DEPARTMENT OF NATIONAL DEFENCE

ANNEX A

Environmental Sensing Capability

Maintenance and Support Statement of Work

Version 4.0

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OPI: Polar Epsilon System Engineer

Environmental Sensing Capability

Maintenance and Support Statement of Work

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1 Introduction

1.1 Purpose

This Statement of Work (SOW) describes the work to be performed and the deliverables to be provided related to the provision of hardware and software maintenance support services for the Polar Epsilon (PE) Environmental Sensing (ES) Capability in order to maintain the operational availability of the ES System. These services include: preventive and corrective maintenance; technical and engineering support; repair and overhaul of failed equipment; replacement of spare parts; operator and maintainer training; configuration management; and special investigations and technical studies.

There are four key resource roles in the management of the System

1. Maintenance Support Manager

2. Senior Technical Resource

3. Junior Technical Resource

4. Administrative Support Resource

1.2 System Description

The ES capability uses the USA's TERRA and AQUA earth observation satellites to receive and process moderate resolution imaging spectroradiometer (MODIS) data to recover ocean colour and sea surface temperature products in support of DND/CAF operations. In future, the ES capability may also use the US S-NPP satellites to recover and process visible infrared imaging radiometer suite (VIIRS) products. Appendix 1 provides a brief system description.

For the purposes of this SOW, the ES System is defined as the operational system made of hardware and software components defined in detail in Appendices 2 and 3. There is an ES System installed on each coast. The ES System located on the East coast is referred to as ES – East and the ES System located on the West coast is referred to as ES – West. The hardware and software components of ES – East and ES – West are the same. Therefore, any reference to "the ES System" includes the ES – East and ES – West.

1.3 ES Locations

The ES equipment is located at the sites listed below. Appendix 2 contains a list of the inventory held at each of these sites.

1. ES – East
    a. Masstown, Nova Scotia, Remote Site, and
    b. Halifax, Nova Scotia, MARLANT HQ. MetOc Operations Room and the Base Server Room,
2. ES – West
    a. Aldergrove, British Columbia, Remote Site, and
    b. Esquimalt, British Columbia, MARPAC HQ. MetOc Operations Room and the Base Server Room.

1.4 Overview of Requirement

The requirement consists of two Components:

- Component A, which includes defined maintenance and support services for the ES System, to be provided on a monthly, ongoing, pre scheduled basis; and,

- Component B, which includes maintenance and support services for the ES System, to be provided on an "As and When Requested" basis via a task authorization.

These components are further described as follows:

Component A:

Defined maintenance and support services for the ES System include:

- Contract management and Contract management reporting, as detailed in Section 4.1. Contract management refers to the management of both the defined maintenance and support services, as well as the maintenance and support services to be performed on an "As and When Requested" basis;
- Preventive and Minor Corrective Maintenance, as detailed in Sections 4.2.1 and 4.2.2, for all hardware and software components within the ES System that are listed in Appendices 2 and 3;
- Development, Implementation, and Maintenance of a Service Requirement Request (SRR) Database and Reporting, as detailed in Sections 4.2.3 and 4.2.4;
- Telephone and Email Technical and Engineering Support Services, as detailed in Section 4.3; and,
- Configuration Management for Minor Changes, as detailed in Section 4.4.

Component B:

Maintenance and support services for the hardware and software components of the ES System to be provided on an "As and When Requested" basis includes:

- Second Line Corrective Maintenance and Third Line Corrective Maintenance for all hardware and software within the ES System at all ES locations, as detailed in Section 4.5.1;
- Procurement of Spares, as detailed in Section 4.5.2;
- Special Investigations and Technical Studies, as detailed in Section 4.5.3;
- Upgrades or Enhancements (excluding those which are Minor Changes), as detailed in Section 4.5.4;
- Configuration Management associated with Major Changes, as defined in Section 4.4.2.1;
- Travel to any of the ES locations as detailed in Section 4.5.5; and
- Training, as detailed in Section 4.5.6.

Work will be performed at the Contractor's facilities, as well as on site at the ES locations for the hardware and software components of the ES System.

1.4 Terminology and Acronyms

AD	Applicable Document
CA	Contract Authority
CDRL	Contract Data Requirements List
CAF	Canadian Armed Forces
CFSS	Canadian Forces Supply System
CFWOS	Canadian Forces Weather and Oceanographic Service
CI	Configuration Item
CISD	Canadian Industrial Security Directorate (PWGSC)
CM	Corrective Maintenance
COTS	Commercial Off the Shelf
DCR	Design Change Request
DID	Data Item Description
DND	Department of National Defence
EAC	Equipment Application Code
ECN	Engineering Change Notice
ECP	Engineering Change Proposal
ERN	Equipment Registration Number
ES	Environmental Sensing
ES System	Hardware and Software components of the ES capability (ES-East and ES-West)
LCMM	Life Cycle Materiel Manager
MetOc	Meteorological and Oceanographic Centres
MODIS	Moderate Resolution Imaging Spectroradiometer
MRP	Mobile Repair Party
MSM	Maintenance Support Manager
MSP	Maintenance Support Plan
NOC	Network Operations Centre
NSN	NATO Stock Number
OC	Ocean Colour
OEM	Original Equipment Manufacturer
PA	Procurement Authority
PM	Preventive Maintenance
PWGSC	Public Works and Government Services Canada
SCA	Supply Customer Account

SITS	Special Investigations and Technical Studies
SM	Supply Manager
S-NPP	Suomi National Polar-orbiting Partnership
SOW	Statement of Work
SRR	Service Requirement Request
SST	Sea Surface Temperature
SWRP	Software Release Package
TA	Technical Authority
US	United States
VIIRS	Visible Infrared Imaging Radiometer Suite
ZIP	Zone Interface Point

2 Documents

2.1 Applicable Documents

The following are applicable documents (AD) to this Statement of Work:

AD-1 Environmental Sensing Capability Polar Epsilon Maintenance Manual Version 1.13, 15 September 2016.

AD-2 Environmental Sensing Capability Polar Epsilon Operator Manual, Version 1.11, 15 September 2016.

AD-3 Maintenance Manual (All OEMs)

AD-4 System Manual (All OEMs)

AD-5 Concept of Operations, 00000625

AD-6 CDRL-010 System Design Description, Version 1.6, 15 September 2016.

AD-7 CDRL-011 External Interface Control Document, Version 1.6, 15 September 2016.

AD-8 MODIS Ingestion User Guide, Version 4.5, 14 September 2016.

AD-9 SeaDAS MODIS Processing User Guide, Version 4.5, 14 September 2016.

AD-10 SeaDAS MODIS Processing User Reference, Version 4.3, 14 September 2016.

AD-11 PE Operator Training Presentation, Version 1.5, 14 September 2016.

AD-12 PE Maintenance Administrator Training Presentation, Version 1.5, 14 September 2016.

AD-13 PE Maintenance Hardware Training Presentation, Version 1.4, 14 September 2016.

AD-14 Technical Data Package, Version 1.11, 15 September 2016.

3 ES System Maintenance Concept and Requirement

Preventive and Corrective Maintenance activities must be coordinated and performed with the aim of meeting the availability of the ES capability in an operational state as described in Section 3.2 of this SOW.

3.1 Boundary Responsibilities

The ES capability consists of ES System hardware and software components; physical infrastructure; and communications infrastructure as described in Appendix 1 of this SOW. Maintenance of ES capability must be conducted by the Contractor with DND support.

