and cable runs. The labelling method shall be logical and conform to industry standards.

All cables shall be identified with commercially produced or machine printed alpha numeric labels protected by clear heat shrink tubing. Hand printed labels are not acceptable.

All wiring shall be identified at both ends of the wire. The coding shall enable a technician to identify the wire or cable without referring to manual tracing methods, test equipment or as-built drawings.

Cable identification labels shall be attached as follows:

a. within 30 cm of the termination for both ends.

b. in the middle of any access point, i.e. pull box, wall shaft opening, cable tray, etc.

All individual wires shall be labelled according to a cable numbering system or wire function plan, which is acceptable to the Design Authority.

All terminal strips shall be identified with its own unique terminal number and function.

3.1.3 **Exterior Cabling**

Where a cable enters or exits an exterior box, chassis, or conduit, the cable entrance shall be completely sealed to prevent an influx of water. A drip loop shall be formed in the cable to assist in maintaining this weather tight seal.

Conduit bushings shall be used on all conduit entrances/exits.

Sharp edges on metal boxes or chassis enclosures shall be supplied with suitable protection to eliminate possible nicks, tears or wear in cable insulation sheaths.

3.1.4 **Slack**

Wires and cables shall be as short as practical, with sufficient slack to:

a. allow a minimum of three (3) reconnects due to wire breakage;

b. prevent undue stress on cable forms, wires, terminals and connections;

c. enable parts to be removed and replaced during servicing without disconnecting adjoining wires or circuits;

d. facilitate movement of equipment for maintenance purposes; and

e. provide drip loops in exterior cabling.

Slack shall be provided in junction boxes where space permits. Slack shall not exceed one single loop of cable forming the circumference of the junction box.

Slack shall be provided below equipment racks and shall be neatly coiled below the access flooring. The length of slack shall be equal to the height of the associated equipment rack. Units in drawers and slide out racks shall be provided with sufficient slack to permit removing the units without severing connections.

All cross connection wiring shall be neat and tidy, properly bundled, and tied. This procedure shall allow sufficient slack for tracing of individual wires via manual methods.

Parts mounted on a hinged door shall be wired by means of a single cable, and arranged to flex without being damaged by the opening and closing of a door. If physical separation between wires is essential so as to make a single cable impractical, more than one flexible cable may be utilized.

3.1.5 **Terminations**

All terminations relying on friction for electrical and mechanical connection shall be tested in accordance with the manufacturer's instructions and shall meet the performance requirements detailed therein.

Terminal fanning strips shall be used where a number of wires are contained in a harness, shall be used unless a multi-pin connector is provided.

Spade terminal lugs shall be used on all wiring, connections to screw-thread terminals, except where solder or other type of terminal is specified.

Where wires are connected to lugs, which are clamped under screw terminals in the form of a terminal connection strip, no more than one wire shall be attached to each lug, in order that each wire may be removed individually. This requirement will not apply in the case of common connections, daisy chain distribution circuits, or similar terminations where wires will not need to be disconnected for servicing.

No more than two (2) lugs shall be attached to each terminal.

Wire and cable insulation shall be stripped back to allow for proper connection to the lug. No bare wire shall be visible between the terminal lug and the insulator.

Terminal strips must be fastened to a hard surface using a screw, or nut and bolt. Adhesive supports to secure the terminal strip, or floating terminal strips are not acceptable.

3.1.6 **Splicing and Joining**

Splicing of wires on new installations is not permitted.

Where connectors are used on cable assemblies, they shall be a locking type which will not disengage under tension.

All joints or splices in underground cable runs shall be located inside accessible, secure, waterproof, and lockable steel enclosures. The enclosures shall be located at least one (1) metre above grade and be firmly secured to existing structures or to stub pole supports.

Splices in underground cable runs, if required to repair Crown caused damage, shall be subject to approval from the Design Authority.

Stranded conductor splices shall be held by wire binding terminals in order to prevent stray strands from causing either short circuits or grounds.

Joints and splices shall be soldered and encased in waterproof shrink tubing for protection against leaching, oxidization, moisture damage, etc.

Joints and splices shall be clearly and accurately identified on applicable as-built drawings.

3.1.7 **Shielding**

Shielding shall be secured on wires and cables to prevent accidental contacting or shorting exposed current-carrying parts, grounded metal objects, or structures.

Shielding shall terminate at sufficient distance from the exposed conductors of the cable to prevent shorting or arcing between the cable conductor and the shielding.

Ends of the shielding material shall be secured against fraying.

3.1.8 **Protection**

Wires and cables shall be strategically located and protected to avoid contact with rough, irregular surfaces or sharp edges.

Wires and cables shall be protected by suitable grommets or bushings when passing through openings in metal.

Guards or other suitable protection shall be provided on insulated high voltage cables.

3.1.9 **Support**

Wires and cables shall be properly supported with adequate strain relief to prevent excessive strain on the connections, devices, or joints of any electrical apparatus connected therein.

Adhesive supports with ty-wrap products shall not be used unless they are secured by a nut and bolt device.

3.1.10 **Clearance**

Physical clearance between wires/cables and associated heat emitting parts, i.e. amplifiers, shall be sufficient to prevent deterioration of the wires or cables. Refer to Table 19 of CSA Standard C22.1 Part 1.

3.1.11 **Inductive and Capacitive Effects**

Wires and cables, including harness wire and cables, shall be located such that inductive and capacitive effects do not adversely affect system operation. The amount of twists in paired wires shall be increased over the length of wire not covered by the cable sheath.

3.2 **Power Wiring**

The contractor shall not employ "Marette" (TM) type connectors regardless of CSA Standard C22.1 regulations. All wiring shall terminate on an insulated or protected barrier strip or terminal board, and be provided with spade terminal lugs where required.

Where control and signal wires which are run in conduit, cable-harness, or cable-trough systems, shall be run in separate wire ways. The separation shall be a physical barrier of suitable material and shall conform to applicable building codes and wiring methods.

All high voltage and/or high current terminations shall be provided with protective guard devices by the contractor. The device shall be mounted to allow for maintenance access to the terminals.

Terminal lugs shall be used on all power wiring, both VAC and VDC.

Warning labels must be installed in accordance with the CSA guidelines to warn maintenance personnel of any hazardous voltages and currents.

3.2.1 **AC Wiring**

AC wiring methods shall conform to all local and national wiring regulations.

Outlet boxes shall be installed such that all outlets are clear of any obstructions including wiring and cabling, and shall be easily accessible.

Power distribution within a cabinet or rack shall be via a power outlet strip, as provided by the original cabinet or rack manufacturer. A third party outlet strip is not acceptable. All power strips must be mounted into the equipment cabinet with rack mounting hardware.

All power cable installations shall be completed in a neat and sturdy fashion and shall meet all requirements of the specifications detailed herein.

Power cords within equipment cabinets and racks shall be maintained as short as practicable with due consideration for maintenance needs.

Systems which use redundant equipment, such as dual microprocessors, shall power each unit from two separate breakers connected to opposite phases of the AC feed.

3.2.2 **AC Power Connections**

All AC power connections from the cabinet or rack power outlet strip to the AC junction box shall be via flexible armoured cable. AC power connectors are not permitted.

3.3 **Conduits, Enclosures, Cable Troughs and Raceways**

3.3.1 **Conduits**

Conduits installed above ground, and accessible to the inmate population, shall be rigid steel.

Metal conduits installed in secure and inmate accessible areas shall be fitted with double the normal quantity of support hangars.

In locations subject to extreme temperature changes, and/or where conduit lengths are of non-standard size, the contractor shall make provisions for the inclusion of conduit expansion joints.

Rigid PVC conduits shall be used only in buried applications.

Rigid PVC conduits shall not be threaded, but may be used with approved adapters and couplings applied in a manner consistent with industry standards.

EMT conduit may be used in administrative areas, and locations which are not normally assessable to the inmate population.

Liquid-tight flexible metal conduits may be used where a flexible connection is required, i.e. cameras, microwave dishes, etc. In such applications, the length of "flex" conduit shall not exceed one (1) metre.

PVC conduits which cross roadways shall be encased in poured concrete.

The contractor shall provide a suitable means of protecting the buried conduit against damage caused by digging or excavating. The preferred method is installing a tape marker directly above the conduit path.

In addition to these requirements, the applicable industrial standards apply, including:

a. CSA Standard C22.2 No. 45-M1981 - Rigid Metal Conduit

b. CSA Standard C22.2 No. 56-1977 - Flexible Metal Conduit

3.3.2 **Enclosures**

All electrical connections, terminations, and cross connections shall be made within lockable, covered steel enclosures, using good quality locks. At least two keys must be supplied to CSC.

Outdoor enclosures shall be environmentally sealed and gasketed to provide a moisture/dust free and secure environment.

Enclosures which contain electrical equipment such as circuit breakers, relays, switches, and transformers, or cable networks, connections and terminations, shall be weatherproof and dust-tight and meet the provisions of IP64.

All enclosures such as junction boxes, racks and consoles shall be positioned for ease of maintenance, service, and connection/disconnection of cables and cable harnesses.

The contractor shall provide a proper drain hole in all enclosures which are grouted in concrete.

All floor mounted cabinets, racks, and consoles shall be secured to prevent overturning when associated drawers, shelves and movable parts are extended, or when heavy objects are placed on pull out shelves or writing tables.

In addition to the provisions stated herein, the applicable industrial standards shall apply, including:

a. CSA Standard C22.2 No. 29-M1983 for Industrial Products.

b. CSA Standard C22.2 No. 94-1976 for Special Purpose Enclosures.

3.3.3 Cable Troughs and Raceways

Cable troughs and raceways shall be continuous and shall be constructed of metal.

The contractor shall provide adequate mounting devices which will permit the use of fastening devices that will not damage conductor insulation.

Cable troughs, raceways, and fittings shall be free from burrs or other sharp edges which may cause damage to the cable or insulated conductors.

Cable troughs and raceways shall be installed as a complete system before the conductors or cables are installed.

Cable troughs may be either ventilated or solid and unless otherwise specified, shall be equipped with covers and steel guards to protect against damage.

In addition to these provisions, the appropriate standards shall apply, including:

a. CSA Standard C22.2 No. 126-M1980 - Cable Troughs and Fittings.

b. CSA Standard C22.2 No. 79-1978 - Raceways and Fittings.

c. CSA Standard C22.2 No. 62-1972 - Surface Raceways and Fittings.

3.3.4 Labelling

The contractor shall label equipment racks, junction boxes etc. The labelling method shall be logical and conform to industry standards. All equipment racks and junction boxes shall be identified with commercially produced or machine printed alpha numeric labels. Hand printed labels are not acceptable.

Identification of chassis equipment shall be located in a suitable location within the rack and affixed to the rack, not the chassis.

Approved materials used for labels include lamicoyd strip, etched metal, stamped labels, or indelible ink.

3.4 Soldering

On solder connections, the insulation on individual wires shall not be stripped back more than 1.5 mm from the solder area.

Soldering shall be executed so that positive electrical and strong mechanical connections are assured.

Leads shall not be wrapped more than once around the terminal.

Soldered connections on the back of connector plugs, i.e. cannon plugs, switches, relay sockets or any other device employing solder lugs, shall be insulated by means of a short length of insulating tubing placed over each wire in the connector.

"Cold" solder joints, and excessive solder on connections shall not be acceptable.

Each soldered connection shall be tested for mechanical and electrical strength to ensure that a strong connection is achieved.

Use of acid based solder flux is not permitted.

Where insulation material is subject to heating during soldering, the material shall be undamaged and the fastened parts shall not be loosened.

3.5 Welding

All welds shall be free of harmful defects such as cracks, porosity, undercuts, voids and gaps.

There shall be no burn through.

Weld fillets shall be uniform, smooth, and shall cover a sufficient area of the welded surface to ensure that a solid bond is achieved.

Surfaces to be welded shall be free of extraneous particles which may affect the mechanical elements of the welded area.

3.6 Crimping

Crimp connections shall be made in accordance with the manufacturer's instructions. Industry standards shall be observed at all times.

Solid conductors may be used with crimp connections where the use of solid conductor wiring cannot be avoided. In all other cases only stranded wiring shall be used on crimp connections.

Solid conductors which are connected to terminals by crimping shall be soldered as well. This provision only applies to terminal lugs. It does not apply where wires may be spliced by crimping except in the case of some LED's and indicator lights which employ pigtail leads which should be soldered or connected by screw terminals.

3.7 Cleaning

Upon completion of the installation, the equipment shall be cleaned of smudges, loose or excess solder, weld beads, metal chips, burrs, mold release agents, or any other foreign material which might detract from the intended operation, function, or appearance of the equipment.

All corrosive materials shall be removed.

The cleaning processes employed shall leave no harmful residues and shall not have a negative effect on the equipment or its parts.

4.0 GROUNDING REQUIREMENTS

4.1 General

Grounding source and distribution points shall be provided by the Crown unless otherwise specified at the bidder's conference, in the Statement of Technical Requirement (STR), or any applicable documents.

The grounding shall be such that the signal ground, equipment ground, and electrical power ground shall be connected at one point and shall follow the shortest possible path. Where necessary, ground isolation techniques shall be employed.

The path from the tie point to any ground shall be permanent, continuous, have sufficiently low impedance to limit the potential above ground, and facilitate the operation of the 'over current' devices in the circuits.

Ground conductors shall be made of copper, sized for a minimum of 200 circular mils for each 300 mm length of conductor.

Inactive wires installed in long cable or conduit runs shall be grounded to prevent stray or static electrical discharges, with proper consideration given to prevent ground loops or other grounding problems.

Installation must be such that ground loops are prevented.

4.2 Signal Ground

Signal grounds shall be used to provide a ground potential reference which is independent of the frame ground and the power equipment ground.

An insulated grounding conductor shall be connected from the equipment signal ground terminal to the main ground connection point for single units such as equipment racks.
An insulated ground plate shall be used with insulated grounding conductors for multiple units, such as common equipment room (CER) equipment, from each equipment signal ground terminal connected to the plate. The plate shall be connected to the main ground connection point by means of a single insulated grounding conductor.

4.3 **Frame Ground**

The ground connection of the receptacle may be used for the frame ground as long as that ground connection is isolated and insulated from the power equipment ground system. Such receptacles shall be clearly identified so that they will not be used to supply equipment that does not require frame grounds.

The receptacle ground connection conductor shall be insulated and isolated from the power equipment grounding system, and shall be connected from the receptacle ground connection to an isolated ground plate.

The isolated ground plate may be an insulated buss bar for low power applications,.

Size of grounding conductors shall be in accordance with the requirements of CSA Standard C22.1 Section 10 and Table 17.

4.4 **Combined Signal and Frame Ground**

Connection between the signal ground terminal and the frame ground terminal shall be part of the equipment wiring. The connection to the main ground connection point shall be similar to that for a frame ground.

4.5 **Main Ground Connection Point**

Main ground connection point shall be installed in accordance with CSA Standard C22.1 Section 10, and C22.2 No. 41.

4.6 **Ground to Chassis**

Ground connections to an electrically conductive chassis or frame shall be made by:

a. soldering to a spot-welded terminal lug.

b. soldering to a portion of the chassis or frame that has been formed into a soldering lug.

c. using a terminal on the ground wire and securing the terminal by a screw, nut and lockwasher.

When using a terminal on a ground wire which is secured by a screw, nut and lockwasher, the screw shall fit in a tapped hole in the chassis or frame, or it shall be held in a through hole by a nut.

When the chassis or frame is painted, the metal around the screw hole shall be scraped clean and plated (or tinned) to provide a corrosion resistant connection.

4.7 Shielding

Shielding on wire and cable shall be grounded to the chassis or frame, in the manner specified in Section 2.5.5

4.8 Lightning Protection

All equipment with external cabling including radiating cables or other forms of antennas which may be susceptible during lightning strikes or other static discharges shall be protected fully in accordance with the relevant safety rules and regulations.

The ground rod used for lightning protection shall be copper or copper-plated steel, and shall be a minimum of 2.5 metres in length. Where the ground conditions preclude installation of a single ground rod, multiple rods of a shorter length may be used in parallel to provide the lightning protection.

The copper ground conductor shall be fastened to the ground rod using a thermic welding technique. Clamps are not acceptable.

5.0 ELECTRICAL/MECHANICAL DESIGN REQUIREMENTS

5.1 Design Considerations

All equipment shall be manufactured and finished with a degree of uniformity and grade of workmanship which shall comply with applicable industry standards, and the generally accepted principles of safe practice.

Exposed and moving parts that might constitute a safety hazard shall be provided with protective guards and warning labels.

