

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

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**ES/SOW-0101  
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

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**Prepared by:**

  
**Manager,  
Electronics Systems Research**

**Approved by:**

  
**Director,  
Engineering Services**  
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

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## **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.

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## 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.

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### 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 contract 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.

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#### 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).

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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 matters 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 installation 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.



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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.

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**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.

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## 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 1/2" 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.

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## 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.

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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.

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## 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.

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**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.