3.1.1 DND Responsibility

DND is responsible for the maintenance of the physical and communications infrastructure of the ES Capability, as well as, the Radome Assembly.

Specifically, this includes: the physical infrastructure described in Section 1.2 of the System Description in Appendix 1; the communications infrastructure described in Section 1.3, of the System Description in Appendix 1; and the Radome Assembly which includes the Radome Hatch, Fail-Safe Switch Assembly and Interior Light Assembly.

3.1.2 Contractor Responsibility

The Contractor is responsible for the maintenance and support of the ES System (ES – East and ES – West). The ES System consists of all the hardware and software components identified in Section 1.1 of the System Description in Appendix 1 and the items listed in the System Site Inventory in Appendices 2 and 3. These components are within the System Boundaries as demonstrated in Figure A-1 of the System Description in Appendix 1 for the ES System. In Appendix 1, the Radome Assembly is identified as being within the System Boundary. However, it is the only component within the System Boundary of the ES System that is not within the maintenance responsibility of the Contractor.

The Contractor must provide all services (Component A and B) from a team of a qualified resources which must include, as a minimal, the following 4 key resources;

1. Maintenance Support Manager

   The Maintenance Support Manager is responsible for the management and supervision of the contract and all tasks / deliverables. This person will insure the work is competed correctly, on time, and on budget. They will be the first point of contact.

2. Senior Technical Resource

   The Senior Technical resource is responsible for the maintenance of the hardware and software components of the PE ES system, provision of technical email and phone support and maintenance of the SRR database.

3. Junior Technical Resource

   The Junior Technical Resource is responsible for supporting the senior technical resource in the maintenance of the hardware and software components of the PE ES system, provision of technical email and phone support and maintenance of the SRR database

4. Administrative Support Resource

The Administrative Support Resource is responsible for assisting in the preparation of documentation related to the contract deliverables and for supporting the Maintenance Support Manager.

The 4 key resources positions must be maintained at all times. As a result of a larger than anticipated volume of transactions, it is possible that additional resources will be required in any of the stated categories. The Contractor must be able to propose additional resources for the stated categories as required to meet this increased demand. Additional Resources, beyond the present Resources must meet the same or higher technical, minimal, and mandatory evaluation scoring as the current resource within 2 points as per the evaluation criteria of the original RFP.

Component B – Task Authorization Work

When submitting a response to Task Authorization work requests; typical, only the four key labour recourse categories will be proposed and used in terms of labour. However, Canada recognizes that there may be exceptional situations where a specialized subcontractor labour may be required. Any use of subcontracting on a Task Authorization must be pre-approved by the Technical Authority.

3.2 Availability Requirement

The ES System must achieve an overall ES System availability level of no less than 95%. The ES System availability level is calculated as follows:

ES System Availability =

$$\frac{\text{(available for passes of Aqua and Terra satellites – unavailable for passes of Aqua and Terra satellites)}}{\text{available for passes of Aqua and Terra satellites}}$$

ES System unavailability for passes is defined as being all lost pass opportunities from the time that an ES System failure is communicated to the Contractor by the DND operators, maintainers or TA to when the ES System is restored to an operational state.

3.3 Maintenance Level

Responsibilities and resources needed to provide maintenance support are generally allocated to a number of levels or “lines”. The maintenance concept for the ES System envisions three levels of maintenance, as follows:

First Line Maintenance – This involves inspection of the equipment and simple preventive maintenance in the operational environment.

Second Line Maintenance – This involves preventive maintenance, corrective maintenance and removal or replacement of major assemblies at the operational site.

Second Line Maintenance includes: board replacements; major component replacements; mechanical repairs; limited overhaul; and alignment and calibration work.

Second Line Maintenance must provide limited configuration and test support for Commercial Off The Shelf (COTS) software. Second Line Maintenance must provide on-site preventive and corrective maintenance repairs necessary to maintain or restore the ES System to and operational state.

Second Line Preventive Maintenance that needs to be performed by the Contractor and is defined in Appendix 6 as well as Minor Corrective Maintenance defined in Section 4.2.2 will be performed as part of Component A. All other Corrective Second Line Maintenance will be performed on an "As and When Requested" basis by the Contractor.

Third Line Maintenance – This involves extensive overhaul and repair of equipment, or correction of software problems necessary to restore the ES System to an operational state. Typically Third Line maintenance is performed at the Contractor's facility, with the exception of some antenna work that may need to be performed on-site by Contractor personnel.

4 Tasks

4.1 Contract Management Tasks

4.1.1 Appointment of Maintenance Support Manager

The Contractor must appoint a Maintenance Support Manager (MSM). The MSM must have sufficient authority for the overall management and supervisory responsibility of all aspects of the Work to be performed by the Contractor under the Contract. The MSM must be the primary point of contact for the DND Technical Authority (TA).

4.1.2 Progress Review Meetings

The Contractor must prepare and conduct Progress Review Meetings between the Contractor, the TA and other representatives of Canada.

Progress Review Meetings must be held on a quarterly basis in order to discuss technical issues and problems, the status of outstanding Service Requirement Requests, and other issues of relevance to the management of the Contract.

4.1.2.1 Dates and Locations

The locations of each Progress Review Meeting must be at the Contractor's facility, unless otherwise agreed by the Contractor and TA.

Progress Review Meetings will be held at a time that is mutually agreeable to both the Contractor and the TA.

The Contractor must confirm the dates of each Progress Review Meeting at least two weeks before the start of the Progress Review Meeting.

4.1.2.2 Agenda

The Contractor must prepare and deliver an Agenda for each Progress Review Meeting. Each Agenda (Contract Data Requirements List (CDRL) 001) must conform to the Data Item Description (DID) PM-01 Agenda.

4.1.2.3 Minutes

The Contractor must prepare and deliver Minutes for each Progress Review Meeting. Each set of Minutes (CDRL 002) must conform to the DID PM-02 Minutes.

4.1.2.4 Action Item Log

The Contractor must prepare and deliver an Action Item Log for each Progress Review Meeting. The Action Item Log (CDRL 003) must conform to the DID PM-03 Action Item Log.

4.1.3 Monthly Status Report

The Contractor must prepare and deliver a Monthly Status Report. Each Monthly Status Report (CDRL 004) must conform to DID PM-04 Monthly Status Report.

4.1.4 Trip Report

The Contractor must prepare and deliver a Trip Report for any travel to ES System sites (i.e. Preventive Maintenance, Corrective Maintenance, or as the result of an "As and When Requested" Task). Each Trip Report (CDRL-007) must conform to DID RP-02 Trip Report.

4.1.5 Engineering Change Proposal (ECP) and Engineering Change Notice (ECN) Preparation

All ECPs and ECNs (even if the ECP or ECN relates to Work that would be implemented under Component B) will be prepared and submitted as part of the Work to be undertaken by the Contractor under Component A, as defined in Section 1.4 of this SOW.

4.2 ES System Maintenance Tasks

4.2.1 Preventive Maintenance

The Contractor must provide Preventive Maintenance (PM) of the ES System identified in Appendix 6.

As a minimum, the PM activities that are identified in Appendix 6 must be provided by the Contractor on an annual basis. It is estimated that no more than 4 days per year will be required at ES locations to perform PM activities.