All elements of the equipment shall be designed to operate in a highly reliable fashion, consistent with available technology, with a minimum of system downtime due to scheduled and unscheduled maintenance.

Where units or subsystems are integrated into common facilities, no single failure of a component, sub- assembly, assembly, or sub-system shall result in the failure of any other sub-system or reduced capacity or performance of other sub-systems or parts thereof.

The system shall be designed such that no failure of a single component, unit, subassembly, or subsystem will result in failure of the system or the next higher hierarchical elements.

All equipment shall be designed and installed to provide useful service, with minimal maintenance for a period of no less than 10 years, unless otherwise specified.

Tabletop or wall-mount power supplies or transformers shall not be used to power equipment installed within equipment racks and cabinets. Power supplies or transformers used within racks and cabinets shall be securely fastened to the rack equipment rails or side of the cabinet. DIN rail mounted power supplies are preferred.

5.2 Assemblies

The contractor (or manufacturing agent) shall apply special considerations in the execution of assembling system component parts.

Rack mounted equipment chassis; whose depth from the front face panel to the rear of the chassis exceeds 25 cm shall be equipped with rack slides.

Each assembly shall have a permanently fixed label showing the model number, serial number, and power requirements.

Materials used in assemblies shall be chosen with due consideration being given to the intended use, safety, durability, retention of appearance, and ability to resist corrosion from a variety of causes including tear gas.

In addition to applicable CSC/DES specifications, the appropriate industrial standards shall apply, including:

a. EIA-310-D Racks, Panels, and Associated Equipment.

b. CSA C22.2 No. 94-1976 Special Purpose Enclosures.

c. CSA C22.2 No. 29-M1983 Panel boards and Enclosures.

5.3 **Printed Circuit Board (PCB)**

PCBs shall be constructed of non-flammable material, preferably a glass epoxy base.

The contractor shall provide extractor devices at the front of each card assembly.
All cards shall have keyed edges to prevent accidental replacement by another type of card.

Each device shall be identified and properly labelled, showing card type, and revision number.

All PCBs shall be etched. Wire wrap connections are not acceptable.

In addition to the requirements set forth herein the appropriate industrial standards shall apply, including:

a. CSA C22.2 No.154-M1983 Data Processing Equipment.

b. CSA C22.2 No.0.7-M1985 Equipment Electrically Connected to a Telecommunications Network.

c. EIA RS-406/IPC-C-405A General Document for Connectors, Electric, Printed Wiring Boards.

5.4 **Components**

All electrical equipment, i.e. power supplies, amplifiers, etc. attached to the equipment structure shall be fastened securely and rigidly not using nuts and lockwashers.

Electrical components used in manufacturing in-house products shall be of commercial quality and shall comply with the standards of the Canadian Electrical Code, Part II.

Electronic circuit components, such as resistors, capacitors, inductors, or semiconductor devices which have no applicable standards in the Canadian Electrical Code, Part II shall comply with the test parameters as set forth in CSA C22.2 No. 154-M1983 Part 6.

6.0 QUALITY ASSURANCE REQUIREMENTS

The contractor shall provide objective evidence that the system and any major component therein have been designed, manufactured, inspected and tested under the umbrella of a quality assurance program capable of meeting the requirements of the applicable ISO Standard 9002 Series. More stringent requirements will be identified on a case by case basis, as needed.

In addition, the contractor shall develop a site-acceptance test/inspection procedure to demonstrate that all parameters of the system are fully operational and conform to the Statement of Technical Requirements.

6.1 In-plant Inspection

The equipment shall meet all functional, electrical, and visual/mechanical test parameters and shall have been fully tested and inspected by the contractor. Results shall be documented and reported to the Design Authority. Periodic inspections may be done by the Design Authority or his designated representative to verify that the equipment meets all requirements.

Particular attention shall be given to the following:

a. Inventory of received equipment.

b. Physical condition of equipment i.e.: scratches, dents, paint chips, etc . . .

c. Construction techniques, board and components accessibility.

d. Neatness, clamping and tying of wiring, cabling and harnesses.

e. Strain relief of cables and wire connections.

f. Legibility of nameplates, identification plates, and markings.

g. Safety and protective covers, warning labels and grounding.

h. Tightness of connectors, screw type fasteners, etc.

i. Soldered and weld joints.

j. Completeness.

k. Operation of drawers, adjustable and sliding parts, controls etc.

l. Shielding.

m. Cable and wire connections, ground clamps and terminal strips.

n. Type and quality of paint finish.

o. Quality of printed circuitry, etching, the electronic components and other associated parts.

p. Quality of locks, cabinets and other materials.

It must be noted that the in-plant tests are performed as a requirement of the financial arrangements and serve to guarantee that the design parameters of the FDR are followed and will meet the requirements of the applicable system specification. Sign-off of in-plant tests will not denote any form of final acceptance of the equipment and design.

6.2 Test Equipment

All test equipment shall be supplied by the contractor.
All instruments and test equipment shall be checked periodically by the QA Inspector in order to ensure accuracy of measurement. Records showing when the test equipment was last calibrated are to be provided as proof of accuracy.

6.3 Calibration

All test equipment used by the contractor shall bear a calibration seal showing the date calibrated and the due date for the next calibration.

The contractor shall ensure that the test equipment's calibration due date does not occur during the test period.

All equipment performance measurements shall be made with instruments whose accuracy and calibration guarantee that the results comply with the terms of the contract.

CSC reserves the right to furnish and/or require the use of any applicable instruments and standards in order to ascertain the accuracy of any measurements.

Test equipment suspected of being damaged or out of calibration shall be rejected by the Design Authority.

6.4 Safety Design Aspects

Particular attention is to be given to the safety design aspects of CSC installations, so as to minimize any hazards while in gaining access to, operating and servicing equipment. Such design aspects shall include the proper grounding of equipment, the installation of protective covers and warning labels over high voltage areas, the installation of warning labels on x-ray equipment, etc.

Radio and TV camera towers must receive careful attention in regards to make them accessible for servicing, especially during inclement weather.

7.0 ON-SITE INSTALLATION

7.1 Inspections

Inspections will be performed by the Design Authority or their designated representative. A thorough visual and mechanical inspection of the installation shall be performed to ensure that all applicable requirements and safety precautions have been met.

7.2 Damage to Government Property

Damage to Government property, including buildings, equipment, etc. during the course of the installation shall be made good by the contractor.

The contractor shall replace all equipment which has suffered major damage, i.e. damage which renders the equipment BER, unserviceable, or subject to deterioration.

If stocks of the applicable equipment are at such a level that replacement of the damaged items cannot be made, and the contractor cannot readily obtain new equipment in order to allow the installation to proceed without delay, the contractor shall:

a. repair the damage immediately with available materials.

b. return to the site and replace the equipment as soon as new equipment is procured.

Minor damage shall be repaired in a manner which leaves the government property in a condition equivalent to its original state and performing the original function, with no deterioration in appearance, performance, and/or reliability.

Any equipment where the paint finish becomes scratched or marred during the installation shall be completely refinished and repainted consistent with the appearance of new equipment.

Equipment shall neither be exposed to rain, nor be left out-of-doors during inclement weather. This stipulation does not apply to construction materials.

7.3 Protection of Surfaces

The contractor shall obtain approval from the appropriate Institution authority before moving heavy loads or equipment on floors, roofs and other surfaces.

The contractor shall adequately protect floors, finished surfaces and roofs from damage during the installation and shall implement special measures when moving heavy loads or equipment on them.

The contractor shall keep the floors free of oils, grease, or other materials likely to damage or discolour them.

The contractor shall provide dust protection for the equipment during the installation period, as related construction activities may occur simultaneously.

7.4 Cutting, Patching and Digging

The contractor shall perform all cutting, patching or digging necessary for the installation of the system.

The contractor shall be responsible for changes or damage to any existing work, cables or equipment by cutting, welding, drilling, or digging without prior consent from the Design Authority.

The contractor shall promptly repair any damage for which he is responsible in order to restore the facilities to their original condition.

7.5 Visual-Mechanical Inspection

Inspection shall be performed by the Design Authority or his designated representative.

Prior to the commencement of performance and operational testing, the installation shall be inspected to ensure that all applicable requirements and standards have been met.

Particular attention shall be given to the following:

a. Physical condition and positioning of equipment.

b. Neatness, clamping and tying of wire and cable harnesses.

c. Cable and wire connections, ground clamps, and terminal strips.

d. Soldered and welded joints.

e. Strain relief of cables, wire connections, and cable harnesses.

f. Cleanliness of equipment boxes under computer flooring.

g. Nameplates, identification methodology and markings.

h. Operation of drawers, adjustable and sliding parts and controls.

i. Equipment fit, fastening devices and accessibility of parts.

j. Construction and finishes.

k. Legibility of labels and tags.

l. Safety aspects, including secure provisions for climbing and working on towers.

m. Shielding.

n. Grounding.

o. Equipment Cooling Provisions.

p. Washers and lock-washers.

q. Tightness of screw type fasteners & connectors.

r. Screws, nuts and bolts shall show no evidence of cross-threading or mutilation.

s. Bottom of equipment racks etc. shall be free of debris and loose parts.

7.6 **Final System Acceptance**

The system shall be accepted when all of the following items have been completed to the satisfaction of the Design Authority and with the written certification of the project manager:

a. performance and operational tests.

b. all documentation.

c. all training.

d. all other terms and conditions.

The system warranty shall be deemed to begin at the completion of the Final System Acceptance or when the system is taken into service with accepted deficiencies, whichever comes first.

7.7 On-Site Maintenance

Building and site maintenance shall be interpreted to include all the areas in which the contractor is carrying out installation activities.

All sites and buildings shall be maintained by the contractor in a clean and tidy condition.

Upon completion of each day's work, all areas such as hallways, stairways, elevators and storage rooms used by the contractor in delivering or storing equipment shall be left in a clean and tidy condition.

The contractor shall store all electronic components not yet installed in a lockable storage room/trailer at the end of each workday. This procedure will reduce the probability of damaged and/or stolen equipment prior to system acceptance. Prior to the commencement of performance and operational testing, the installation shall be inspected to ensure that all applicable requirements and standards have been met.

8.0 DELIVERY

8.1 Packaging

All equipment shall be packaged to ensure that the equipment will not be damaged during shipment and/or delivery to the institution, as well as any associated handling on site.

Fragile components must be clearly identified and labelled.

All circuit cards, equipment modules, etc. shall be protected by the original packaging material until the equipment is placed into service.

8.2 Addressing

Address labelling shall be clearly marked in a minimum of two (2) locations on each package. The following format shall be observed:

a. Complete name of the institutional site.

b. Complete shipping address.

c. Clear description of contents.

d. Complete name of the Institutional representative.

All of the above addressing items will be provided at the Bidder's Conference.

- END OF TEXT -

Correctional Service Canada
Technical Services Branch
Electronics Systems

ES/SPEC-0101
Revision 2
14 January 2002

ELECTRONICS ENGINEERING SPECIFICATION

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 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

Prepared by:

Manager,
Electronics Systems Research

Approved by:

Director,
Engineering Services

TABLE OF CONTENTS

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
RFP	Request for Proposal
STR	Statement of Technical Requirements
SOW	Statement of Work
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 of Canada (CSC) for the procurement and installation of a Public Address (PA) system for federal correctional institutions.

1.2 Purpose

The purpose of the Public Address system is to provide a means for institutional staff members to make voice announcements within the institution, either on a selected, specific-area or a general, all-call basis. The primary uses of the PA system are to enable the staff to page a specific inmate or group of inmates and make high-priority announcements regarding emergency conditions such as fire, disturbance, etc.

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 PA capability or replace existing obsolete equipment.

1.3 Commercial-Off-The-Self Equipment

The 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 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. CSC may when it deems necessary, request the supplier to arrange for a full site demonstration. CSC shall verify in depth any of the system technical specifications called up. 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 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 Public Address 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 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.
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 PA system in accordance with this specification and Statement of Work, ES/SOW-0101. The PA system may be interfaced with the institution telephone system or it may be a stand alone PA system.

3.1.1 System Capacity

The control station(s) may be interfaced with the institution telephone system or may be installed as a stand alone system. In either case, the control station(s) shall be capable of selecting any number of zones simultaneously by actuating the desired zone-select switches. Similarly, the secondary control station(s) shall be capable of selecting more than one sub-zone at a time or ALL-CALL to enable all constituent sub-zones within the overall zone.

The system shall be of a modular design and it shall be possible at a future date to add more control stations and associated speaker equipment to the basic installed complement without requiring the existing hardware.

3.1.2 Period of Operation

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

3.2 System Configuration

The PA system shall be functionally divided into a number of zones and sub-zones covering designated sections of the institution. The area covered by each, together with the number and location of the various control stations will be given in the STR. Also included will be the quantity and location of the various hardware elements making up the complete PA system.

These system elements are, as follows:

a. one or more Master Control Stations, each consisting of a master control panel and a microphone or an institution telephone set;

b. one or more Secondary Control Stations, each consisting of a secondary control panel and a microphone or an institution telephone set;

c. one or more loudspeaker assemblies, each consisting of a loudspeaker and matching transformer, an enclosure and a baffle plate or horn;

d. common equipment (amplifiers, power supplies, switchers, etc.);

e. interconnecting wiring, cables, etc.; and

f. conduit, ducts, outlet boxes, etc.

The system shall be a constant-voltage type having tap selectable speaker transformers to permit the proper audio power output from each speaker.

3.3 System Elements Description

3.3.1 Master Control Panel

The master control panel or the interfaced telephone set shall contain the necessary controls and annunciators to permit the operator to select any desired Public Address zone or to make ALL-CALL announcements into all zones simultaneously. It shall contain one illuminated, latching-type alternate-action switch for each desired Public Address zone, and one for ALL-CALL.

The required physical configuration of the master control panel or the telephone set and the number of zones to be accessed from it may vary with the particular application and will be specified in the STR.

3.3.2 Microphone

A microphone shall be provided for each master and secondary control panel. It shall be a rugged unit capable of withstanding rough handling. The STR will specify the physical style to be supplied. It shall contain a Push-To-Talk (PTT) switch to enable the selected voice path. The switch shall be a non-latching type which automatically disables the microphone when released.

3.3.3 Secondary Control Panel

The secondary control panel shall contain the necessary controls and annunciators to permit the operator to select the desired sub-zone or to make ALL-CALL announcements within his own local zone(s).

It shall contain one illuminated, latching-type, alternate-action switch for each local PA sub-zone plus one for local-area ALL-CALL. The panel shall also contain a small speaker to permit the operator to hear voice announcements made to his area from a master control station. A volume control shall be provided on the rear panel. The required physical configuration of the secondary control panel and the number of sub-zones to be accessed from it may vary with the particular application and will be specified in the STR.

3.3.4 Loudspeaker Assemblies

The loudspeaker assembly will consist of the following items in the quantities specified in the STR: a loudspeaker and matching transformer, enclosure and baffle plate.

Different types of loudspeaker assemblies may be required depending on the specific application: indoor ceiling/wall mounted (e.g., living unit), indoor wide area (e.g., gymnasium) and outdoor wide area (e.g., sports field).

The horn and driver assemblies for outdoor mounting shall be rugged weatherproof units capable of satisfactory operation under the environmental conditions defined in this specification.

All speaker assemblies shall have high resistance to damage and destruction due to deliberate physical abuse. The contractor shall submit a prototype sample of each proposed type of loudspeaker assembly for approval by the Design Authority prior to proceeding with procurement of system quantities.

3.3.5 **Loudspeaker**

The loudspeaker shall be capable of satisfactorily handling the required power level and shall be compatible with the enclosure in which it is mounted.

3.3.6 **Enclosures**

The loudspeaker enclosure shall be physically rugged to prevent damage by deliberate abuse. It shall be free of mechanical resonances which would adversely affect the system performance or sound quality. The STR will specify whether the enclosures are Government Furnished Equipment (GFE) or to be supplied by the contractor. Physical protection shall be provided by the contractor to speaker assemblies mounted in areas where they may be subject to abuse by inmates.

3.3.7 **Baffle Plate**

The baffle plate for the speaker enclosure shall be heavy-gauge steel construction and shall be secured to the enclosure by tamper-proof screws. It shall be designed to adequately disperse the sound over the required area and shall protect the speaker from attempted forced entry of foreign objects such as pencils, piano wire, etc.

3.3.8 **Matching Transformer**

The matching transformer which is part of the loudspeaker assembly shall have a number of selectable taps to permit on-site selection of the proper power level to be delivered to each speaker.

3.4 System Requirements

3.4.1 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 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.

3.4.2 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 lights, switches, actuators, etc. which the operator must access directly should be located in the Control Posts.

3.5 Design Requirements

3.5.1 General

To the maximum practical extent, off-the-shelf equipment should be selected for use in the PA 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.

3.5.2 Wiring Supervision

Wiring shall be supervised in all PA 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.

3.5.3 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 interference.

3.5.4 Power Failure

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

3.5.5 System Failure

A PA system failure shall be deemed to have occurred when any required communications or any required control function cannot be performed.

3.5.6 Human Factors

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

3.5.7 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.

3.5.8 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 (e.g., a lighted push-button instead of a separate light and an unlit push-button).

The system may use EIA standard display and control panels or video display units. The design of either display and control method shall be in accordance with the ES/STD-0802 or ES/STD-0803, Standards.

3.6 Operational Requirements

3.6.1 General

The PA system shall provide satisfactory sound distribution within each designated area of the institution. The equipment shall produce high speech intelligibility throughout the area covered by the system at all normal microphone distances and shall be entirely free of audible transients as circuits are selected and de-selected and microphones are switched.

CSC experience has shown that in acoustically "live" environments (long reverberation time) better intelligibility will be obtained by using a larger number of low-power speakers instead of a few high-power ones.

The microphone input circuit shall employ automatic level control with a minimum of 40 dB limiting range. The outdoor speaker system shall provide satisfactory sound coverage over the area(s) defined in the STR. The contractor shall provide design calculations prior to commencement of installation to demonstrate that his planned configuration will provide the required coverage.

3.6.2 Secondary Control Station

The secondary control station shall be able to make a PA announcement to a particular sub-zone or zone by:

a. momentarily depressing the associated push-button selector switch on the secondary control panel causing it to become illuminated steady ON, then

b. depressing the microphone Push-to-Talk (PTT) switch to activate the voice circuit.

Releasing the PTT switch will remove the microphone from the voice circuit but will leave the zone/sub-zone selector actuated and the push-button illuminated.

Where a sub-zone consists of more than one speaker assembly, all shall be selected by a single push-button selector.

When the announcement is complete, momentarily depressing the push-button selector causing the illuminated push-button to extinguish and the associated voice circuit to be released.

Other secondary annunciation panels shall not receive the audio message from the first panel. It shall not be possible for a secondary station to preempt a call in progress originating at a master station.

3.6.3 **Master Control Station**

The master control station shall be able to make PA announcements into any one of the zones, but not address a specific sub-zone. The method of performing this is identical to that described above for the secondary control panel.

The master control panel shall have the capability to override (preempt) an announcement in progress originating from any secondary panel. When this occurs, the priority message shall be heard on the monitor speaker at the secondary station and the voice message from the secondary station shall be cut off. When a system contains more than one master control station the STR will define the required precedence of preemption capability.

3.7 **Environmental Requirements**

The PA system shall operate over the following indoor environmental conditions:

3.7.1 Temperature: 0° C to +50° C;

3.7.2 Humidity: 0 to 90% relative, non-condensing; and.

3.7.3 Location: sheltered environment.

The PA system shall operate over the following outdoor environmental conditions:

3.7.4 Temperature: -40° C to +55° C;

3.7.5 Humidity: up to 100% relative condensing; and

3.7.6 Location extremes of wind, driving rain, ice loading, blown sand and dust, sun exposure.

3.8 **Power Requirements**

The system shall use VAC power within the following limits:

3.8.1 Voltage: 120 VAC ±10%;

3.8.2 Frequency: 60 Hz ±1.5%;

3.8.3 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

3.8.4 Power: power consumption shall not exceed 100 watts.

3.9 **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.

3.10 **Documentation Requirements**

All final system documentation shall be provided in accordance with the ES/SOW-0101, Statement of Work.

3.11 **Support Requirements**

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

3.12 **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 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.

Correctional Service Canada
Technical Services Branch
Electronic Security Systems

ES/SPEC – 0500
Revision 5
12 March 2012

ELECTRONICS ENGINEERING SPECIFICATION

INMATE CELL CALL SYSTEM FOR USE IN FEDERAL CORRECTIONAL INSTITUTIONS

AUTHORITY

This Specification is approved by the Correctional Service Canada for the procurement and installation of an Inmate Cell Call System in Canadian federal correctional institutions.

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

Director, Electronic Security Systems
Correctional Service of Canada
340 Laurier Avenue West,
Ottawa, Ontario
K1A 0P9

Prepared by:

Project Officer,
Electronic Security Systems

Approved by:

Director,
Electronic Security Systems

RECORD OF REVISIONS

Revision	Paragraph	Comment
5	<Most>	Original Record of Revisions. Major update with RFID tracking and report samples.

CONTENTS

ABBREVIATIONS

The following abbreviations are used in this specification:

API	Application Programming Interface
CCD	Call Cancellation Device
CD	Commissioner's Directive
CER	Common Equipment Room
COD	Call Origination Device
CSC	Correctional Service Canada
FAAS	Facility Alarm Annunciation System
GFE	Government Furnished Equipment
ICCS	Inmate Cell Call System
MCCP	Main Communications and Control Post
NTP	Network Time Protocol
OSOR	Officer's Statement/Observation Report
RFID	Radio Frequency Identification
RFP	Request for Proposal
STR	Statement of Technical Requirements
TCP/IP	Transport Control Protocol/Internet Protocol
UPS	Uninterruptible Power Supply

DEFINITIONS

The following definitions are used in this specification:

Design Authority	Director, Engineering Services, Correctional Service Canada (CSC)
Contractor	The Company selected as the successful bidder.

1 INTRODUCTION

1.1 General

This specification defines the essential technical and functional requirements of the Correctional Service of Canada for the procurement and installation of an Inmate Cell Call System (ICCS) for Federal Correctional Institutions. This system shall share displays with the Security Patrol System in the Control Posts, if they are from the same supplier.

1.2 Purpose

The primary purpose of the ICCS is as life safety system. It is an alarm button which is permanently installed in a cell that, when activated, triggers an alarm at the unit control post. The ICCS are derived from the Commissioner’s Directive (CD) 567-2 Use of and Responding to Alarms. Data logging and report generation will provide a record for evidentiary use, assessment, and follow-up. It is also used for tracking Officer's Statement/Observation Reports (OSORs) relating to exceeded cell call service timeouts.

2 APPLICABLE DOCUMENTS

2.1 Specifications, Standards and Statements of Work

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

ES/SOW-0101 Statement of Work for Installation of Electronic Systems

ES/SOW-0102 Statement of Work for Quality Control of Electronic Systems Installations

ES/SOW-0110 Statement of Work for Structured Cable Systems for Electronic Systems Installations

ES/SPEC-0005 Specification for Main Communications and Control Post Integration Consoles

ES/SPEC-0102 Electronics Engineering Specification, Data Logger for use in Federal Correctional Institutions

EIA-310 Electronic Industry Association Standard for Racks, Panels and Associated Equipment

3 REQUIREMENTS

3.1 General

The ICCS consists of one Call Origination Device (COD), and one Call Cancellation Device (CCD) per cell, two or more Status Displays per Control Post for redundancy, one or more Monitoring Displays, common equipment, wires, cables, conduits, ducts, etc.; and interfaces to the Data Logger, and to the Main Communications and Control Post (MCCP).

The Status Displays display the Cell Call application. The existing Facility Alarm Annunciation System (FAAS) will collect, record, and display alarm signals in the MCCP. The Monitoring Displays display the Monitoring, Reporting, Configuration, Maintenance, and Admin Applications.

The contractor shall design, supply, install, test and provide documentation and training for an ICCS in accordance with the Specifications, Standards and Statements of Work specified in Section 2 of this specification.

3.1.1 System Capacity

The system shall support:

a) at least two hundred and fifty (250) cells (COD + CCD) per Status Display in a Control Post;
b) at least sixteen (16) Status Display pairs per facility; and
c) at least four (4) Configuration Displays per facility.

3.1.2 Period of Operation

The ICCS and all associated equipment shall be rated and capable of operation 24 hours per day, seven days a week with an expected operational life of no less than 10 years.

A system failure shall be deemed to have occurred when any required alarm or warning (visual or audible) is not produced or when any required control function cannot be performed. This applies to both the Status Display and the Monitoring Display.

Loss or restoration of primary power to the system shall not produce spurious reads or outputs to the data logger. When power is returned after a power failure, the system shall resume normal operation without operator action and shall automatically start from an all calls cleared condition.

3.2 System Requirements

3.2.1 Commercial-Off-The-Shelf Equipment

The ICCS shall use commercial off-the-shelf equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. The goal is to allow integration of co-located systems on to shared displays and provide a consistent, common look and feel. The equipment design shall provide open Ethernet TCP/IP APIs to the consoles and the edge devices to allow integration with future systems. The goal is for the APIs to be usable in an extensible, open architecture, security electronics framework.

3.2.2 Technical Acceptability

The CSC operational environment is unique for its diversity of locations, climate exposures and the physically 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 Technical Services Branch, 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.

3.2.3 Prototype Approval

When the contractor is to supply the COD and CCD as part of the system, a working COD and CCD prototype shall be provided to the Design Authority for approval prior to manufacturing or purchasing of system quantities

3.2.4 General

The system shall:

a) be managed with a non-proprietary interface;
b) include an open SDK for the display interface generation;
c) provide a managed, object model for all TCP/IP end devices that abstracts their core functionality;
d) provide a published or standard protocol for all TCP/IP end devices preferably based on existing network standards such as SNMP;
e) synchronize its internal clocks with a NTP network time source, where available;
f) ensure a minimum of twelve (12) months of data is retained; and
g) ensure data over twelve (12) months is deleted automatically.

3.2.5 System Configuration

The ICCS shall consist of the following elements in the quantities given in the Statement of Technical Requirements (STR):

a) COD
    i. vandal resistant mount and construction (provide no lip for prying between box and cover or button and cover, single gang box configuration preferred, surface mount is not acceptable, and no suspension points),
    ii. IP65 environmental rating or better,
    iii. IK10 impact resistance rating or better,
    iv. sever the wiring in case of unit destruction,
    v. if mechanical, isolate the switch from loads greater than the operation force (to prevent switch damage),
    vi. leave 9/16” of unobstructed depth in the installation box for cabling,
    vii. pushbutton with a minimum diameter of 2.5cm,
    viii. require between 5.6 and 11.0N (20 and 40 oz.) force to operate,
    ix. provide audible feedback in the form of a click or a beep upon activation,
    x. provide visual feedback in the form of an red LED upon activation, preferably integrated into the pushbutton,
    xi. connect to TCP/IP over Ethernet (either directly or from a I/O end device such as the CCD),
    xii. if connected to an I/O end device, have supervised wiring to detect short circuits and open circuits,
    xiii. be powered directly by Power over Ethernet (PoE) or from the I/O end device;
b) CCD
    i. vandal resistant mount and construction (provide no lip for prying between box and cover, single gang box configuration preferred, surface mount is acceptable),
    ii. IP65 environmental rating or better,
    iii. IK10 impact resistance rating or better,
    iv. leave 9/16” of unobstructed depth in the installation box for cabling,
    v. a red LED visual alarm indication,

vi. a green LED visual card read indication, 20 seconds duration,
vii. audible card read indication with enable/disable in the protocol,
viii. green colour insert or finish (to differentiate from Security Patrol Device),
ix. connect using TCP/IP over Ethernet (either directly or from a remote controller),
x. support in-situ re-programming of the reader using TCP/IP over Ethernet,
xi. be powered by Power over Ethernet (PoE) IEEE 802.3af (802.3at Type1), and
xii. read HID “Corporate 1000” Format compatible RFID cards (GFE);

c) Status Display
   i. deployed in each control post console and security patrol “home” locations,
   ii. graphical colour touch screen display,
   iii. minimum 19” screen size,
   iv. minimum resolution height x width of 1.2 million pixels,
   v. no mouse or keyboard,
   vi. an RFID reader (CCD equivalent) for alarm acknowledge, and
   vii. audible alarm output;
d) Configuration Display
   i. deployed according to the STR, may be combined onto other displays or systems,
   ii. a graphical touch screen display,
   iii. minimum 19” screen size,
   iv. minimum resolution height x width of 1.2 million pixels,
   v. an RFID reader (CCD equivalent) for application access control, and;
   vi. two (2) USB 2.0 (or better) ports (to be used for a keyboard and mouse for the Configuration Application only, a USB keyboard and a USB mouse are part of this system);
e) Common equipment (network hardware, CCD controllers, etc.);
f) Interconnecting wiring, cables, etc.; and
g) Conduit, ducts, outlet boxes, etc.

3.2.6 Displays

The displays shall:

a) use iconography and guidelines provided (pending creation) or approved by CSC.

The preferred display layout will be based on a simplified floor plan of the whole or part of a unit based on screen space. Icons shall be used instead of text where possible.

3.2.7 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 and ES/SOW-0110 Statements 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 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 RFP.

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.

3.2.8 Common Equipment

Where feasible and practical all common equipment (e.g., power supplies, logic boards, amplifiers, etc.) shall be located in the Terminal Equipment Room supplied for that purpose. This area will be identified in the STR. Consistent with the foregoing, only items of equipment such as visual and audible annunciators, switches, actuators, etc. which the operator must access directly shall be located in the control panels.

All equipment deployed in Terminal Equipment Room shall be rack mounted in racks compliant with EIA-310.

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

3.2.9 Interface to Data Logger

The contractor shall supply and install all necessary wiring and control equipment required to interface the ICCS to the MCCP Data Logger described in ES/SPEC-0005. All actions in the ICCS shall be logged including alarms, acknowledgements, cancellations, escalations, fault alarms, reboots, mask changes, and configuration changes.

3.2.10 Interface to MCCP/FAAS

The contractor shall supply and install all necessary wiring and control equipment required to connect the ICCS to the FAAS in the MCCP as described in ES/SPEC-0005. The message formats shall be as described in ES/STD-0102. It is preferable that the messages be provided over TCP/IP. The cable connection and integration into the FAAS shall be under a separate contract. All ICCS faults and alarms shall be provided in a format compatible with the FAAS specification. The integration of these alarms into the FAAS is under a separate contract.

3.3 Design Requirements

3.3.1 General

To the maximum practical extent, off-the-shelf equipment shall be selected for use in the ICCS. New designs shall be approved by the Design Authority prior to manufacturing or purchasing.

A design objective is to use TCP/IP over Ethernet to connect the system elements with PoE being used to power edge devices.

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 ICCS system.

3.3.2 Wiring Supervision

All signal wiring other than TCP/IP cables 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 persons or environmental conditions. Ethernet elements shall be monitored with regular communication checks at least every minute.

3.3.3 Sabotage, Tampering and Survivability

Elements of the ICCS will 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, improper interception, or interference. In particular, the COD shall not provide a suspension point nor shall it have more than the

thickness of the face plate proud of the wall.

3.3.4 Human Factors

Elements of the ICCS shall conform to accepted principles of good human factors design.

3.3.5 Existing Equipment

In most installations, control and annunciation elements of the ICCS 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 ICCS 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.

3.4 Operational Requirements

3.4.1 Sample operational sequence

This is a sample operations sequence including events at the Unit and the MCCP. These samples cover a normal cell call, and acknowledge, service, and mask timeouts.

System configuration:

a) Acknowledge timeout: 1 minutes
b) Service timeout: 5 minutes
c) Mask timeout: 1 hour

Unit MCCP

<normal cell call>

03:25:23 Cell call COD button is pressed in Cell A01:
- alarm sounds at the associated Status Display,
- alarm LED on the COD illuminates,
- alarm LED on the CCD illuminates,
- Cell A01 icon on the Status Display indicates an alarm by flashing red. If the page containing Cell A01 is not currently displayed, it will be brought to the foreground, and
- 1 minute acknowledge timeout starts.

03:25:47 Correctional Officer acknowledges the alarm with their RFID card:
- acknowledge mutes the alarm,
- Cell A01 icon on the Status Display indicates acknowledged by changing to solid red, and
- 5 minute service timeout starts;

<Correctional Officer proceeds to cell, and deals with the inmate's needs>

03:28:12 Correctional Officer cancels the alarm with their RFID card at the cell door:
- alarm LED on the COD goes out,
- alarm LED on the CCD goes out,
- Cell A01 icon on the Status Display returns to the normal state, green.

<end normal cell call>

<cell call unacknowledged alarm>

04:46:21 Cell call COD button is pressed in Cell A01:
- alarm sounds at the associated Status Display,
- alarm LED on the COD illuminates,
- alarm LED on the CCD illuminates,
- Cell A01 icon on the Status Display indicates an alarm by flashing red. If the page containing Cell A01 is not currently displayed, it will be

brought to the foreground, and
- 1 minute acknowledge timeout starts.