For first line maintenance activities that require more frequent execution, DND Operators and Maintainers may assist the Contractor as described in Section 5.1.

4.2.2 Minor Corrective Maintenance

Corrective maintenance is defined in Section 4.5.1.

Minor Corrective Maintenance (CM) activities include:

1. CM activities that take less than 1 business day for diagnosis and generation of a software patch to correct a system defect;
2. Minor Changes as described in Section 4.4.2.2.

It is estimated that Minor Corrective Maintenance activities may be needed up to 8 times per year.

If explanations and potential solutions cannot be identified within the limits of 1 business day, the Contractor will provide a recommendation on potential ways forward, which would typically result in a request for the creation of an "As and When Requested" Task to address the required Second or Third Line Corrective Maintenance to restore the system to an operational state.

4.2.3 Maintenance Plan

The Contractor must deliver a final version of the Maintenance Plan in accordance with CDRL 005 that details how the Contractor plans to maintain the ES System.

The Maintenance Plan (CDRL 005) must conform to the DID LS-01 Maintenance Plan.

4.2.4 Service Requirement Request (SRR) Database

The Contractor must develop and maintain a SRR database.

The SRR database is the primary tool through which the Contractor, system operators, maintenance personnel and the TA can initiate and track the status of all Service Requirement Requests.

The Contractor must host the SRR database that is accessible to system operators, maintenance personnel and the TA via a web interface.

The SRR database and Web interface must be available to Canada's users 24 hours a day, 365 days a year, and must be available 99% of the time.

The Contractor must create and maintain user accounts for all of Canada's users identified by the TA throughout the period of the Contract.

The Contractor must provide a user manual for the SRR Database.

An SRR must remain open on the database until the Contractor and the TA officially close it.

At a minimum, the SRR database must contain the following information:

a. Unique SRR number (automatically generated by the SRR Database)
b. Severity of the problem (major or minor),
c. System component(s) affected,
d. Status of the SRR (active, closed, other),
e. Date opened,
f. Reporting/initiating agency,
g. Contractor's point of contact for the SRR,
h. Description of SRR,
i. Related SRRs (if any),
j. SRR type (hardware, software, interface, documentation),
k. Percent time expended to date on the activity compared to time estimated to completion (if applicable),
l. Effective release, issue, or version number,
m. Updated status summary,
n. Installation and test date,
o. Expected closing date, and
p. Other relevant information.

4.2.5 SRR Report

The Contractor must prepare and deliver an SRR Report. Each SRR Report (CDRL-006) must conform to the DID RP-01 SRR Report.

4.3 Technical and Engineering Support via Telephone and Email

The Contractor must provide Technical and Engineering Support to system operators, maintenance personnel and the TA via telephone, email or both.

The Contractor must be available to provide Technical and Engineering Support via telephone, email or both during normal business hours, Monday to Friday, not including statutory holidays observed by Canada. Normal business hours are defined as 09:00 – 17:00 local time at the Contractor's place of business.

The Contractor's telephone number for Technical and Engineering Support must be equipped to enable DND or CAF personnel to leave a voice message both during normal business hours and outside of normal business hours.

For all requests for Technical and Engineering Support received by the Contractor via telephone or email, the Contractor must acknowledge the request within a reasonable timeframe not greater than one business day in order to initiate a follow-up and identify the expected resolution time, keeping in mind the ES System Availability Requirement defined in Section 3.2.

4.4 Configuration Management

In the course of providing Preventive and Corrective Maintenance, the Contractor may be required to make changes to the configuration of the ES System.

The Contractor must provide hardware, software, data and documentation configuration management for the ES System by ensuring that all changes to the ES System are documented, approved and implemented in an orderly and controlled manner.

4.4.1 Configuration Management Plan

The Contractor must deliver a final version of the Configuration Management Plan that details how the Contractor plans to perform Configuration Management for the ES System.

The Configuration Management Plan (CDRL 008) must conform to the DID CM-01 Configuration Management Plan.

4.4.2 Configuration Changes

Changes to the ES System configuration must be classified as either Major or Minor Changes. The Contractor must advise the TA of all configuration changes.

All Major Changes must be approved in accordance with the Configuration Change Approval Process at Section 4.4.3 before implementing the final version of the configuration change. However, Major Changes may be made on an interim basis before approval is obtained in those cases where normal system operations would be adversely affected before TA approval could otherwise be obtained.

All Minor Changes do not require TA approval prior to implementation of the final version of the configuration change. The Contractor must implement the Minor Change with the next issue of the applicable ES System Documentation or software version release of the affected configuration item.

4.4.2.1 Major Changes

A Major Change is defined as any of the following changes to the system:

a. Technical performance,

b. Reliability and maintainability,

c. Testability,

d. Efficiency,

e. Interoperability and interface characteristics,

f. Specified tolerances and operating limits,

g. Safety,

h. Training and support resources and procedures,

i. Skills required to operate or to maintain the system,

j. Overhaul and rebuilding procedures.

4.4.2.2 Minor Changes

Minor changes are those not defined as a major change above and are generally:

a. Corrections to documentation errors,

b. Corrections to software code which do not affect the software logic, design, or mathematical formulations, and

c. The addition of clarifying notes to documents or software.

4.4.3 Configuration Change Approval Process

For a Major Change to the ES System configuration, the Contractor must prepare and deliver to the TA an Engineering Change Proposal (ECP) for all proposed Major Changes to the ES System configuration. Each ECP (CDRL-009) must conform to DID CM-02 ECP.

The TA will review the submitted ECP for completeness, clarity and impact on the ES Capability. The TA may approve the ECP, approve the ECP with conditions or not approve the ECP. The TA will advise the Contractor of their decision in writing within ten (10) business days of receipt of the ECP.

If the TA approves an ECP, the Contractor must proceed with the detailed design, implementation plan and testing plan of the Major Change proposed in the ECP.

Prior to implementation, testing and operational evaluation of the Major Change proposed in the ECP, the Contractor must prepare and deliver to the TA an Engineering Change Notice (ECN) for TA approval. Each ECN (CDRL-010) must conform to DID CM-03 ECN.

The TA will review the submitted ECN for completeness, clarity and impact on the ES Capability. The TA may approve the ECN or not approve the ECN. The TA will advise the Contractor of their decision in writing within ten (10) business days of receipt of the ECN.

If the TA approves the ECN, the Contractor must proceed with the implementation and evaluation of the change. Should failures occur upon testing, implementation or operational evaluation, rework may be required. In such cases, the Contractor must amend the ECN to correct the errors and submit the revised ECN for TA approval prior to installation and testing of the reworked components.

4.4.4 ES System Documentation

The ES System Documentation that the Contractor is responsible for managing includes the following:

1. System Design Description [AD 6]
2. External Interfaces Control Document [AD 7]
3. Maintenance Manual [AD 1]
4. Operations Manual [AD 2]
5. Training Materials [AD 12] [AD 13]
6. Technical Data Packages [AD 14]

4.4.5 Revised Documentation and Data Package

The Contractor must update and deliver ES System Documentation impacted by any Minor or approved Major Changes to the ES System Configuration implemented by the Contractor during the period of the

Contract. The updated ES System Documentation must be delivered as a Revised Documentation and Data Package. Each Revised Documentation and Data Package (CDRL-011) must conform to DID CM-04 Revised Documentation and Data Package.