04:47:21 Acknowledge timeout expires:
- MCCP alarm and display of unacknowledged cell call, and
- 5 minute service timeout starts;

< MCCP contacts Control Post>

<Correctional Officer proceeds to cell, and deals with the inmate's needs>

04:50:39 Correctional Officer cancels the alarm with their RFID card at the cell door:
- alarm LED on the COD goes out,
- alarm LED on the CCD goes out,
- Cell A01 icon on the Status Display returns to the normal state, green.

04:50:39 MCCP alarm removed.

<end cell call un-acknowledged alarm>

<cell call service timeout expiry alarm>

04:46:21 Cell call COD button is pressed in Cell A01:
- alarm sounds at the associated Status Display,
- alarm LED on the COD illuminates,
- alarm LED on the CCD illuminates;
- Cell A01 icon on the Status Display indicates an alarm by flashing red. If the page containing Cell A01 is not currently displayed, it will be brought to the foreground, and
- 1 minute acknowledge timeout starts.

04:46:35 Correctional Officer acknowledges the alarm with their RFID card:
- acknowledge mutes the alarm, and
- Cell A01 icon on the Status Display indicates acknowledged by changing to solid red, and
- 5 minute service timeout starts.

04:51:35 Service timeout expires:
- MCCP alarm and display of service timeout;

<MCCP contacts Control Post>

<Correctional Officer proceeds to cell, and deals with the inmate's needs>

04:52:39 The Correctional Officer cancels the alarm with their RFID card at the cell door:
- alarm LED on the COD goes out,
- alarm LED on the CCD goes out,
- OSOR required recorded for officer cancelling alarm,
- Cell A01 icon on the Status Display returns to the normal state, green.

04:52:39 MCCP alarm removed.

<end cell call service timeout expiry alarm>

<alarm mask>

04:50:56 The Correctional Officer receives approval to mask Cell A01:
- selects Cell A01 and selects "mask", and
- Cell A01 icon on the Status Display turns yellow indicating masked.

04:50:56 MCCP alarm and display of masked cell call alarm.

05:50:56 Mask timeout expires:
- Cell A01 unmasks automatically, and
- Cell A01 icon on the Status Display returns to its current state (Note b).

05:50:56 Mask timeout expires:
- MCCP mask alarm automatically removed.

<end alarm mask>

Notes:

a) Masking a cell call does not cancel any active cell call; however a cell call may be cancelled while masked.
b) There are no time-out alarms escalated from a masked cell call.
c) Unmasked cell calls return to their current state. If the cell call is active, the alarm

become unacknowledged and the alarm sounds with acknowledge and service timeouts reset.

3.4.2 Operational Details

Operationally, the masking of a cell call alarm by a Correctional Officer requires approval by the Correctional Manager or the Unit Supervisor. This is not part of the electronic system.

Acknowledgement of the alarm is not required prior to cancelling a cell call alarm at the cell. Cancellation includes implicit acknowledgement of the alarm for that cell. Only an alarm that is not cancelled prior to the expiry of the service timeout requires completion of an OSOR.

Neither the COD nor the CCD shall differentiate between acknowledged and unacknowledged alarm states. An active cell call always indicates solid red at the COD and CCD. This prevents making acknowledge state information available to offenders.

The acknowledge timeout starts when the COD is pressed in the cell. The service timeout starts upon receipt of the acknowledge input, or expiration of the acknowledge timeout.

Some facilities have pairs of control posts that are consolidated to a single location during night-time operation. The system shall allow for transfer of ICCS control and display to one alternate control post. The system shall be configurable to allow control transfers in either direction or only one direction as specified in the STR.

3.4.3 All Applications

All applications shall be implemented as browser-based or thin client applications running on servers in the CER and displayed in the control post.

All applications shall:

a) provide an on-screen legend, possibly implemented as a pop-up window, to explain icon colours and usage;
b) accept an input to toggle between French and English versions; and
c) support maintainer modifiable French and English user messages.

Application access shall be limited according to the following RFID privilege levels:

		Applications					
		Status	Monitoring	Reporting	Configuration	Maintenance	Admin
Privilege	User	Yes	N/A	No	No	No	No
	Reporter	Yes	N/A	Yes	No	No	No
	Configurer	No	N/A	No	Yes	No	No
	Maintainer	Yes	N/A	Yes	Yes	Yes	Yes
	Admin	No	N/A	No	No	No	Yes

An RFID card shall have at most one privilege assigned. The Reporter privilege will likely be assigned to Correctional Managers. The Monitoring Application is integrated only into the MCCP and does not use any card authorization.

3.4.4 Status Application

A Cell Call System is a life safety system to provide inmates with a way to initiate an alarm to call for the assistance of staff and to monitor timely responses to the alarms. The Status Application shall be the only application available at the Control Posts.

The Status Application shall:

a) be displayed on the Status Display at the control post;
b) operate independently on each display of the Status Display (multiple Status Displays are required for redundancy);
c) operate all of the Ranges from any Status Display in the responsible Control Post;
d) display a simplified floor plan of the unit – it may take multiple maps (this may be integrated into other co-located displays pending CSC approval);
e) display the status for each cell as follows:
    i. Green – the cell call is normal and operational,
    ii. Yellow – the cell call is masked,
    iii. Flash Red – the cell call is in alarm, not acknowledged,
    iv. Red – the cell call is in alarm, acknowledged,
    v. Flash Magenta – fault or tamper detected - offline, not acknowledged, and
    vi. Magenta – fault or tamper detected, or maintenance (differentiated by icon) - offline, acknowledged;
f) sound an audible status of the reader as follows:
    i. Call alarm – a continuous sound pending acknowledgement or service, and
    ii. Fault/tamper alarm – a different, lower pitch continuous sound pending acknowledgement;
g) indicate alarms with a slow flash;
h) ignore additional COD button presses while the alarm is un-cancelled;
i) display alarms in the order received;
j) show unacknowledged alarms immediately if there are no other current unacknowledged alarms;
k) if integrated with other systems, Cell Call alarms shall have display priority;
l) accept an acknowledge input to mute the alarm tone for all current visible unacknowledged alarms (no cell selection required);
m) allow acknowledgement of multiple concurrent alarms in any sequence;
n) allow cancellation of multiple concurrent alarms in any sequence;
o) in the case of multiple alarms on different screens/maps, show the next unacknowledged alarm screen/map once the previous alarm is acknowledged;
p) flash red the map selector button for all maps containing un-cancelled cell call alarms when multiple alarms occur on different screens/maps;
q) accept an input to start transfer of control to the alternate station;
r) accept an RFID card input to confirm transfer of control to the alternate station;
s) accept an RFID card input to accept control transfer at the alternate station;
t) accept an input to start return of control to the original station;
u) accept an RFID card input to confirm return of control to original station;
v) accept an RFID card input to accept return of control transfer at the original station;
w) in case of a system failure, automatically transfer control to the alternate station, if one is identified;
x) accept an input to select a single cell (no groups);
y) indicate the user selected cell with a fast flash;
z) enable mask or unmask command based on selected cell state;
aa) accept a mask/unmask input on the Status Display to mask/unmask the selected cell's cell call;
bb) accept an RFID card input at the Status Display to confirm mask/unmask a selected cell's cell call;
cc) display an unacknowledged alarm for any cell call not cancelled when it is unmasked;
dd) accept an RFID card input at the corresponding CCD to cancel an alarm whether unmasked or masked;
ee) if the service timeout has expired, assign OSOR requested to the cancelling Correctional Officer; and
ff) use icons for input and status display.

All control transfers are initiated only from the post currently responsible for the patrol and require an acknowledgement at the post receiving the responsibility – A "give" model not a "take" model.

3.4.5 Monitoring Application

The system reports unacknowledged and late service times to the FAAS in the MCCP – the application is integrated into the existing PIU system. The FAAS integration shall include:

a) display cell call acknowledge timeout alarms;
b) display cell call service timeout alarms;
c) display cell call mask alarms;
d) display cell call faults; and
e) accept acknowledge inputs for alarms.

3.4.6 Reporting Application

The Reporting Application shall provide reporting capabilities to the ICCS including:

a) be displayed on the Configuration Display;
b) accept an input to logoff the user;
c) log off the current user after five (5) minutes of inactivity; and
d) allow generation of reports as follows:
    i. All Cell Call Report: for a user selected time interval (all time intervals are 5 minute resolution and 24 hour clock) grouped by unit control post and sorted in time order including header: date, report interval and fields: unit identifier, cell identifier, alarm time, acknowledge time, service time, service officer, LATE/MASK/UNMASK tag if service is late, masked or unmasked, late interval, and OSOR received state, (Late cell call service times shall be made to stand out in the report),
    ii. Single Unit Control Post Cell Call Report: for a user selected unit control post, for a user selected time interval (all time intervals are 5 minute resolution and 24 hour clock) sorted in time order including header: date, report interval, unit identifier and fields: cell identifier, alarm time, acknowledge time, service time, service officer, LATE/MASK/UNMASK tag if service is late, masked or unmasked, late interval, and OSOR received state, (Late cell call service times shall be made to stand out in the report),
    iii. OSOR Pending Correctional Officer Report: a user selected date interval report sorted by Correctional Officer including header: date, report interval, and fields: unit identifier, cell identifier, date, time, status, and footer: count of pending OSORs, and
    iv. Correctional Officer Performance Report: a user selected date interval report of all officer performance sorted by Correctional Officer including header: date, report interval and fields: officer, in time cell calls, cell calls, percent in time cell calls, OSORs submitted, OSORs required and percent OSORs submitted;
e) allow printing of any report;
f) use touch screen input exclusively.

The data for all ICCS reports shall be maintained in a separate database as part of the ICCS. The data shall also be maintained in an auxiliary database located in a different part of the institution as a backup.

Notes:

a) Cell calls may be late, masked, or both;
b) OSORs are required for all late cell calls – no option;
c) All reports include the report type in the header;
d) All reports include the institution in the header;
e) All reports include the selection criteria in the header; and
f) All reports include a printing date and time in the footer.

Sample reports (Single Unit Control Post reports are a subset of All Units reports):

All Cell Call Report:

Select:
08:00 to 11:00 2011 September 2
Output:

All Patrols Report
2011 September 2 08:00 to 11:00 at Joyceville Institution

Unit 5

Cell	Date	Call	Ack	Service	Officer	Status	Interval Rec'd
A07	2011/09/02	08:04:22	08:04:34	08:07:55	Joe Jacobs		
B13	2011/09/02	09:54:17		09:55:33	Joe Jacobs		
A07	2011/09/02		09:56:20		Joe Jacobs	MASK	
B08	**2011/09/02**	**09:57:04**	**09:57:07**	**10:04:49**	**Joe Jacobs**	**LATE**	**00:02:42**
A07	2011/09/02		10:56:20		<Auto>	UNMASK	

3 call(s)

Unit 6

Cell		Call	Ack	Service	Officer	Status	Interval Rec'd
A04	2011/09/02	09:26:55	09:27:00	09:29:03	Jane Jacobs		
A04	2011/09/02	09:29:17		09:29:33	Jane Jacobs		
A04	2011/09/02	09:31:41	09:31:57	09:32:28	Jane Jacobs		
A04	2011/09/02		09:34:07		Jane Jacobs	MASK	
A04	2011/09/02		10:19:20		Jane Jacobs	UNMASK	

3 call(s)

Printed: 2011 September 4 14:32:14

OSOR Pending Correctional Officer Report:

Select:
2011 September 2 to 2011 September 2
Output:

OSOR Pending Correctional Officer Report
2011 September 2 at Joyceville Institution

Officer: Jane Jacobs

Unit	Cell	Date	Time	Status	Interval

0 OSORs pending.

Officer: Joe Jacobs

Unit	Cell	Date	Time	Status	Interval
Unit 5	B08	2011/09/02	09:57:04	LATE	00:02:42

1 OSORs pending.

Printed: 2011 September 5 07:09:49

Correctional Officer Performance Report:

Select:
2011 September 1 to 2011 September 30
Output:

Correctional Officer Performance Report
2011 September 1 to September 30 at Joyceville Institution

Officer	On Time Cell Calls		Submitted OSORs	
Jane Jacobs	32/33	96.97%	1/1	100.00%
Joe Jacobs	24/44	54.55%	17/20	85.00%

Printed: 2011 October 5 09:33:21

3.4.7 Configuration Application

The Configuration Application shall provide configuration capabilities to the ICCS including:

a) be displayed on the Configuration Display;
b) accept an input to log the current user out of the system;
c) log the current user out of the system after five (5) minutes of inactivity;
d) add/remove authorized RFID cards with names for User, Reporter, and Configurer privileges– this will either share/extend an existing RFID card database or require creation of one that will be used by this and other future applications.
e) create/edit descriptive information for each reader up to 30 characters;
f) create/edit descriptive information for each unit up to 30 characters;
g) assign readers to cells;
h) assign cells to units;
i) have the acknowledge timeout set to 1 minute, fixed;
j) have the service timeout set to 5 minutes, fixed;
k) have the cell call mask timeout set to 1 hour, fixed;
l) allow generation and printing of reports as follows:
    i. list by type, authorized RFID cards and names sorted by last name,
    ii. list added and/or removed authorized RFID cards and names, with authorizing RFID card, by date range sorted by date and time,
    iii. list all readers with readers grouped by unit, sorted by cell identifier, and
    iv. list all readers not assigned to a unit.
m) allow editing of English and French user text messages;
n) allow archiving Single Detail Reports to external, USB connected storage in a text format; and
o) accept input from a USB keyboard and mouse.

3.4.8 Maintenance Application

The Maintenance Application shall provide maintenance capabilities to the ICCS including:

a) be displayed on the Configuration Display;
b) all selection of Report, Configuration, Maintenance, or Admin application.
c) accept an input to logoff the user;
d) log off the current user after five (5) minutes of inactivity;
e) allow generation and printing of an fault/tamper list for a user selectable time interval;
f) cell call maintenance mask/unmask any reader in the facility – not subject to mask timeout; and
g) add/remove authorized RFID cards with names for All privileges.

3.4.9 Admin Application

The Admin Application shall provide administration capabilities to the ICCS including:

a) be displayed on the Configuration Display;
b) require an Admin enabled RFID card to access the system;
c) accept an input to logoff the user;
d) log off the current user after five (5) minutes of inactivity; and
e) allow generation and printing of reports as follows:
    i. list by type of authorized RFID cards and names sorted by last name, and
    ii. list added and/or removed authorized RFID cards and names, with authorizing RFID card, by date range sorted by date and time;
f) add/remove authorized RFID cards with names for Configurer, Maintainer, and Admin privileges.

3.4.10 Interface to Data Logger

The ICCS shall provide an output to the Data Logger described in ES/STD-0102, to provide a record of all cell call related ICCS events including:

a) System failures and restorations;
b) COD acknowledge and service timeout alarms with unit, range and cell;
c) all tamper/fault alarms with unit, cell and any available details;
d) cell call alarm acknowledges with unit and cell;
e) CCD cancellations with unit, cell and RFID data;
f) cell call masking/unmasking with unit, cell and RFID data;
g) configuration, maintenance, and admin Application logon/logoff;
h) all RFID application authorization changes with authorizing RFID card; and
i) cell call mask/unmask with unit, cell, and authorizing RFID card.

All of these activities shall be logged in plain-language (or approved abbreviation thereof) without the need for a cross-reference table. The events shall also include date and time to the nearest second.

3.4.11 Interface to FAAS

The system reports cell call alarms and faults to the MCCP. The alarms are integrated into the existing FAAS application at the MCCP.

The FAAS shall:

a) display alarms for:
    i. Un-acknowledged cell call,
    ii. Un-serviced cell call,
    iii. Cell call masking, and
    iv. Cell call tamper/fault;
b) display each alarm respectively until resolved by:
    i. Acknowledge or service,
    ii. Service,
    iii. Unmasking, and
    iv. Cell call restoration;
c) system failure and restoration; and
d) log all alarms and acknowledgements.

3.5 Environmental Requirements

The Status and Configuration displays shall operate over the following indoor environmental

conditions:

a) Temperature: 0° C to +50° C; and
b) Humidity: 0 to 90% relative, non-condensing.

3.6 Power Requirements

The Status and Configuration displays shall 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 shall not cause damage to the unit;
d) Power: power consumption shall not exceed 100 watts per display; and
e) Power backup: all components of the system shall be supported by UPSs for a minimum of 1 hour.

3.7 Installation Requirements

The ICCS 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 ICCS documentation shall be provided in accordance with the ES/SOW-0101, Statement of Work.

3.9 Support Requirements

The ICCS 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 ICCS shall be in accordance with the ES/SOW- 0101, Statement of Work.

4 QUALITY ASSURANCE

The ICCS Quality Assurance program 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 DELIVERY

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

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

6 INTERFERENCE

Performance of the ICCS shall not be affected by the use of standard electronic equipment used at the institution. Distance limits of standard electronic equipment are as follows:

a) 5 watt CB transceivers at 1 metre or more;
b) 6 watt VHF and UHF transceivers at 1 metre or more;
c) 25 mW 420-430 MHz Personal Portable Transmitters at 1 metre or more;
d) Other radio frequency transmitting, receiving and distribution equipment at 5 metres or more; and
e) Personal computer and/or computer work stations at 5 metres or more.

7 SAFETY

All ICCS electrically powered elements shall meet the applicable CSA standards.

Correctional Service Canada
Technical Services Branch
Electronic Security Systems

ES/SPEC – 0506
Revision 2
21 December 2011

ELECTRONICS ENGINEERING SPECIFICATION

SECURITY PATROL SYSTEM 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:

Director, Electronic Security Systems
Correctional Service of Canada
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Prepared by:

Project Officer,
Electronics Security Systems

Approved by:

Director,
Electronics Security Systems

RECORD OF REVISIONS

Revision	Paragraph	Comment
0	N/A	Original issue.
1	<Most>	Major update with new philosophy of Patrols.
2	3.2.7	RFID reader location clarification.
	3.2.10	MCCP/FAAS alarm display removed.
	3.4.2	Clarify Heightened Need and Regular Patrol interaction.
	3.4.3	Acknowledge RFID reader clarification.
	3.4.4	Flashing removed from warning interval and late on Patrol Application with new colours for fault alarms. Removed floor plan requirement, now reader icon sets.
	3.4.7	Enable/disable audible warnings per patrol.

CONTENTS

ABBREVIATIONS

The following abbreviations are used in this specification:

API	Application Programming Interface
CD	Commissioner's Directive
CM	Correctional Manager
CSC	Correctional Service Canada
FAAS	Facility Alarm Annunciation System
GFE	Government Furnished Equipment
MCCP	Main Communications and Control Post
NTP	Network Time Protocol
OSOR	Officer's Statement/Observation Report
RFID	Radio Frequency Identification
RFP	Request for Proposal
SPS	Security Patrol System
STR	Statement of Technical Requirements
TCP/IP	Transport Control Protocol/Internet Protocol
UPS	Uninterruptible Power Supply

DEFINITIONS

The following definitions are used in this specification:

Design Authority	Director, Electronic Security Systems, Correctional Service Canada
Contractor	The company selected as the successful bidder.

1 INTRODUCTION

1.1 General

This specification defines the essential technical and functional requirements of the Correctional Service of Canada for the procurement and installation of a Security Patrol System (SPS) for Federal Correctional Institutions. This system shall share displays with the Inmate Cell Call System if they are from the same supplier.

1.2 Purpose

The purpose of the SPS is to record living unit security patrols (Static Patrols) and generate reports for assessment and follow-up in compliance with Commissioner's Directive (CD) 566-4 Inmate Counts and Security Patrols. It is also used for tracking Officer's Statement/Observation Reports (OSORs) relating to late or missed patrols and for other monitored security and fire patrols throughout the institution (Dynamic Patrols) that do not have CD-based requirements.

2 APPLICABLE DOCUMENTS

2.1 Specifications, Standards and Statements of Work

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

ES/SOW-0101 Statement of Work for Installation of Electronic Systems

ES/SOW-0102 Statement of Work for Quality Control of Electronic Systems Installations

ES/SOW-0110 Statement of Work for Structured Cable Systems for Electronic Systems Installations

ES/SPEC-0005 Specification for Main Communications and Control Post Integration Consoles

ES/SPEC-0102 Electronics Engineering Specification, Data Logger for use in Federal Correctional Institutions

EIA-310 Electronic Industry Association Standard for Racks, Panels and Associated Equipment

3 REQUIREMENTS

3.1 General

The SPS typically consists of a number of RFID Readers, one or more Status Displays (normally two or more per Control Post), one Monitoring Display, common equipment, wires, cables, conduits, ducts, etc.; and an interface with a Data Logger and with the Main Communications and Control Post (MCCP).

The Status Display shows the Security Patrol Application. The Monitoring Display shows the Monitoring, Reporting, Configuration, Maintenance, and Admin Applications.

The contractor shall design, supply, install, test and provide documentation and training for an SPS in accordance with the Specifications, Standards and Statements of Work specified in Section 2 of this specification.

3.1.1 System Capacity

The system shall support:

a) at least one thousand (1000) RFID readers;
b) at least sixty-four (64) Status Displays; and
c) at least four (4) Monitoring Displays.

3.1.2 Period of Operation

The SPS and all associated equipment shall be rated and capable of operation 24 hours per day, seven days a week with an expected operational life of no less than 10 years.

A system failure shall be deemed to have occurred when any required alarm or warning (visual or audible) is not produced or when any required control function cannot be performed. This applies to both the Status Display and the Monitoring Display.

Loss or restoration of primary power to the system shall not produce spurious reads or outputs to the data logger. When power is returned after a power failure, the system shall resume normal operation without operator action and shall automatically start from a patrols cleared condition.

3.2 System Requirements

3.2.1 Commercial-Off-The-Shelf Equipment

The SPS shall use commercial off-the-shelf equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. The goal is to allow integration of co-located systems on to shared displays and provide a consistent, common look and feel. The equipment design shall provide open Ethernet TCP/IP APIs to the consoles and the edge devices to allow integration with future systems. The goal is for the APIs to be usable in an extensible, open architecture, security electronics framework.

3.2.2 Technical Acceptability

The CSC operational environment is unique for its diversity of locations, climate exposures and the physically 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 Technical Services Branch, 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.

3.2.3 Prototype Approval

When the contractor is to supply the RFID reader as part of the system, a working prototype shall be provided to the Design Authority for approval prior to manufacturing or purchasing of system quantities

3.2.4 General

The system shall:

a) be managed with a non-proprietary interface;
b) be compatible with or provide an open SDK;
c) provide a managed, object model for all TCP/IP end devices that abstracts their core functionality;
d) provide a published or standard protocol for all TCP/IP end devices preferably based on existing network standards such as SNMP;
e) synchronize its internal clocks with a NTP network time source, when available;
f) ensure a minimum of twelve (12) months of data is retained; and
g) ensure data over twelve (12) months is deleted automatically.

3.2.5 System Configuration

The SPS shall consist of the following elements in the quantities given in the Statement of Technical Requirements (STR):

a) RFID Readers
    i. vandal resistant (provide no lip for prying between box and cover, single gang box configuration, flush to the wall surface mount may be allowed in the STR),
    ii. IP65 environmental rating or better,
    iii. IK10 impact resistance rating or better,
    iv. leave 9/16” of unobstructed depth in the installation box for cabling,
    v. visual card read indication, 20 seconds,
    vi. audible card read indication with enable/disable in the protocol,
    vii. blue colour insert or finish (to differentiate from Cell Call Cancellation Device),
    viii. connect using TCP/IP over Ethernet (either directly or from a remote controller),
    ix. support in-situ re-programming of the reader using TCP/IP over Ethernet,
    x. be powered by Power over Ethernet (PoE), and
    xi. read HID “Corporate 1000” Format RFID cards (GFE);
b) Status Display
    i. deployed in each control post console and security patrol “home” locations,
    ii. graphical colour touch screen display,
    iii. minimum 19” screen size,
    iv. minimum resolution height x width of 1.2 million pixels,
    v. no mouse or keyboard, and
    vi. audible alarm output;
c) Monitoring Display
    i. deployed in the Correctional Manager office (consider flexible mount for multiple user positions),
    ii. graphical colour touch screen display,
    iii. minimum 19” screen size,
    iv. minimum resolution height x width of 1.2 million pixels,
    v. audible alarm output,
    vi. an RFID reader for application access control, and

vii. two (2) USB 2.0 (or better) ports (to be used for a keyboard and mouse for the Configuration Application only, a USB keyboard and a USB mouse are part of this system);

d) Common equipment (network hardware, RFID reader controllers, etc.);
e) Interconnecting wiring, cables, etc.; and
f) Conduit, ducts, outlet boxes, etc.

Note: The RFID reader for tour starts is separate from the RFID reader for control transfer. The start reader would typically be located at the post entrance or outside the post while the acknowledge reader, where needed would be located at the Status Display.

3.2.6 Displays

The displays shall:

a) use iconography and guidelines provided (pending creation) or approved by CSC.

The preferred display layout will be based on a simplified floor plan of the whole or part of a unit based on screen space. Icons shall be used instead of text where possible.

3.2.7 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 and ES/SOW-0110 Statements 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 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 RFP.

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.

3.2.8 Common Equipment

Where feasible and practical all common equipment (e.g., power supplies, logic boards, amplifiers, etc.) shall be located in the Terminal Equipment Room supplied for that purpose. This area will be identified in the STR. Consistent with the foregoing, only items of equipment such as visual and audible annunciators, switches, actuators, etc. which the operator must access directly shall be located in the control panels.

All equipment deployed in Terminal Equipment Room shall be rack mounted in racks compliant with EIA-310.

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

3.2.9 Interface to Data Logger

The contractor shall supply and install all necessary wiring and control equipment required to interface the SPS to the MCCP Data Logger described in ES/SPEC-0005. All actions in the SPS

shall be logged including visits, alarms, faults, reboots, mask changes, and configuration changes.

3.2.10 Interface to MCCP/FAAS

There are no alarms requiring integration into the FAAS display.

3.3 Design Requirements

3.3.1 General

To the maximum practical extent, off-the-shelf equipment should be selected for use in the SPS. New designs shall be approved by the Design Authority prior to manufacturing or purchasing.

A design objective is to use TCP/IP over Ethernet to connect the system elements with PoE being used to power edge devices.

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 SPS system.

Deployment of the SPS RFID readers within a living unit shall be such that they are not located beside Cell Call Cancellation Devices. The readers shall also be positioned at both ends of each range to provide quality of patrol information. Readers may be positioned at additional locations based on non-linear range configurations.

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 persons or environmental conditions. Ethernet elements shall be monitored with regular communication checks at least every minute.

3.3.3 Sabotage, Tampering and Survivability

Elements of the SPS will 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, improper eavesdropping, or interference.

3.3.4 Human Factors

Elements of the SPS shall conform to accepted principles of good human factors design.

3.3.5 Existing Equipment

In most installations, control and annunciation elements of the SPS 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 SPS 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.

3.4 Operational Requirements

3.4.1 Sample operational sequence

This is a sample operations sequence including events at the Unit Control Post and the

Correctional Manager Office. This sample consists of a start reader and a single other reader, however a typical patrol consists of multiple other readers, grouped as ranges, spread throughout a living unit.

System configuration:

a) Time limit: 60 minutes
b) Time limit warning:10 minutes

Unit CM

04:15 Warning time limit reached:
- the Status Display icons for the start point and other reader turn yellow,
- an audible warning chime is sounded.

04:15 Warning time limit reached:
- the Monitoring Display icons turns yellow.

04:20 The Correctional Officer's card is scanned at the start reader:
- the RFID reader LED turns on for 20 seconds,
- the Status Display icon for the start reader turns green.

04:20 The Correctional Officer's card is scanned at the start reader:
- the Monitoring Display icon for the start reader turns green.

04:25 The Correctional Officer's card is scanned at the other reader:
- the RFID reader LED turns on for 20 seconds,
- the Status Display icon for the other reader turns green (end typical cycle).

04:25 The Correctional Officer's card is scanned at the other reader:
- the Monitoring Display icon for the other reader turns green (end typical cycle).

05:10 Warning time limit reached (50 minutes from last start):
- the Status Display icons for the start point and other reader turns yellow,
- an audible warning chime is sounded.

05:10 Warning time limit reached:
- the Monitoring Display icons turns yellow.

05:20 Patrol time limit reached:
- the Status Display icons for the start point and other reader turns red,
- a different audible alarm chime is sounded.

05:20 Patrol time limit reached:
- the Monitoring Display icons for the start point and other reader flashes red,
- continuous alarm sounded.

05:21 Alarm acknowledged on the screen (no card required):
- the alarm is muted,
- the Monitoring Display icon for the start point and other reader still flash red,
- OSOR Request choice displayed, default "Requested".

05:23 The Correctional Manager contacts the Officer to determine the patrol status.

05:24 OSOR Request choice:
- the Correctional Manager selects whether an OSOR is requested,
- the Monitoring Display icons for the start point and other reader stop flashing and stay red,
- the choice is confirmed and stored once the Correctional Manager's RFID card is scanned.

05:25 (Problem causing delay resolved, able to start patrol).

05:30 The Correctional Officer's card is scanned at the start reader:
- the RFID reader LED turns on for 20 seconds,
- the Status Display icon for the start reader turns green.

05:30 The Correctional Officer's card is scanned at the start reader:

- the Monitoring Display icon for the start reader turns green.

05:35 The Correctional Officer's card is scanned at the other reader:
- the RFID reader LED turns on for 20 seconds,
- the Status Display icon for the other reader turns green (end typical cycle)

05:35 The Correctional Officer's card is scanned at the other reader:
- the Monitoring Display icon for the other reader turns green (end typical cycle).

<Next time limit warning 6:30>

3.4.2 Operational Details

Static patrols and "Heightened Need" patrols that do not start within the timeout shall propagate an alarm to the Correctional Manager (CM) to support the procedures for patrols.

Patrol alarms are defined as follows:

a) a patrol where the next patrol does not start within the institution default timeout of the previous patrol shall be a late patrol and identified as such in the reports;
b) a patrol, where the next patrol starts prior to visiting all of the readers of the previous patrol, shall be a missed reader patrol and identified as such in the reports; and
c) a patrol can be either late, missed reader, or both.

All late or missed reader patrols shall cause alarms on the Monitoring Application.

The system also supports dynamic patrol usage. These are patrols that visit locations that are unscheduled, but monitored. Samples would include fire patrols, yard patrols where the standing orders require a minimum number of patrols during a day, but do not define any inter-patrol interval. The system only records the visit times for these patrols and then the Reporting Application can be used to review the patrol visits.

Some facilities have pairs of control posts that are consolidated to a single location during night-time operation. The system shall allow for transfer of SPS control and display to one alternate control post. Examples of this configuration are Joyceville Institution, LeClerc Institution, and Kingston Penitentiary. The transfers may be configured to allow transfers in both directions or only one direction as specified in the STR.

When Heightened Need Patrols are enabled with Regular Patrols, the interactions shall be handled as follows:

a) Since a living unit's Regular Patrol includes any Heightened Need Patrol on ranges in that unit, the Regular Patrol counts towards a Heightened Need Patrol and will restart the Heightened Need Patrol interval as well;
b) The first Heightened Need Patrol is scheduled such that the deadline allows for the full warning interval and occurs in the next 15n to (15n + 5) minute window after the most recent Regular Patrol start;
c) Any randomly started patrol is assumed to be a Heightened Need Patrol– only Heightened Need Patrol readers turn yellow - until d);
d) Any Heightened Need Patrol becomes a Regular Patrol if any readers not in the Heightened Need patrol are included – additional unvisited readers turn yellow at this point; and
e) A Regular Patrol is deemed incomplete if it is not finished by the start or deadline of the next Heightened Need Patrol (Only one type of patrol can be active at any time, although it can change type from fewer to more readers – see d)).

Start time logic sample: If x is the time of the last 60 minute deadline Regular Patrol start then if Heightened Need Patrol is enabled at:

x to x+10, the first deadline is x+15;

x+10 to x+15, the first deadline is x+20;
x+15 to x+25, the first deadline is x+30;
x+25 to x+30, the first deadline is x+35;
x+30 to x+40, the first deadline is x+45;
x+40 to x+45, the first deadline is x+50; and
> x+45, use the next Regular Patrol as the first Heightened Need Patrol.

The above rules result in the patrol types being synchronized while having the first Heightened Need Patrol within 15 minutes of being enabled.

3.4.3 All Applications

All applications shall be implemented as browser-based or thin client applications.

All applications shall:

a) provide an on-screen legend, implemented as a pop-up window or alternate screen, to explain icon colours and usage;
b) accept an input to toggle between French and English versions; and
c) support maintainer modifiable French and English user messages.

3.4.4 Patrol Application

A Security Patrol consists of randomly visiting a set of readers located about the facility started within a certain time interval. Each patrol has a start reader that will usually be located at a control post.