4.4.6 Software Release Packages

The Contractor must prepare and deliver a Software Release Package for any Minor or approved Major changes to a software component of the ES System. Each Software Release Package (SWRP) contains the Software Release and Software Release documentation. The Software Release must be delivered in accordance with the Software Release Deliverable Requirements defined in Section 7.2 of this Statement of Work. The Software Release Documentation (CDRL-012) must conform to DID CM-05 Software Release Package.

4.4.7 Hardware Data Package

The Contractor must prepare and deliver a Hardware Data Package for any Minor or approved Major changes to a hardware component of the ES System. Each Hardware Data Package (CDRL-013) must conform to DID CM-06 Hardware Data Package.

4.5 "As and When Requested" Tasks

"As and when requested" Tasks include DND requested:

- Second and Third Line Corrective Maintenance for any hardware and/or software within the ES System, at any of the ES locations;
- Procurement of spares;
- Studies of the ES capability;
- Upgrades and enhancements to the ES capability;
- Configuration Management for Major Changes;
- Travel to any of the ES locations; and
- On-site Operator and Maintainer Training.

This "As and When Requested" Component does not include studies or implementation of software updates to the ES System required to maintain the operational state and currency of the ES System.

4.5.1 Second and Third Line Corrective Maintenance

The Contractor must provide Corrective Maintenance (CM) required to meet the system availability defined in Section 3.2 of this Statement of Work. As and when requested by the Technical Authority, the Contractor must provide Second and/or Third Line Corrective Maintenance of the components of the ES System.

Second Line Corrective Maintenance, as defined in Section 3.3 of this Annex includes:

1. Diagnosis;
2. Repair;
3. Rebuild; and,
4. Overhaul.

To reduce the need for Contractor travel, log files may be uploaded to an approved Contractor FTP site to assist with diagnosis, and software patches for repair may be provided by the Contractor to the FTP site for download by system operators and maintenance personnel.

Minor Corrective Maintenance, defined in Section 4.2.2, forms part of Component A.

Third Line Corrective Maintenance is defined in Section 3.3 of this Annex.

4.5.1.1 Second and Third Line Corrective Maintenance Response Requirement

In the event of a system failure that requires Second Line Corrective Maintenance by the Contractor's Corrective Maintenance technician or mobile repair team, the Contractor must restore the ES System to operational service within 5 business days of issuance of an approved Task Authorization in accordance with the terms of the Contract. An approved Task Authorization for Third Line Corrective Maintenance, such as the extensive overhaul and repair of equipment at the Contractor's facility will specify the delivery and installation requirements for completion of the task.

4.5.1.2 Second and Third Line Corrective Maintenance Trip Report

The Contractor must prepare and deliver a Corrective Maintenance Trip Report for each task authorized for the provision of Second Line Corrective Maintenance at any of the ES locations. Each Corrective Maintenance Trip Report (CDRL-007) must conform to DID RP-03 Corrective Maintenance Trip Report. The Contractor must also prepare and deliver a Corrective Maintenance Trip Report for each task authorized for the provision of Third Line Corrective Maintenance, where the Third Line Corrective Maintenance is provided on site at an ES location.

4.5.2 Procurement of Spares

Spare parts for the ES System are discussed in Section 5.2.1.

In accordance with any Task Authorization approved and issued under the Contract, the Contractor may be requested to replenish system spare(s).

4.5.3 Special Investigations and Technical Studies

On request of the TA, the Contractor must conduct Special Investigations and Technical Studies (SITS) on the ES System for the purposes of investigating upgrades or enhancements to the ES Capability.

4.5.4 Upgrades or Enhancements to the ES Capability

On request of the TA, the Contractor must implement upgrades or enhancements to the ES Capability. Additional configuration management resulting directly from the implementation of the upgrade or enhancement requested by the TA would not be part of the Configuration Management performed by the Contractor under the firm component of the Work.

An example of a potential upgrade or enhancement to the ES Capability would be the required changes to the ES System that enable the ES System to receive and process VIIRS products. The changes to the ES System software and hardware components, updates to the ES System documentation and change approval process documentation would for this upgrade or enhancement would be Work under the approved Task Authorization.

Upgrades and enhancements do not include required routine updates to the ES System hardware or software components for the purposes of maintaining the currency of the ES System.

4.5.5 Travel to ES Locations

All travel associated with the work, for both Component A & B, must be pre-approved by the TA via a task authorization.

Requirements for site visits are described in Section 6.2.

4.5.6 Training

On request of the TA, the Contractor must deliver a complete on-site training serial. A complete on-site training serial includes all the necessary training to meet the training objective for each audience as described in Table 1. The complete on-site training serial must be completed within 2 weeks of commencement of the training.

Table 1: Complete on-site Training Serial

Training Audience	Training Objective	Maximum Number of students	Location
Operators	The training required to equip the operators with the knowledge, skills, materials and hands-on experience necessary to fully operate the ES System.	6	Base Site
System Administrators	The training required to equip the System Administrators with the knowledge, skills, materials and hands-on experience necessary to fully perform System Administration Tasks, as well as, maintenance of the Base Server Room and MetOc Operations Room Components.	4	Base Site
Maintenance Technicians	The training required to equip the Maintenance Technicians with the knowledge, skills, materials and hands-on experience necessary to provide first line maintenance of the Remote Site Indoor and External Components of the ES System.	4	Remote Site

5 DND Support

5.1 First Line Maintenance

DND Operators and Maintainers will assist the Contractor by providing simple preventive and corrective First Line Maintenance of the ES System. This simple preventive and corrective First Line Maintenance is restricted to the following:

- Visual inspection of the ES System Hardware components;
- Cleaning of the ES System Hardware components located in the MetOc Operations Room, Base Server Room, and equipment racks at the remote reception site;
- Re-boot or re-initialize ES System hardware and software components as required;
- Reloading ES System Software;
- Fault identification and isolation of failed subsystem or Line Replaceable Unit; and
- Swapping out of failed components at the Line Replaceable Unit level with a pre-configured spare supplied by the Contractor.

The above listed First Line Maintenance assistance provided by DND Operators and Maintainers will be conducted in accordance with procedures defined by the Contractor or with the guidance of the Technical and Engineering Support via Telephone provided by the Contractor.

5.2 Government Furnished Equipment

5.2.1 System Spare Parts

DND will provide to the Contractor the inventory of System Spare Parts identified in Appendix 4 – System Spare Parts as Government Furnished Equipment (GFE).

The Contractor will keep this GFE inventory at the Aldergrove site location.

The management, repair, overhaul and procurement of System Spare Parts are the responsibility of the Contractor during the period of the Contract. If the Contractor becomes aware that a spare part or system component is going out of production by an OEM, the Contractor must notify the Technical Authority. At the expiry of the Contract, the Contractor must ensure a full inventory of System Spare Parts at the Aldergrove site. Any replacement System Spare Parts must be the latest configuration of the System Spare Parts required for the ES System configuration on the date of Contract expiry.

5.2.2 Site Test Equipment

DND will provide System Test Equipment identified in Appendix 5 – System Test Equipment for use by the Contractor. This GFE may not be removed from the site.

5.2.3 Training Facilities

DND will provide to the Contractor, classroom facilities at the Base Site for the Contractor to deliver Training. These Base Site classroom facilities will include:

- Desks and chairs for the Contractor’s instructor and all students, and
- A projection screen.