The Patrol Application shall:

a) be displayed on the Status Display at the control post;
b) display a row of icons for the patrol area with spacing adjusted to group the ranges (this may be integrated into other co-located displays pending CSC approval);
c) display the status for each RFID reader as follows:
    i. Green – time to time limit is greater than time limit warning interval – any visit to a reader resets the status to green and for the start reader, the patrol timeout is reset to the time limit interval,
    ii. Yellow – the patrol's time to time limit is less than time limit warning interval – the actual time remaining to the time limit shall not be displayed,
    iii. Red – time limit has expired or a new patrol started with one or more readers missed in the previous patrol,
    iv. Flash Magenta – alarm – fault or tamper detected (time limit expiration is not an alarm on the Status Display),
    v. Magenta – masked by maintenance or fault/tamper detected and acknowledged,
    vi. "Heightened Need" – The same colours shall be used with a different icon,
    vii. A "Heightened Need" patrol only shows the start and the selected range readers, and
    viii. A regular patrol including a "Heightened Need" area will be counted as a "Heightened Need" patrol and restart the interval time;
d) sound an audible status of the reader as follows:
    i. Warning Chime – a short sound to indicate a reader has entered the time limit warning interval, and
    ii. Alarm Chime – a short sound, different from the Warning Chime, to indicate the time limit has expired;
e) accept an acknowledge input to mute the alarm tone for all current visible unacknowledged alarms;
f) show unacknowledged alarms immediately, if there are no other current alarms. In the case of multiple alarms on different screens, show the next alarm once the previous alarm is acknowledged;

g) display alarms in the order received;
h) initiate transfer of control from one alternate station – requires RFID card inputs to initiate the transfer and to accept at the receiving station;
i) initiate return of control to one alternate station – requires RFID card inputs to initiate the return and to restore at the receiving station;
j) if integrated with Cell Call, Cell Call alarms shall have display priority; and
k) use icons for input and status display.

Note: The ability to transfer control requires an acknowledge RFID reader. If this feature is not used, the reader is not required.

Note: All control transfers are initiated only from the post currently responsible for the patrol and require an acknowledgement at the post receiving the responsibility – A “give” model not a “take” model.

Note: Acknowledging fault/tamper alarms will be with an on-screen button where the system does not have transfer capability and with an acknowledge RFID reader where deployed.

3.4.5 Monitoring Application

The system reports late patrols to the Correctional Manager for Correctional Officer security and to allow problem follow-up with an electronic register.

The Monitoring Application shall:

a) be displayed on the Monitoring Display in the office of the Correctional Manager;
b) display a row of icons for the patrol area of each residential unit;
c) display readers grouped into patrols;
d) display the state for readers as follows:
    i. Green – time to time limit for the patrol is greater than the time limit warning interval,
    ii. Yellow – time to time limit for the patrol is less than the time limit warning interval,
    iii. Flashing Red – an alarm indicating:
        - the patrol has passed the time limit and an OSOR request decision is pending, and/or
        - one or more readers have been missed in the previous patrol and an OSOR request decision is pending.
    iv. In the case of being late or missed patrol alarm, the alarm mode continues until the OSOR request decision is entered regardless of the reader state,
    v. Red - the late or missed patrol alarm has an OSOR request and the next patrol has not yet been started,
    vi. Magenta – masked by maintenance or fault/tamper detected (differentiated by icon detail),
    vii. “Heightened Need” – The same colours shall be used with a different icon, and
    viii. Use slow flash for alarms and fast flash for selected icons;
e) sound a continuous tone for unacknowledged alarms;
f) accept an acknowledge input to mute the alarm tone for all current visible unacknowledged alarms;
g) maps with alarms automatically appear on the screen unless there is already a pending, unacknowledged alarm displayed;
h) perform the following operations requiring an authorized RFID card for confirmation
    i. accept an OSOR Request input (default to requested),
    ii. accept an OSOR Received input,
    iii. set “Heightened Need” for a range. The time limit is 15 minutes and the time limit warning is 5 minutes, and
    iv. clear a “Heightened Need” range; and
i) use touch screen input excluding an on-screen keyboard.

Note: A late patrol applies to the patrol just starting and a missing reader applies to the incomplete previous patrol.

Note: Selecting a Heightened Need Patrol is done by selecting any reader on a range and all readers on that range are selected as a group. The selection may be toggled on or off and may include multiple ranges in a patrol.

3.4.6 Reporting Application

The SPS provides CSC with the ability to monitor, record, and report Security Patrol visits and times along with the identification of the Correctional Officer to support reviewing the electronic register.

The Reporting Application (may be integrated with the Monitoring Application) shall:

a) be displayed on the Monitoring Display in the office of the Correctional Manager;
b) allow entry of OSOR receipt confirmations into a list of late or missed patrols with outstanding OSOR requests (only allow confirmations for requested OSORs);
c) allow generation of reports as follows: (A patrol is defined as a related set of readers and typically the group of ranges associated to a control post. “Heightened Need” patrols identified within the reports and shall be interleaved with patrols from the same start reader. Dynamic patrols may be included or excluded from the All Patrols reports and they are excluded from the Roll-up Report.)
    i. All Patrols Report: all patrols for a user selected time interval (all time intervals are 5 minute resolution and 24 hour clock) grouped by patrol and sorted in time order including header: date, report interval and fields: patrol name, date, start time, duration, starting officer, LATE/INCOMP tag if late and/or missed reader(s), late interval, missed reader(s), OSOR requested state, and OSOR received state, (Late/incomplete patrols shall be made to stand out in the report),
    ii. All Patrols Quality Report: all patrols for a user selected time interval grouped by patrol and sorted in duration order including header: date, report interval and fields: patrol name, date, start time, duration, starting officer, LATE/ INCOMP tag if late and/or missed reader(s), late interval, missed reader(s) , OSOR requested state, and OSOR received state, and footer: average duration,
    iii. All Patrols Late Report: all patrols for a user selected time interval grouped by patrol and sorted in time order filtered to only late patrols including header: date, report interval and fields: patrol name, date, start time, duration, starting officer, LATE/ INCOMP tag if late and/or missed reader(s), late interval, and missed reader(s), OSOR requested state, and OSOR received state,
    iv. Single Patrol Report: a user selected patrol for a user selected time interval sorted in time order including header: date, report interval, patrol and fields: date, start time, duration, starting officer, LATE/ INCOMP tag if late and/or missed reader(s), late interval, missed reader(s), OSOR requested state, and OSOR received state,
    v. Single Patrol Quality Report: a user selected patrol for a user selected time interval sorted in duration order including header: date, report interval, patrol and fields: date, start time, duration, starting officer, LATE/ INCOMP tag if late and/or missed reader(s), late interval, missed reader(s), OSOR requested, and OSOR received state, and footer: average duration,
    vi. Single Patrol Late Report: a user selected patrol for a user selected time interval sorted in time order filtered to only late patrols including header: date, report interval and fields: patrol name, date, start time, duration, starting officer, LATE/ INCOMP tag if late and/or missed reader(s), late interval, missed reader(s), OSOR requested, and OSOR received state,
    vii. Single Patrol Detail Report: a user selected patrol detail for a user selected time interval sorted in time order including header: date, report interval, patrol and fields: date, time, reader, inter-reader interval, and officer (the time interval selects on the start times – all readers in a patrol starting in the interval shall be

included) (start readers shall be made to stand out in the report),

viii. OSOR Pending Correctional Manager Report: a user selected date interval report sorted by Correctional Manager including header: date, report interval, and fields: location, date, time, status, Correctional Officer, and footer: count of pending OSORs,

ix. OSOR Pending Correctional Officer Report: a user selected date interval report sorted by Correctional Officer including header: date, report interval, and fields: location, date, time, status, requesting Correctional Manager, and footer: count of pending OSORs,

x. Audit Report: a user selected day report of all patrol details for a 24 hour period grouped by patrol and sorted in time order including header: date, report interval, patrol and fields: date, time, reader, inter-reader interval, and officer (the time interval selects on the start times – all readers in a patrol starting in the interval shall be included) (start readers shall be made to stand out in the report),

xi. Correctional Officer Performance Report: a user selected date interval report of all officer performance sorted by Correctional Officer including header: date, report interval and fields: officer, on time patrols, patrols, percent on time patrols, OSORs submitted, OSORs requested and percent OSORs submitted, and

xii. Roll-up Report: a user selected time interval sorted by unit grouped by late interval ranges including header: date, report interval and fields: ratio and percent of patrols on time, with missed readers, and late in 5 minute groupings and footer per unit: ratio late/missed all patrols and total patrols, ratio of OSORs Requested and OSORs received and footer: percent late all patrols and total patrols (Missed can be either on-time or late);

d) allow printing of any report;
e) use touch screen input exclusively.

The data for all SPS reports shall be maintained in a separate database as part of the SPS. The data shall also be maintained in an auxiliary database located in a different part of the institution as a backup.

Notes:

a) Security Patrols may be late, incomplete, or both;
b) OSORs submitted without a corresponding OSOR request are not logged in the system;
c) Single Patrol reports refer to all rounds of a single patrol started within the time interval;
d) All reports include the report type in the header;
e) All reports include the institution in the header;
f) All reports include the selection criteria in the header; and
g) All reports include a printing date and time in the footer.

Sample reports (Single Patrol Reports are subsets of All Patrol Reports, Audit report is Single Patrol Detail Reports for all patrols):

All Patrols Report:

Select:
08:00 to 11:00 2011 September 2, no dynamic patrols
Output:

All Patrols Report
2011 September 2 08:00 to 11:00 at Joyceville Institution

Unit 5

Start	Duration	Officer	Status	Interval	Req'd/Rec'd
2011/09/02 08:04:22	00:06:28	Joe Jacobs			
2011/09/02 08:57:47	**01:01:34**	**Joe Jacobs**	**INCOMP**		**x**
			Unit 5 Range C End		

2011/09/02 09:59:21	**00:07:13**	**Joe Jacobs**	**LATE**	**00:01:34**	**x**	**x**
2011/09/02 10:56:55	00:05:21	Joe Jacobs				

4 patrol(s)

Unit 6

Start	Duration	Officer	Status	Interval
2011/09/02 08:21:22	00:03:16	Jane Jacobs		
2011/09/02 08:57:47	00:08:12	Jane Jacobs		
2011/09/02 09:49:21	00:07:13	Jane Jacobs		
2011/09/02 10:46:55	00:08:21	Jane Jacobs		

4 patrol(s)

Printed: 2011 September 4 14:32:14

All Patrols Quality Report:

Select:
08:00 to 11:00 2011 September 2
Output:

All Patrols Quality Report
2011 September 2 08:00 to 11:00 at Joyceville Institution

Unit 5

Start	Duration	Officer	Status	Interval	Req'd/Rec'd
2011/09/02 08:04:22	00:06:28	Joe Jacobs			
2011/09/02 08:57:47	**01:01:34**	**Joe Jacobs**	**INCOMP**		**x**
			Unit 5 Range C End		
2011/09/02 09:59:21	**00:07:13**	**Joe Jacobs**	**LATE**	**00:01:34**	**x x**
2011/09/02 10:56:55	00:05:21	Joe Jacobs			
4 patrol average:	00:20:09				

Unit 6

Start	Duration	Officer	Status	Interval	Req'd/Rec'd
2011/09/02 08:21:22	00:03:16	Jane Jacobs			
2011/09/02 09:49:21	00:07:13	Jane Jacobs			
2011/09/02 08:57:47	00:08:12	Jane Jacobs			
2011/09/02 10:46:55	00:08:21	Jane Jacobs			
4 patrol average:	00:06:46				

Printed: 2011 September 4 14:33:22

All Patrols Late Report:

Select:
2011 September 2 08:00 to 2011 September 2 11:00
Output:

All Patrols Late Report
2011 September 2 08:00 to 2011 September 2 11:00 at Joyceville Institution

Unit 5

Start	Duration	Officer	Status	Interval	Req'd/Rec'd
2011/09/02 08:57:47	**01:01:34**	**Joe Jacobs**	**INCOMP**		**x**
			Unit 5 Range C End		
2011/09/02 09:59:21	**00:07:13**	**Joe Jacobs**	**LATE**	**00:01:34**	**x x**

1 late patrol(s), 1 incomplete patrol(s)

Unit 6

Start Duration Officer Status Interval
0 late patrol(s), 0 incomplete patrol(s)

Printed: 2011 September 4 14:35:41

Single Patrol Detail Report:

Select:
09:55 to 10:00 2011 September 2 Unit 5
Output:

Single Patrol Detail Report
2011 September 2 09:55 to 10:00 Unit 5 at Joyceville Institution

Read	Reader	Interval	Officer
2011/09/02 09:59:21	**Unit 5 Control Post**	**00:00:00**	**Joe Jacobs**
2011/09/02 09:59:41	Unit 5 Range A Entrance	00:00:20	Joe Jacobs
2011/09/02 10:02:44	Unit 5 Range A End	00:03:03	Joe Jacobs
2011/09/02 10:04:00	Unit 5 Range C Entrance	00:01:16	Joe Jacobs
2011/09/02 10:04:16	Unit 5 Range C End	00:00:16	Joe Jacobs
2011/09/02 10:05:12	Unit 5 Range B Entrance	00:00:56	Joe Jacobs
2011/09/02 10:06:46	Unit 5 Range B End	00:01:34	Joe Jacobs

Printed: 2011 September 4 15:17:29

OSOR Pending Correctional Manager Report:

Select:
2011 September 2 to 2011 September 2
Output:

OSOR Pending Correctional Manager Report
2011 September 2 at Joyceville Institution

Manager: Bill Jacobs

Patrol		Status	Officer
Unit 5	2011/09/02 08:57:47	INCOMP	Joe Jacobs
Unit 5	2011/09/02 13:22:46	LATE	Jane Jacobs
Unit 5	2011/09/02 16:12:11	INCOMP	Joe Jacobs

3 requested OSORs outstanding.

Manager: Fred Jacobs

Patrol		Status	Officer
Unit 4	2011/09/02 18:04:01	LATE	Joe Jacobs

1 requested OSORs outstanding.

Printed: 2011 September 5 07:09:49

OSOR Pending Correctional Officer Report:

Select:
2011 September 2 to 2011 September 2
Output:

OSOR Pending Correctional Officer Report
2011 September 2 at Joyceville Institution

Officer: Jane Jacobs

Patrol		Status	Manager
Unit 5	2011/09/02 13:22:46	LATE	Bill Jacobs

1 requested OSORs pending.

Officer: Joe Jacobs

Patrol		Status	Manager
Unit 5	2011/09/02 08:57:47	INCOMP	Fred Jacobs
Unit 5	2011/09/02 16:12:11	INCOMP	Bill Jacobs
Unit 4	2011/09/02 18:04:01	LATE	Fred Jacobs

3 requested OSORs pending.

Printed: 2011 September 5 07:09:49

Correctional Officer Performance Report:

Select:
2011 September 1 to 2011 September 30
Output:

Correctional Officer Performance Report
2011 September 1 to September 30 at Joyceville Institution

Officer	On Time Patrols		Submitted OSORs	
Jane Jacobs	266/275	96.73%	6/8	75.00%
Joe Jacobs	224/269	83.27%	38/44	86.36%

Printed: 2011 October 5 09:33:21

Roll-up Report:

Select:
2011 October 1 to 2011 December 31
Output:

Roll-up Report
2011 October 1 to 2011 December 31 at Joyceville Institution

Unit 5 (2418 Patrols)

Late Interval	Ratio	Percent
On Time	2277/2418	94.17%
Incomplete	0/2418	0.00%
00:00-04:59	113/2418	4.67%
05:00-09:59	27/2418	1.12%

10:00-14:59	0/2418	0.00%
15:00-19:59	1/2418	0.04%
All	141/2418	5.83%
OSORs Req'd/Rec'd	117/123	95.12%

Unit 6 (2502 Patrols)

Late Interval	Ratio	Percent
On Time	2480/2502	99.12%
Incomplete	1/2502	0.04%
00:00-04:59	20/2502	0.80%
05:00-09:59	0/2502	0.00%
10:00-14:59	1/2502	0.04%
All	22/2502	0.88%
OSORs Req'd/Rec'd	11/22	50.00%

Joyceville Institution (4920 Patrols)

Late Interval	Ratio	Percent
On Time	4757/4920	96.69%
Incomplete	1/4920	0.02%
00:00-04:59	133/4920	2.70%
05:00-09:59	27/4920	0.55%
10:00-14:59	1/4920	0.02%
15:00-19:59	1/4920	0.02%
All	162/4920	3.29%
OSORs Req'd/Rec'd	128/145	88.28%

Printed: 2012 January 4 15:17:29

3.4.7 Configuration Application

The readers shall be grouped into ranges (typically two or three readers in a single or upper/lower range). Ranges and possibly other readers with a start reader shall be grouped into patrols. A range is the only grouping that accepts "Heightened Need".

The Configuration Application shall:

a) be displayed on the Monitoring Display in the office of the Correctional Manager;
b) require a configuration enabled RFID card to log in (different from a Correctional Manager RFID card);
c) accept an input to log the current user out of the system;
d) log the current user out of the system after five (5) minutes of inactivity;
e) add/remove authorized RFID cards with names for all valid users (Correctional Officers assigned to security patrols, Correctional Managers, Configurers, and Maintainers) – this will either share/extend an existing RFID card database or require creation of one that will be used by this and other future applications.
f) add/remove Correctional Manager capability to an authorized RFID card;
g) add/remove Maintainer capability to an authorized RFID card – adding Maintainer capability will remove all other capabilities i.e. Maintainers cannot be Correctional Officers or Correctional Managers;

h) add/remove Configurer capability to an authorized RFID card;
i) assign readers to ranges (A reader should belong to at most one range except in special cases. Ranges are only used to implement “Heightened Need”);
j) assign ranges, readers, and a start reader to patrols;
k) enable/disable audible warnings of patrols;
l) assign patrol pairs and acceptable transfer direction e.g. Unit 5 patrol may transfer responsibility to Unit 6;
m) edit descriptive information for each reader up to 30 characters;
n) edit descriptive information for each range up to 30 characters;
o) edit descriptive information for each patrol up to 30 characters;
p) set the institution default patrol time limit to 60 or 120 minutes;
q) set the patrol time limit for a specific patrol or reader not in a patrol (overriding the default time limit) to no limit, or institution default (readers and patrols with a no limit never alarm as expired – this is used for Dynamic Patrols only);
r) have the patrol warning time limit of 10 minutes, fixed;
s) have the “Heightened Need” patrol time limit of 15 minutes, fixed;
t) have the “Heightened Need” patrol warning time limit of 5 minutes, fixed;
u) allow generation and printing of reports as follows:
    i. list by type of authorized RFID cards and names sorted by last name report,
    ii. list added and/or removed authorized RFID cards and names by date range sorted by date and time report,
    iii. list all patrols with readers grouped by range, and
    iv. list all readers not in any patrol.
v) allow editing of English and French user text messages;
w) allow archiving Single Detail Reports and Roll-up Reports to external, USB connected storage in a text format; and
x) accept input from a USB keyboard and mouse.

3.4.8 Maintenance Application

The Maintenance Application shall:

a) be displayed on the Monitoring Display in the office of the Correctional Manager;
b) require an maintenance enabled RFID card to log in (different from a Correctional Manager RFID card);
c) accept an input to log the current user out of the system;
d) log the current user out of the system after five (5) minutes of inactivity;
e) allow generation and printing of an fault/tamper list for a user selectable time interval report;
f) allow masking/unmasking of readers; and
g) use touch screen input excluding an on-screen keyboard (drop-down lists are preferable).

The STR may designate an additional separate location for the Monitoring Display for the Maintenance Application.

3.4.9 Admin Application

The Admin Application shall:

a) be displayed on the Monitoring Display in the office of the Correctional Manager;
b) require an admin enabled RFID card to log in (different from a Correctional Manager and Maintenance RFID card);
c) log the current user out of the system after five (5) minutes of inactivity;
d) log off the current user after five (5) minutes of inactivity;
e) add/remove Correctional Manager capability to an authorized RFID card;
f) add/remove Maintainer capability to an authorized RFID card;
g) add/remove Admin capability to an authorized RFID card – Correctional Manager, Maintainer, and Admin capabilities are mutually exclusive and adding one of them will

remove the other. The last Admin authorized RFID card cannot be removed or changed;
h) use touch screen input exclusively.

3.4.10 Interface to Data Logger

The SPS shall provide an output to the Data Logger described in ES/STD-0102, to provide recording of all patrol-related activities in the SPS including:

a) all unauthorized RFID card reads with reader; and
b) all authorized RFID card reads with reader and application changes including:
   i. All alarms, acknowledgements and OSOR request decisions with authorizing person,
   ii. All control station transfer requests and accepts,
   iii. All OSOR receipts with authorizing person,
   iv. All "Heightened Need" enables/disables with authorizing person,
   v. Configuration, Maintenance, and Admin Application logon/logoff,
   vi. Application access privilege changes,
   vii. All patrol time-out changes,
   viii. Reader mask/unmask, and
   ix. All user text modifications.

All of these activities shall be logged with the time, date, and patrol where applicable in plain-language (or abbreviation thereof) without the need for a cross-reference table.

3.4.11 Interface to FAAS

The Security Patrol System shall provide an output to the FAAS at the MCCP described in ES/STD-0102, to error reporting of all SPS devices:

a) System failures and restorations;
b) RFID reader Maintenance Application masks and unmasks;
c) RFID reader failures and restorations; and
d) log all alarms.

3.5 Environmental Requirements

The system displays shall operate over the following indoor environmental conditions:

a) Temperature: 0° C to +50° C; and
b) Humidity: 0 to 90% relative, non-condensing.

Some RFID readers may be deployed in outdoor locations. Those readers shall operate over the following environmental conditions:

a) Temperature: -40° C to +65° C; and
b) Humidity: 0 to 100% relative, condensing.

3.6 Power Requirements

The system displays shall 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 shall not cause damage to the unit;
d) Power: power consumption shall not exceed 100 watts per display; and
e) Power backup: all components of the system shall be supported by UPSs for a minimum

of 1 hours.

It is preferable that the system share capacity on a TER level UPS.

3.7 Interference Requirements

Performance of the SPS shall not be affected by the use of standard electronic equipment used at the institution. Distance limits of standard electronic equipment are as follows:

a) 5 watt CB transceivers at 1 metre or more;
b) 6 watt VHF and UHF transceivers at 1 meter or more;
c) 25 mW 420-430 MHz Personal Portable Transmitters at 1 metre or more;
d) Other radio frequency transmitting receiving and redistribution equipment at 5 meters or more; and
e) Personal computer and/or computer work stations at 5 meters or more.

3.8 Installation Requirements

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

3.9 Safety Requirements

All SPS electrically powered elements shall meet the applicable CSA standards.

3.10 Documentation Requirements

All final SPS documentation shall be provided in accordance with the ES/SOW-0101, Statement of Work.

3.11 Support Requirements

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

3.12 Training Requirements

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

4 QUALITY ASSURANCE

The SPS Quality Assurance program 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 DELIVERY

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

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

6 SAFETY

All SPS electrically powered elements shall be CSA, UL, ULC or CE approved, as required by law.

- END OF TEXT -

Correctional Service Canada
Technical Services Branch
Electronics Systems

ES/SPEC-0900
Revision 2
10 July 2003

ELECTRONICS ENGINEERING SPECIFICATION

DOOR/BARRIER/GATE CONTROL SYSTEM FOR USE IN FEDERAL CORRECTIONAL INSTITUTIONS

AUTHORITY

This Specification is approved by Correctional Services Canada for the procurement and Installation of Door, Barrier and Gate Control systems, subsystems, and equipment 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 Services Canada, 340 Laurier Avenue West, Ottawa, Ontario, K1A 0P9

Prepared by:

Manager,
Electronics Systems Research

Approved by:

Director,
Engineering Services
25 July 03

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ABBREVIATIONS

The following abbreviations are used in this specification:

CER	Common Equipment Room
COTS	Commercial-Off-The-Shelf
CP	Control Post
CSA	Canadian Standards Association
CSC	Correctional Service Canada
DES	Director of Engineering Services
DCS	Door/Barrier/Gate Control System
EIA	Electronic Industries Association
GFE	Government Furnished Equipment
Hz	Hertz
ICCS	Inmate Cell Call System
msec	Millisecond
RFP	Request for Proposal
PW&GSC	Public Works & Government Services Canada
QA	Quality Assurance
SPEC	Specification
SOW	Statement of Work
TES	Terminal Equipment Space
UPS	Uninterruptable Power Supply
VAC	Voltage Alternating Current

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 Service 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 Door/Barrier/Gate Control System (DCS) in federal correctional institutions.

1.2 Purpose

The primary purpose of the Door/Barrier/Gate Control System is to provide control and status monitoring of the electrical/mechanical doors, barriers and gates in the correctional facilities. The system will enable the staff to effectively control the movement of inmates and other persons within the institution.

The DCS system may be used in both medium and maximum security institutions.

1.3 Commercial-Off-The-Self Equipment

The DCS 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 Door/Barrier/Gate Control 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 DCS.

1.6 Quantity of Equipment

The quantity and location of the equipment required for CSC institutions will be contained in the specification identified in the Request for Proposal (RFP).

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/STD-0802	Standard for Display and Control Panel
ES/STD-0803	Standard for Video Display Unit
EIA-310-D	Electronic Industry Association Standard for Racks, Panels and Associated Equipment
CSA-C22.1	Canadian Electrical Code, Part 1.

3.0 REQUIREMENTS

3.1 General

The Door/Barrier/Gate Control System (DCS) consists of a number of control panels with the necessary inputs and outputs to control the door, barrier or gate motors and monitor the limit and status switches at each door, barrier or gate.

3.1.1 Period of Operation

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

3.2 System Requirements

3.2.1 General

The DCS shall be a reliable, maintainable, modular and expandable state-of-the-art door/barrier/gate control system. Any system components located in areas continually exposed to the inmates shall be highly resistant to physical attack, tampering, liquids, jamming, abrasives, heated objects, etc.

The system shall be designed in such a way that any failure of any component shall not affect more than one group of cell doors, barriers and gates designated in the range and the failure of one group shall not cause a complete system failure.

Each group of cell doors, barriers and gates shall have a dedicated control and display terminal.

3.2.2 System Capacity

The number of control and display terminals and the number of cell doors, barriers and/or gates controlled and monitored by each control panel shall be as specified in the RFP. The DCS shall be of a modular design and it shall be possible at a future date to add more control terminals and associated equipment to the basic installed complement without changing the existing hardware.

3.2.3 System Redundancy

For redundancy purposes, two or more control processors shall be used with one processor as the main control and the other processors as the back up. Switching to the back up processors shall not cause interruption or loss of system conditions.

The communications network between the control processors and the various cell doors, barriers and gates shall have redundant paths. If one communications path fails or is disabled, the other paths shall enable uninterrupted operations to be continued.

3.2.4 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 Request for Proposal.

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.

3.2.5 Control Equipment

To the maximum extent, the common control equipment (power supplies, logic boards, amplifiers, etc.) shall be located in Terminal Equipment Spaces (TES) and/or Common Equipment Rooms (CER) provided for the purpose. These areas will be identified in the RFP. It is preferred that only equipment such as control and display terminals which the operator must access directly should be located in the Control Posts (CP), Living Unit Offices or Nursing Stations.

3.2.6 Sabotage, Tampering and Survivability

Any elements of the DCS located in areas exposed to inmates shall have high resistance to damage, destruction, or conversion to other uses (including weapons). All interconnecting service must be secure against tampering or damage.

3.3 Design Requirements

3.3.1 General

To the maximum extent, off-the-shelf equipment shall be selected for use in the DCS. New designs shall 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 among all elements of the system. A space-diversity approach to system communications shall be employed to ensure that loss of one interconnection routing does not impair the operational capability of the complete system.

3.3.2 **Control and Display Terminal**

The control and display terminal may be an EIA standard rack, desk, or wall-mounted control panel with a number of indicator lights and buttons or the control terminal may be a touch-sensitive video display unit with graphic maps. If a control and display panel is used, each series of buttons shall have moveable, reusable tags located adjacent to each or a means of identifying each cell door, barrier or gate. If a graphic map is used, all icons shall be identified and labelled.

The control and display terminal will usually be installed in the Security Control Post, Living Unit Office, or Nursing Station which is responsible for the supervision of an area containing the group of inmate cells called a range.

Mounting space within control posts is usually limited and the problem of determining a suitable equipment mounting location is minimized if the control and display terminals are small. Therefore, the designer should make maximum possible use of control devices which combines two or more functions into a single unit, e.g., a lighted push-button instead of a separate light and an unlit push-button if a control and display panel is used.

The EIA standard display and control panels or video display units shall be in accordance with ES/STD-0802 or ES/STD-0803 Standards respectively.

3.3.4 **Power Failure**

The door control system shall be equipped with an uninterruptible power supply (UPS) capable of keeping the displays operational for a minimum of thirty (30) minutes in the event of a Hydro power failure. If a door is manually opened or closed during a Hydro power failure the display shall register the change. The status of the UPS (normal or battery operation) shall be displayed on the control panel(s).

In the event of a primary power outage lasting more tha the period mentioned above; the door control system shall shut down automatically and the status of the doors shall not be affected by the shut down. Ie.. if a door was locked prior to the shut down, the door shall remain locked after the shut down.

After restoration of the primary power; the door control system shall resume normal operation without humain intervention and shall display the current status of all the doors.

3.3.5 **System Failure**

A DCS failure shall be deemed to have occurred when any required door, barrier and/or gate action is not produced or when any required control or monitor function cannot be performed.

3.3.6 **Human Factors**

Elements of the Door/Barrier/Gate Control System which are used directly by staff (i.e., control panels, etc.) shall conform with accepted principles of good human factors design.

3.3.7 **Existing Equipment**

In most installations, control elements of the Door/Barrier/Gate Control System will share console space with other electrical/electronic equipment such as Inmate Cell Call Systems (ICCS), 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 layout to assist the operator in the performance of his duties.

3.4 **Operational Requirements**

3.4.1 **Single Cell Door, Barrier or Gate Control**

The control and display terminal shall provide an OPEN, CLOSE, GROUP and STOP function in accordance with the appropriate Standards ES/STD-0802 or ES/STD-0803.

3.4.2 **Group Operation**

The door control system shall have the ability to satisfactorily handle a group of cell doors in the same manner as a single cell door, in accordance with the appropriate Standards ES/STD-0802 or ES/STD-0803. Cell doors may be selectively cancelled from the group in any desired sequence, independent of the sequence in which they were initiated. Any number of cell doors, up to the maximum installed complement shall be capable of group operation without a system overload.

A visual (flashing light) and an audible alarm (buzzer) shall preclude the group close function by a few seconds in each range. That is; when the group close button is actuated, a flashing light will be viewed and a series of audible bursts will be heard in each of the applicable range, and a few second later all the doors in the group register will close. The frequency and level of the flashing light and the audio burst shall be adjustable independently.

3.4.3 **Barrier Emergency Control**

Each control and display terminal shall provide an EMERGENCY CLOSE function for all barriers normally operated from the control post. The button shall have a red light to indicate that the emergency control has been activated.

3.4.4 **System Status Indication**

Each control and display terminal shall provide a system status indicator. The status indicator shall be green for normal operations and red for system failure. A separate indicator shall indicate if the system is on the uninterruptable power supply (UPS) battery back up.

3.4.5 **Indicator Test Device**

The control and display terminal shall contain an Indicator Test button which when activated shall cause all visual indicators on the control and display panel to turn "ON" and remain "ON" until the test button is released. Operation and release of the test button shall not cause any change of system status with respect to the events in progress.

3.5 **Environmental Requirements**

The Door/Barrier/Gate Control System shall operate over the following indoor environmental conditions:

3.5.1 Temperature: 0° C to +50° C; and

3.5.2 Humidity: 0 to 90% relative, non-condensing.

3.6 **Power Requirements**

The DCS shall use VAC power within the following limits:

3.6.1 Voltage: 120 VAC ±10%;

3.6.2 Frequency: 60 Hz ±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 Door/Barrier/Gate Control 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 Door/Barrier/Gate Control System documentation shall be provided with a Copyright Release for the documentation delivered in support of the system. The DCS documentation shall be in accordance with the ES/SOW-0101, Statement of Work.

3.9 **Support Requirements**

The Door/Barrier/Gate Control 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 Door/Barrier/Gate Control System shall be in accordance with the ES/SOW-0101, Statement of Work.

4.0 QUALITY ASSURANCE

4.1 **General**

The Door/Barrier/Gate Control 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 DCS documents, drawings, plans, manuals, etc. (where applicable) shall be in accordance with the ES/SOW-0101, Statement of Work.

Delivery requirements of the Door/Barrier/Gate Control System equipment shall be in accordance with the ES/SOW-0102, Statement of Work.

6.0 INTERFERENCE

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

7.0 SAFETY

All Door/Barrier/Gate Control System electrically powered elements shall meet the applicable Canadian Standards Association (CSA) standards.