The Base Site classroom facilities provided to the Contractor for training will not include: a projector, computers or access to the Internet. However, power will be available for use by the Contractor for the purposes of operating the Contractor supplied projector(s) and computer(s).

In the event that the Contractor wishes to conduct the Operator portion and System Administrator portion of the training concurrently, DND will provide up to two classrooms for use by the Contractor.

6 Administrative Requirements

6.1 Place of Work

With the exception of site visits to support the accomplishment of the work under this SOW, all work must be carried out at the Contractor's facility.

6.2 Site Visits

All visits to DND sites by Contractor or Sub-Contractor personnel require the prior approval of the DND TA.

The Contractor must submit requests for site visits in the form of a Visit Request.

Each Visit Request (CDRL 014) must conform to DID PM-05 Visit Request.

All visit requests for planned visits, such as planned preventive maintenance and training, must be submitted by the Contractor to the DND TA at least 30 days prior to the date of the planned visit.

In case of unplanned site visits, such as those related to corrective maintenance, the Contractor must submit the visit request to the TA at soon as the details of the visit are known.

The DND TA will provide a letter of invitation to the Contractor on a yearly basis to initiate the Visitor Clearance Request (VCR) process for access to the ES sites.

6.3 Health and Safety

The Contractor must be compliant with Federal and Provincial statutes, standard industry practices, applicable codes and standards.

7 Deliverables

7.1 Contract Deliverables

Contract Deliverables are listed in the Contract Deliverables list presented in Table 2.

Table 2: Contract Deliverables

Deliverable	*Description*	*Delivery*	*Quantity*	*SOW Reference*
SWRP {Release ID}	Software Release Installation Package	Within 10 days of installation and operational evaluation of any Major Change to an ES System software component; and 5 days prior to every second Progress Review Meeting unless there have been no changes to an ES System software component.	5	4.4.6 7.2
CDRL	All data and documentation deliverables listed in Table 3 Contract Data Requirements List (CDRL)	Draft Minutes 5 days after the end of the Progress Review Meeting. Final Minutes 5 days after DND approval of Draft Minutes.	Lot	7.3 See Table 3 for detailed SOW references.

7.2 Software Release Deliverable Requirements

7.2.1 Purpose

The Software Release Installation Package provides DND with the media required to re-install and re-configure any software component of the ES System.

7.2.2 Requirements

The form of the Software Release Installation Package will depend on the Contractor's approach for supporting maintenance tasks related to the restoration of a component to operational service after a failure, or the loading of software on a spare component.

It is expected that the Software Release Installation Package will be provided in the form of a collection of software installation CD-ROMs and/or DVDs provided by the Contractor and by third-party Original Equipment Manufacturers.

It is expected that the software installation media for the Contractor's software applications will include:

- An installation application
- Files that are installed by the installation package
- Data used during the modification of registry entries or configuration files
- Release notes
- Other applicable documentation

The installation software should automate the installation processes as much as possible, minimizing the requirement for user actions during installation.

7.3 Contract Data (Documentation) Deliverables

7.3.1 Contract Data Requirements List (CDRL)

Data and documentation deliverables are listed in the CDRL list presented in Table 3.

Table 3: Contract Data Requirements List

CDRL Item	*SOW Component*	*Description*	*Delivery*	*SOW Reference*	*DID Number*
001	A	Agenda {Meeting ID, Date}	Draft Agenda 10 days prior to the scheduled start date of the Progress Review Meeting. Final Agenda prior to start of Progress review Meeting.	4.1.2.2	PM-01
002	A	Minutes {Meeting ID, Date}	Draft Minutes 5 days after the end of the Progress Review Meeting. Final Minutes 5 days after DND approval of Draft Minutes.	4.1.2.3	PM-02
003	A	Action Item Log {Date of issuance}	Within 5 days after Progress Review Meeting.	4.1.2.4	PM-03
004	A	Monthly Status Report {Report ID, Date}	Within 10 days after the final working day of the month being reported.	4.1.3	PM-04

CDRL Item	*SOW Component*	*Description*	*Delivery*	*SOW Reference*	*DID Number*
005	A	Maintenance Plan	Final version within 10 days of Contract Award	4.2.2	LS-01
006	A	SRR Report {Report ID, Date}	Within 10 days after the final working day of the month being reported.	4.2. 4	RP-01
007	A	Trip Report {Report ID, Date}	Within 10 days of an ES System site visit	4.2.6	RP-02
008	A	Configuration Management Plan	Final version within 10 days of Contract Award	4.4.1	CM-01
009	A	Engineering Change Proposal {ECP ID}	For TA approval prior to proceeding with detailed design, implantation and testing of a Major Change to the ES System configuration	4.4.3	CM-02
010	A	Engineering Change Notice {ECN ID}	For TA approval prior to installation and operational evaluation of a Major Change to the ES System configuration	4.4.3	CM-03
011	A and B	Revised Documentation and Data Package {Package ID, Date}	Within 10 days of installation and operational evaluation of any Major Change (Component B); and 5 days prior to every second Progress Review Meeting unless there have been no changes to ES System Documentation (Component A).	4.4.5	CM-04
012	A and B	Software Release Documentation {Release ID, Date}	Within 10 days of installation and operational evaluation of any Major Change to an ES System software component (Component B); and 5 days prior to every second Progress Review Meeting unless there have been no changes to an ES System software component (Component A).	4.4.6	CM-05

CDRL Item	*SOW Component*	*Description*	*Delivery*	*SOW Reference*	*DID Number*
013	B	Hardware Data Package {Package ID, Date}	Within 10 days of installation and operational evaluation of any Major Change to an ES System hardware component.	4.4.7	CM-06
014	A	Visit Request {Date}	Within 30 days of planned visit; or As soon as visit details are available for corrective maintenance visits.	6.2	PM-05

7.3.2 Common Documentation Deliverable Requirements

Each documentation deliverable shall be delivered in two different electronic formats; a non-editable version compatible with Adobe Acrobat Reader, and an editable version in a format compatible with one or more of the following Microsoft Office software applications:

a. Microsoft Word 2000,

b. Microsoft PowerPoint 2000,

c. Microsoft Excel 2000, and

d. Microsoft Visio Professional 2002.

Documentation deliverables shall be in the English language.

The Contractor must submit documentation deliverables in electronic format, as attachments to Emails directed to the DND TA, for review and approval. Hard copy versions of documentation deliverables (to a maximum of six) shall be provided in quantities indicated by the TA on acceptance of the document. Documentation deliverables are considered “delivered” on date of receipt by DND, before close of local business time on that date.

Each document deliverable shall display the CDRL number, description, version, and issue date.

8 Data Item Descriptions (DID)

8.1 PM-01 Agenda

8.1.1 Purpose

An agenda is to be promulgated for all Progress Review Meetings to provide an outline of items for discussion.

8.1.2 Preparation Instructions

The agenda for each Progress Review Meetings must be prepared following the Contractor's format, using the content guidance contained in this DID.

Each agenda must indicate:

a. purpose of the meeting,

b. time, date, location and expected duration of review, meeting or conference,

c. a list of Contractor attendees, and

d. the name and phone number of the meeting co-ordinator.

Where applicable, each agenda must include the following standard following agenda items:

e. Item 1 - review of the minutes of the previous meeting, and

f. Item 2 - review of progress by the Contractor. This item would include a brief description of progress on actions or problems, if any, identified at the last review.

Where applicable, each agenda must include a list of the Contractor originated items to be addressed that includes for each item:

g. the name, position and telephone number of the Contractor's representative responsible for sponsoring the item,

h. the objectives to be achieved,

i. a brief background of the subject, and

j. where applicable, expected impact on the project in terms of cost, schedule and DND activities.

Where applicable, each agenda must include a list of DND and PWGSC originated items to be addressed, that includes for each item:

k. the name, position and telephone number of the DND and PWGSC representative responsible for sponsoring the item,

l. the objectives to be achieved,

m. a brief background of the subject, and

n. where applicable, expected impact on the project in terms of cost, schedule and DND activities.

o. other pertinent information such as visit clearances, security arrangements, or any other relevant information that would assist DND and PWGSC personnel.

8.2 PM-02 Minutes

8.2.1 Purpose

The minutes of a meeting reports on the discussion and documents the decisions taken at Progress Review Meetings.

8.2.2 Preparation Instructions

The minutes of each Progress Review Meeting must be prepared following the Contractor's format, using the content guidance contained in this DID.

The Contractor must forward to DND in soft copy, draft minutes for review of completeness and accuracy.

Upon approval by the TA, the minutes must be returned to the Contractor for publication and distribution to meeting attendees.

Each meeting minutes must identify the meeting being reported.

Each meeting minutes must:

a. Describe the discussion and document the decisions taken for agenda items,

b. Include copies of briefing materials and discussion documents, and

c. Identify action items added to the action item log as a result of the Progress Review Meeting.

Minutes are only a record of activity and carry no authority. No change to this SOW or other contract documents may be authorised by the minutes of a meeting. Such actions require formal contract amendment by the Contract Authority.

8.3 PM-03 Action Item Log

8.3.1 Purpose

The action item log provides a consolidated record of action items that are generated during meetings, reviews, email correspondence, phone calls, and documentation reviews.

8.3.2 Preparation Instructions

The action item log must be prepared following the Contractor's format, using the content guidance contained in this DID.

The action item log must contain a consecutive list of Action Items cross-referenced to the meeting at which the Action Item was assigned.

Each action item record must contain:

- Unique identifier
- Description of the Action Item
- Source of the Action Item (e.g. the meeting at which the Action Item was recorded)
- Organization responsible for completing the action
- Agreed closure date
- Current status

- Objective evidence of closure when closed

8.4 PM-04 Monthly Status Report

8.4.1 Purpose

The Monthly Status Report allows the TA to track the activities that have been accomplished by the Contractor for the month being reported.

8.4.2 Preparation Instructions

Each issue of the Monthly Status Report must be prepared following the Contractor's format, using the content guidance contained in this DID.

The monthly report must include as a minimum:

a. a list of all PM and CM activities conducted,

b. a list of all training activities provided by the Contractor,

c. a list of all spare parts procured, and

d. a list of all active Task Authorizations.

Each monthly report must include the status of all configuration management activities as follows:

a. list the current active release number and date of all modified configuration items,

b. list the status of all active configuration changes (Engineering Change Proposals and Engineering Change Notices) including the item affected, the expected closure date, and the release number in which the change will be incorporated,

c. list the closed configuration changes, and

d. list the availability and/or support expiry dates of hardware and software inventory items which may be subject to long-lead delivery times and/or becoming obsolescent (semi-annually).

The monthly report must include the status of the spare parts inventory as follows:

e. list any items consumed from the spare parts inventory,

f. list any new items placed into the spare parts inventory, and

g. list any items repaired and returned to the spare parts inventory.

8.5 PM-05 Visit Request

8.5.1 Purpose

The visit of Contractor personnel to a DND facility requires that the DND TA submit and gain approval of a visit clearance request from each DND facility to be visited. The visit request provides the information required by the DND TA to generate the required visit clearance request on behalf of the Contractor.

8.5.2 Preparation Instructions

Each Visit Request must be prepared following the Contractor's format, using the content guidance contained in this DID.

Each Visit Request must include the following information:

a. DND facility to be visited,

b. Purpose of visit, and

c. Proposed dates.

For each member of the Contractor's team participating in the visit, the Visit Request must include:

d. Full Name,

e. Date of Birth,

f. Security clearance level,

g. PWGSC CISD's Security Clearance ID # (if required), and

h. Photo ID document description and serial number (e.g. US Passport number ABC123456, Yukon Drivers License number 666666666).

Visit requests may be embedded in email correspondence directed to the DND TA.

8.6 LS-01 Maintenance Plan

8.6.1 Purpose

The aim of the maintenance plan is to describe how the Contractor intends to provide the required maintenance support services.

8.6.2 Preparation Instructions

The maintenance plan must be prepared following the Contractor's format.

The content of the maintenance plan must address the scope of maintenance support services described in Section 4.2 and describe the Contractor's approach for the delivery of the maintenance support services.

The maintenance plan must include the following items:

a. Identify the level of maintenance to be performed

b. System components on which the maintenance will be performed

c. Allocation of Labour and non-labour resources

d. Approximated time allocated to perform the maintenance

e. Frequency

f. Tools required

g. Maintenance procedures

h. Item to verify when maintenance completed

The maintenance plan must identify any maintenance support tasks that will be subcontracted, and the subcontractor that will be undertaking the work.

The maintenance plan must be compliant with the requirement of applicable software licenses.

8.7 RP-01 SRR Report

8.7.1 Purpose

The SRR Report allows the TA to track the status of all Service Requirement Requests.

8.7.2 Preparation Instructions

SRR Report must be prepared following the Contractor's format, using the content guidance contained in this DID.

The SRR Report must include:

a. a list of new opened Service Requirement Requests (SRRs),

b. a list of SRRs that are ready to be closed, and

c. for each open SRR, a brief description, its classification as a Major or Minor Change (if applicable), priority, the personnel classification involved (including all subcontractors), the percent of the work completed, the estimated completion date, and any other relevant comments.

8.8 RP-02 Trip Report

8.8.1 Purpose

The Trip Report describes activities performed at an ES System site by the Contractor.

8.8.2 Preparation Instructions

The Trip Report must be in the Contractor's format and must include:

a. Site and date of the visit,

b. Purpose of the visit (PM/CM/"As and When Requested" Task)

c. Background information on the hardware or software system involved,

d. Related SRR,

e. Diagnostic and troubleshooting procedures conducted,

f. Further actions required (if any),

g. Recommended system changes and other suggested recommendations.

For CM visits, the Trip Report must also include:

a. Description of Problem, including symptoms,

b. Identified cause of Problem,

c. Repair actions taken (temporary or permanent),

8.9 CM-01 Configuration Management Plan

8.9.1 Purpose

The configuration management plan provides DND with the Contractor's configuration management policies and describes the organization and procedures which the Contractor intends to use to implement them.

8.9.2 Preparation Instructions

The configuration management plan must be prepared following the Contractor's format, using the content guidance contained in this DID.

The configuration management plan must describe how the Contractor will implement the configuration management tasks described in Section 4.4, and incorporate the procedures described in Section 4.4.1 into the Contractor's configuration management procedures.