Correctional Service Canada
Technical Services Branch
Electronics Systems

ES/STD-0803
Revision 2
20 February 2002

ELECTRONICS ENGINEERING STANDARDS

VIDEO DISPLAY UNIT ELECTRONIC SYSTEMS

Prepared by:

Manager,
Electronics Systems Research

Approved by:

Director,
Engineering Services

1.0 SCOPE

This standard defines the requirements of the Correctional Service of Canada (CSC) for the Video Display Unit (VDU) for use at federal correctional institutions.

2.0 GENERAL

Video Display Units interface the various electronic security systems to the operator in the Control Posts. The VDU annunciates real time events, displays system status and allows the operator to fully supervise, manage and control the systems as required. These units are mounted in locations on consoles according to functional priority and ease of operators visual monitoring of the display and controls.

3.0 ENVIRONMENTAL CONDITIONS

The system shall meet all requirements over the following operating range:

3.1 Temperature: 0° C to 50° C; and

3.2 Humidity: up to 95% non-condensing.

4.0 POWER REQUIREMENTS

The equipment shall be powered from standard commercial VAC within the following range:

4.1 Voltage: 120 VAC ±10%;

4.2 Frequency: 60 Hz ±1.5%;

4.3 Power: not to exceed 100 watts; and

4.4 Transients: input power fluctuations up to five times nominal voltages for up to 100 msec durations shall not cause damage to the unit.

Following any power failure, the system shall return to the operating mode which was in use prior to the power failure.

5.0 MECHANICAL REQUIREMENTS

The maximum dimensions for the equipment shall be within the following limits:

5.1.1 Height: 400 mm;

5.1.2 Width: 480 mm;

5.1.3 Length: 500 mm.

6.0 DESIGN REQUIREMENTS

6.1 The VDU shall be rack mountable to EIA RS-310-C Rack Standards, designed to be mounted in a console.

6.2 The display screen shall be touch-sensitive and shall not be <14“ diagonally.

6.3 The following screen colour shall indicate the associated functions:

a. FLASHING RED shall be used only to denote alarm conditions which require operator action to be taken without undue delay to avert possible personnel injury, equipment damage, or both.

b. RED shall be used to indicate an acknowledged alarm situation.

c. YELLOW shall be used to alert the operator to conditions requiring attention, or to indicate that the system is in an unsafe state, such as unlocked cell doors or masked perimeter sectors, requiring caution.

d. GREEN shall be used in contrast to red or yellow to indicate the system is in a safe state.

e. WHITE shall be used to indicate system conditions which do not have safe or dangerous implications.

6.5 Various systems shall use audible signals to alert the operator as follows:

a. Audible signals shall be clearly audible at any position the operator will occupy while on duty.

b. Frequency of a signal shall be between 500 and 5000 Hz, and preferably between 500 and 3000 Hz.

c. The operator shall be able to test each signal.

d. Volume of the signal shall be adjustable, either by the operator or by an internal adjustment to the module. The operator shall not be able to disable the signal by making it inaudible.

6.6 The following classes of audible signals shall be used on the console. They must be easily distinguished.

a. **Confirmation'** - a short tone, usually about 0.5 seconds, used to acknowledge an operator action. The same tone shall be used to confirm all console operations for which an audible confirmation is required.

b. **'Warning'** - a short tone, usually about 0.5 seconds, used to warn the operator that an action cannot be carried out because of conflict or error, or that a nonstandard action has been initiated. The same warning tone shall be used for all console operations for which a warning tone is specified.

c. **'Annunciation'** - continuous tone used to indicate a request for action by the operator. More than one such tone may be used for different console functions.

d. **'Alarm'** - continuous tone warning for a dangerous situation. More than one such tone may be used for different console functions.

6.7 The following requirements for screen touch sensitive buttons are as follows:

a. A positive indication of button activation shall be provided.

b. Dimensions and spacing shall be as defined in the individual panel standards.

6.8 Screen touch sensitive buttons shall be separated by >13 mm to prevent unintentional actuation.

6.9 Grouped buttons designed for sequential operation, for example numeric keypads, require separation >6 mm.

7.0 SOFTWARE REQUIREMENTS

7.1 Security system software shall be developed and proven Commercial-Off-The-Shelf (COTS) software unless otherwise specified and shall allow the upgrade of the CPUs without changes in the operation of the software.

7.2 The software shall use Graphics Interface techniques and menu selections to interact with the user.

7.3 The system shall be capable of running third party software concurrently with the security system software.

7.4 Man/machine interfaces shall be in English or French language text depending on the specific institution.

7.5 The system shall provide a method by which a historical report may be backed up on floppy disk for storage and later recall.

7.6 The report archive method shall ensure that no events are lost in the transfer from hard disk to the archive media.

7.7 The disk space for the historical report shall be reclaimed for use in an oldest-first order.

7.8 The system shall have the ability to maintain a historical report of changes made to the databases and record the date and time of the change.

7.9 The system shall provide a means of archiving databases to a floppy disk for long term storage.

7.10 Any future software revisions shall be backward compatible with previous software releases.

8.0 FUNCTIONAL REQUIREMENTS

8.1 Cell Lights and Power

The following VDU display design shall be used for the cell lights and power control:

8.1.1 One screen touch-sensitive button for each cell. Each button will be labelled with a cell identification. The button shall be illuminated by a white light.

8.1.2 Two indicators for each cell push button, one labelled 'light', the second labelled 'power'.

8.1.3 One screen touch-sensitive button for each group of cells. The group shall be defined by lines enclosing the individual cell push buttons. This button shall also have 'light' and 'power' indicators.

8.1.4 Individual cells shall be selected by pushing the appropriate screen touch-sensitive buttons; the buttons of the selected cells will be illuminated as they are selected.

8.1.5 If a selected cell button is pressed again, the cell will be deselected, and the button illumination turned off.

8.1.6 If a group cell button is depressed, it shall be illuminated. Any cells previously selected will be deselected, then all cells in the group will be selected. The group cell button shall be illuminated but the individual cell buttons in the selected group will not be illuminated.

8.1.7 A group may be deselected by pressing the screen touch-sensitive group button again; individual cells cannot be removed from a selected group.

8.1.8 When the cell light buttons are pressed, the following actions shall be taken for lights in all selected cells:

a. 'ON' all lights will be turned on.

b. 'OFF' all lights will be turned off.

8.1.9 When the cell power buttons are pressed, the following actions shall be taken for power to all selected cells:

a. 'ON' power will be turned on to all selected cells.

b. 'OFF' power will be turned off to all selected cells.

8.1.10 The light and power buttons shall have no effect on unselected cells, they will remain in their previous state.

8.1.11 The screen touch-sensitive buttons for each cell shall be illuminated if the power or lights for that cell are in the 'ON' state.

8.2 Other Lighting

Each set of lights to be controlled shall have a separate section on the VDU with the following controls:

8.2.1 One white screen touch-sensitive button, labelled 'OFF', and 'ON'.

8.2.2 If a light dimmer is required, The touch-sensitive button shall have at 10 levels of control and the intensity shall have an approximately linear relationship with scale positions.

8.2.3 'Touching the screen touch-sensitive button turns the lights off or turns the lights on. It shall be illuminated if the lights are on.

8.2.4 The dimmer setting shall be retained when the lights are turned off or on.

8.3 Cell Door Control

A cell door control VDU display shall be used to control the locks as follows:

8.3.1 The control screen shall be arranged to have four colour coded touch screen-sensitive buttons for each cell labelled 'OPEN', 'CLOSE', 'GROUP' and 'STOP', as well as two buttons labelled 'GROUP OPEN' and 'GROUP CLOSED'.

8.3.2 The touch screen-sensitive buttons shall be arranged in a mimic format. They will be separated sufficiently to prevent accidental keying.

8.3.3 The 'OPEN' touch screen-sensitive button shall unlock and open the associated cell door. The touch screen-sensitive button shall illuminate red, and remain illuminated as long as the cell remains unlocked. The 'OPEN' button shall flash red while the cell door is not in a fully open position.

8.3.4 The 'CLOSE' touch screen-sensitive button shall close and lock the associated cell door. The button shall illuminate green and remain illuminated as long as the cell remains closed and locked. The 'CLOSE' button shall flash green while the cell door is not in a locked position.

8.3.5 The 'GROUP' touch screen-sensitive button will act as a toggle switch to select and de-select the cell doors to be included or excluded from the group-type action. The 'GROUP' touch screen-sensitive button shall illuminate amber when the door has been selected to be included in the 'GROUP' function.

8.3.6 The 'GROUP CLOSE' touch screen-sensitive button shall close and lock all group selected cells with the appropriate indications as outlined above.

8.3.7 The 'GROUP OPEN' touch screen-sensitive button shall unlock and open all group selected cells with the appropriate indications as outlined above.

8.3.8 The 'STOP' touch screen-sensitive button shall interrupt the closing or opening of the doors. When selected, the 'STOP' button shall illuminate red

8.4 Other Doors

The system may have to control doors other than cell doors; for example fire doors or doors between sections of the institution. The screen touch-sensitive VDU display control shall be designed in the same way as the cell control doors. There shall be a separate display or region on the display for each type of door controlled.

8.5 Movement Control Barriers

Controls for control barriers shall be placed on a single touch-sensitive screen as follows:

8.5.1 For each barrier controlled, the screen touch-sensitive buttons, shall be labelled 'OPEN', 'STOP', and 'CLOSE'. The 'OPEN' and 'CLOSE' buttons shall have white illumination. The 'STOP' button shall have red illumination.

8.5.2 The layout of the controls shall reflect the physical location of the barriers.

8.5.3 Pushing 'OPEN' shall open the associated barrier. The screen touch-sensitive button shall flash as the barrier opens, when it is fully open the button shall light continuously, and remain lit as long as the barrier is open. There shall be audible confirmation of the action.

8.5.4 Pushing 'CLOSE' shall close the barrier. The screen touch-sensitive button shall flash as the barrier closes, when it is fully closed, the button shall light continuously, and remain lit as long as it is closed. There shall be audible confirmation at the start of the action.

8.5.5 If the barrier is moving, then pushing the 'STOP' button shall immediately stop the motion. There shall be audible confirmation of the action. The light on the open or close button shall turn off, and the stop button shall light up and remain lit until the 'OPEN' or 'CLOSE' buttons are pressed, and motion resumes.

8.5.6 If the barrier is not moving when the screen touch-sensitive stop button is pressed, no action shall be taken, the barrier shall remain in its previous state, and the button lights shall not change. There shall be an audible warning.

8.5.7 If an attempt is made to open a barrier which is interlocked and unable to open, then an audible warning shall sound and no action shall be taken.

8.5.8 If the interlock disable button is pressed, all interlocks shall be disabled, and all barriers may be opened. When the button is pressed, an audible warning shall sound and the button shall be illuminated.

8.5.9 The interlock can be reenabled by pressing the disable button again, with the barriers in a legal position. There shall be an audible confirmation of this action. If the barriers are not in a legal position, there shall be an audible warning and no action shall occur.

8.6 Fire Alarms

The system may monitor a number of fire alarms and shall be displayed on a single screen display as follows:

8.6.1 The display shall have a red light for each alarm.

8.6.2 Each light shall be labelled with the identification of location of the associated alarm. If possible, the lights shall mimic the alarm placement in the institution.

8.6.3 There shall be a single 'ACKNOWLEDGE' screen touch-sensitive button on the display, clearly separated from the indicator lights.

8.6.4 When a fire alarm is activated, the associated red panel light shall start flashing and an audible alarm shall sound.

8.6.5 The operator acknowledges the alarm by pressing the 'ACKNOWLEDGE' screen touch sensitive button, the red light stops flashing and remains on and the audible alarm stops.

8.6.6 The alarm must be reset from the site of the alarm, it cannot be reset from the console.

8.6.7 If more than one alarm has been triggered, the acknowledge button shall acknowledge all alarms.

8.7 Mechanical Systems

A number of mechanical systems, such as fans shall be controlled from a single screen display as follows:

8.7.1 Each system shall have a white screen touch-sensitive button, labelled 'ON'.

8.7.2 Each button shall be labelled showing the function of the controlled device.

8.7.3 The device is turned on and off using the appropriate screen touch-sensitive buttons.

8.7.4 If the device is in the 'ON' state, then the button shall be illuminated.

8.8 Inmate Call System Primary Annunciation Panel

The inmate call system shall be monitored from a single screen display as follows:

8.8.1 There shall be one screen touch-sensitive button per cell, the "Cell Call" button, with split yellow and white illumination areas.

8.8.2 There shall be one white screen touch-sensitive "ACKNOWLEDGE" button and one yellow "DISABLE" button.

8.8.3 There shall be a "Push to Talk" (PTT) button.

8.8.4 When an inmate activates his call button, the associated cell button shall start to flash, and there shall be a continuous audible annunciation.

8.8.5 The operator shall acknowledge the call by pressing the "ACKNOWLEDGE" button. The audible annunciation shall stop, but light shall continue flashing.

8.8.6 The operator can then listen to the inmate by pressing the call button. The light shall stop flashing and illuminate continuously.

8.8.7 The operator can talk to the inmate by pressing the PTT button.

8.8.8 When the call is finished the operator can cancel the call by pressing the associated touch-sensitive "CALL" button again. The light shall go off.

8.8.9 If a call has been triggered and not yet cancelled then triggering it again shall have no effect.

8.8.10 The operator can disable the call system for an inmate by pressing the "DISABLE" button and the cell button simultaneously. The yellow portion of the cell button shall light up and any calls shall be ignored.

8.8.11 Pressing the cell button and the "DISABLE" button a second time shall restore the call system to normal operation.

8.8.12 If the "DISABLE" and cell buttons are pressed while a call is being processed it shall disable the system from further calls, but shall not cancel the current call.

8.8.13 If an intercom is included in the system the operator can listen to any cell at any time by pressing the associated cell button. The button shall illuminate. Listening is stopped by pressing the button again.

8.8.14 If more than one cell call is triggered all calls shall be acknowledged by the "ACKNOWLEDGE" button.

8.9 Inmate Call System Secondary Annunciation Panel

Back up monitoring for the ICS is provided by a secondary panel at another location. This display shall monitor zones, where each zone is controlled by one or more primary panels at a single location.

8.9.1 There shall be one illumination light with yellow and white illumination areas for each zone.

8.9.2 There shall be one white 'ACKNOWLEDGE' button and one white 'TEST' button arranged.

8.9.3 If a cell call is not acknowledged at the primary panel for a zone, then after a preset length of time, the secondary panel yellow 'CALL' light for that zone shall flash and there shall be an audible annunciation.

8.9.4 The secondary panel operator can acknowledge the call by pressing the 'ACKNOWLEDGE' button. The audible annunciation shall stop and light shall illuminate steadily.

8.9.5 The light shall be extinguished when the call is cancelled from the primary panel.

8.9.6 If any cell calls in a zone are disabled, the white 'disabled' light on the corresponding secondary panel zone shall be illuminated.

8.10 FIXED POINT SECURITY ALARMS

A number of Fixed Point Security Alarms (FPSA) may be monitored from a single display as follows:

8.10.1 Each FPSA location shall have a screen touch-sensitive red push button on the display.

8.10.2 Each button shall be labelled to indicate its location.

8.10.3 There shall be a screen touch-sensitive 'ACKNOWLEDGE' push button in the lower right-hand corner of the display.

8.10.4 When an FPSA is activated, the associated button on the panel shall start flashing and an audible alarm shall sound.

8.10.5 The operator responds by pressing the 'ACKNOWLEDGE' button. The light shall stop flashing and burn continuously and the audible alarm shall stop.

8.10.6 The FPSA can be reset by pressing the illuminated button; this shall turn off the light.

8.11 Facility Alarms

The MCCP may be required to monitor a large number of alarms of various types, such as mechanical, fixed point alarms, and portable personal alarms. These can all be monitored from one VDU display.

8.11.1 The alarms shall be grouped by type.

8.11.2 Each alarm shall have an illuminated red push button on the screen.

8.11.3 Each screen touch-sensitive button shall be labelled to indicate the location of the alarm.

8.11.4 There shall be a screen touch-sensitive 'ACKNOWLEDGE' button in the lower right-hand corner of the screen.

8.11.5 When an alarm is triggered, the associated button shall start flashing and an audible alarm shall sound.

8.11.6 The operator responds by pressing the 'ACKNOWLEDGE' button. The light shall stop flashing and burn continuously and the audible alarm shall stop.

8.11.7 The alarm can be reset by pressing the illuminated button; this shall turn off the light, provided the alarm has also been reset at its origin if required.