The configuration management plan must include:

a. A complete list of configuration items to be managed by the Contractor during the period of the contract,

b. The Contractor's configuration management organization and their responsibilities and interfaces,

c. All applicable configuration management policies and directives,

d. The specific configuration management processes and procedures. The steps taken from the Contractor first requiring a change or problem report through to issuing a new release or configuration item update must be described,

e. All configuration management documents and their staffing and control, and

f. The configuration management procedures that will be applied to subcontractors.

8.10 CM-02 Engineering Change Proposal (ECP)

8.10.1 Purpose

The Engineering Change Proposal (ECP) provides DND with insight in to proposed major changes to the ES System and the issue the proposed change is expected to resolve.

8.10.2 Preparation Instructions

The ECP must be prepared following the Contractor's format, using the content guidance contained in this DID for all major configuration changes submitted to the TA for approval. The ECP must include the following information:

a. ECP number,

b. Related SRR,

c. System, unit, module, item, module, or part affected,

d. All documents affected by the configuration change,

e. Functional description of the proposed change,

f. Release/version number and date of release, and

g. Effects upon other systems, performance, operations, maintenance procedures, personnel, training, etc. (if applicable).

8.11 CM-03 Engineering Change Notice (ECN)

8.11.1 Purpose

The Engineering Change Notice (ECN) provides DND with detailed design, implementation plan and testing plan for approved ECPs for major changes to the ES System.

8.11.2 Preparation Instructions

The ECN must be prepared following the Contractor's format, using the content guidance contained in this DID. Each ECN must include the following information:

a. ECN number,

b. Related SRR and ECP,

c. System, unit, module, item, or part affected,

d. A complete technical description of the change,

e. A copy of all test procedures and test results addendum,

f. A copy of the redline changes to all documents and computer listings,

g. The hardware or software release/version number incorporating the redline changes, and

h. The expected installation date.

8.12 CM-04 Revised Documentation and Data Package

8.12.1 Purpose

The Revised Documentation and Data Package provides DND with the latest versions of ES System documentation impacted by changes to the ES System configuration.

8.12.2 Preparation Instructions

The Revised Documentation and Data Package must be in the Contractor's format and must include the following:

- A summary of changes to ES System documentation included in the Revised Documentation and Data Package, and
- A copy of the latest version of the ES System documentation with all changes incorporated into the documents.

In cases where ES System documentation remains unchanged from the previous issue of the Revised Documentation and Data Package, the unchanged version of the ES System document is not required to form part of the Revised Documentation and Data Package.

8.13 CM-05 Software Release Package

8.13.1 Purpose

The Software Release documentation provides DND with release specific information and instructions for installation.

8.13.2 Preparation Instructions

Release notes that accompany the software release should be prepared following the Contractor's format, and must include, but not be limited to, the following content:

• Identification of software build to which the release notes relate

• Changes in software functionality since previous release of software provided to DND

• Instructions for un-installing previous builds, or reference to applicable documentation

• Build-specific instructions for installation and configuration, tailored for the DND-specific hardware platform, operating system, and configuration requirements

• Instructions for verifying the correct installation and configuration of the build

• Identification of possible problems and known defects

• List of related documents that are applicable to the release, but not included with the release package

• Supplemental corrections or additions, prepared in the form of an errata, to a documentation deliverable or other document that is applicable to the release, where the document is already approved or is a standard COTS document.

8.14 CM-06 Hardware Data Package

8.14.1 Purpose

The Hardware Data Package provides the TA with documentation providing a technical description of new or changed hardware components of the ES System.

8.14.2 Preparation Instructions

The Hardware Data Package must be in the Contractor's format and must include the following information specific to the new or changed hardware component:

- Hardware component Name;
- Description of the component;
- Manufacturer;
- Part Number;
- Model Number;
- Serial Number;
- Options associated with the equipment;
- Replacement Cost;
- Sensitive or Controlled Good;

- Physical location;
- Weight;
- Physical dimensions;
- Drawings and/or photographs; and
- High-level assembly drawings.

APPENDIX 1

SYSTEM DESCRIPTION

1 System Description

The Canadian Armed Forces (CAF) have an ongoing requirement for oceanic environmental sensing within Canada's Exclusive Economic Zones, extended offshore areas of responsibility, and ocean areas of interest worldwide. For maritime operations involving CAF assets at sea, accurate and up to date awareness of multiple oceanographic environmental parameters are essential. Chief among these parameters are Ocean Color (OC) and Sea Surface Temperature (SST). The Meteorological and Oceanographic Centres (MetOc) on both coasts provide critical oceanographic analysis products to support maritime operations.

The Environmental Sensing system provides the CAF with:

- The capability to generate, in a timely manner, oceanographic products, required to support maritime operations, in the Canadian coastal area of responsibility, from direct broadcast transmissions of data from NASA's polar orbiting Earth Observing System (EOS) satellites Aqua and Terra;
- The capability to generate oceanographic products, required to support world-wide maritime operations, from the Internet download of EOS data from NASA or other third-party Ocean Color servers; and
- A foundation for the future implementation of the capability to generate oceanographic products from direct broadcast and downloaded data from the Suomi National Polar-orbiting Partnership (S-NPP) satellite.

The Environmental Sensing capability is composed of three major components:

- Vendor Supplied System;
- Physical infrastructure; and
- Communications infrastructure.

The system comprises the core technological elements that provide the Environmental Sensing capability. The physical and communications infrastructure provides a foundation on which the components are installed and operate, as well as the communications links between the geographically separated components.

Each instance of ES is geographically separated into two sites, one on each coast. The earth station components of ES are located at the Aldergrove and Masstown remote sites. The operator workstation, and MODIS processing and data storage components are installed in the MetOcs (MARLANT HQ Halifax and MARPAC HQ Esquimalt) where initial analysis of the generated oceanographic products by the users occurs. A high level, system block diagram of the ES capability is depicted in Figure 1-1.

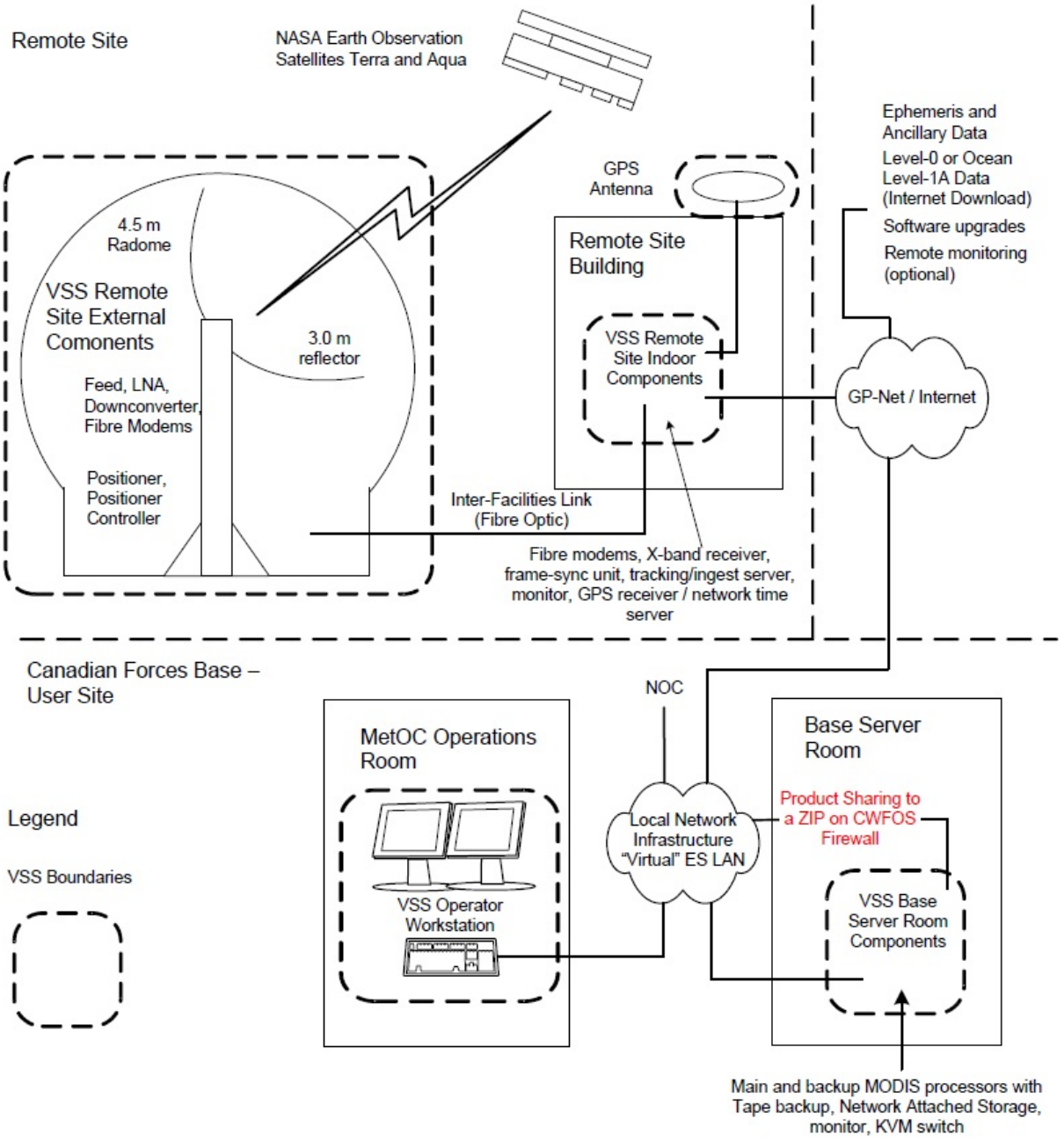

Figure 1-1: ES High Level Block Diagram

1.1 ES System Components

The ES System consists of components located at the remote sites, base server rooms, and the MetOcs. A detailed list of the components is defined in Appendix 2.

1.1.1 Remote Site External Components

The remote site external components comprise the following: an X-Band antenna assembly including antenna dish, feed, low noise amplifier (LNA), down converter, pedestal support structure, motor and electronics including fibre optic modems.

The remote site external components include a radome for the housing of the components described above. The radome is equipped with a lighting system and a fail-safe system that prevents the antenna from operating once the radome hatch is opened.

The remote site external components are connected to the remote site indoor components by a fibre optic inter-facilities link. The inter-facilities link is supplied and installed by DND.

1.1.2 Remote Site Indoor Components

The remote site indoor components comprise:

- Fibre optic modems;
- Data receiver and frame synchronizer;
- Ingest processor with the following functions:
    - Temporary data storage device for buffering of data in case of the loss of GP-Net link to the base server
    - Maintenance functionalities to diagnose problems on the antenna sub-system
    - Antenna tracking
    - Data ingestion
- Network device;
- Remote site indoor equipment rack; and
- GPS antenna to be mounted on the exterior of the building, GPS antenna cable, and GPS receiver and network time server.

1.1.3 Base Server Room Components

The base server room components comprise:

- Production and backup MODIS processor;
- Long term data storage devices (NAS and LTO drive);
- Monitor, input devices, and KVM switch; and
- Network device.

The MODIS processors and data storage devices are located in the base server rooms. The base server room components are installed in a rack supplied by DND.

1.1.4 MetOc Operations Room Components

The operator workstation is located in the MetOc Operations Room and comprises:

- Desk-top PC;
- Dual flat panel monitor; and

- Keyboard and mouse.

1.2 Physical Infrastructure

Physical infrastructure is provided by DND as a foundation on which the elements of the Environmental Sensing capability are installed. Physical infrastructure related to communications infrastructure is described in Section 1.3.

1.2.1 Remote Site Components

To support the remote site components, DND has provided:

- Site-level uninterruptible power supply and alternate power unit; and
- Site-level power quality conditioning and power surge protection.

To support the remote site external components, DND has provided:

- Support structure to mount the antenna assembly and radome;
- Power and grounding for the antenna assembly;
- Lightning protection for the antenna assembly and radome;
- Power and grounding for lighting;
- Telephone service into the radome; and
- Power outlets inside the radome for the use of maintenance workers to provide power to maintenance instruments.

To support the remote site indoor components, DND has provided:

- Environmentally controlled space for installation;
- Power and grounding;
- Attachment point for GPS antenna on building exterior;
- Security and access control; and
- Smoke and fire detection.

1.2.2 Base Server Room Components

To support the base server room components, DND has provided:

- Environmentally controlled space for installation;
- Equipment rack, including power distribution unit, cable management system and patch panels;
- Power and grounding;
- Security and access control; and
- Smoke and fire detection.

1.2.3 MetOc Operations Room Components

To support the MetOc operations room components, DND has provided:

- Environmentally controlled office space;
- Office furniture;
- Power and grounding;
- Security and access control; and
- Smoke and fire detection.

1.3 Communications Infrastructure

The communications infrastructure provides the communications links that connect the geographically separated elements together. The infrastructure for each communications link provided by DND includes, where necessary:

- Data path with sufficient bandwidth to support system requirements;
- Cabling and conduit; and
- Routing and firewall devices.

1.3.1 Inter-Facility Link

The inter-facilities link connects the remote site external components equipment with the remote site indoor components.

The inter-facilities link will transport:

- Intermediate frequency MODIS data from the antenna to the receiver and data ingest components;
- Antenna control signals between the antenna control unit and antenna; and
- Antenna status and alarm data between the antenna and control unit.

The inter-facilities link will be through a fibre optic cable provided by DND.

1.3.2 GP-Net and Internet

The DND GP-Net communications infrastructure is an Internet Protocol / Multi-Protocol Label Switched (IP/MPLS) network that connects system components installed at the remote site with system components installed at the associated Canadian Forces Base in the base server room and MetOc operations room. The GP-Net also provides a communications path to the Internet, to support a number of interfaces with external systems for file. The system connects through the GP-Net and Internet to external agencies as follows:

- Vendor, for software upgrades;
- NASA, to support the downloading of ephemeris data and ancillary data for MODIS processing; and
- NASA and other third-party organizations, to support the downloading of Level-0 or Ocean Level-1A MODIS data.

1.3.3 Other

Other components of communications infrastructure provided by DND include:

- Connection between the Base Network Operations Centre (NOC) and the base server room rack to support DND base-level network and server monitoring services; and
- Connection between the base server room components and the MetOc operations room components.
- Connection for product sharing between the Processing Servers and the Canadian Forces Weather and Oceanographic Service (CFWOS)

APPENDIX 2

SYSTEM SITE HARDWARE INVENTORY

ID	Name	Description	Manufacturer	Part Number	NSN	Location	Quantity per Site
HWCI-01	**Antenna Assembly**	**Antenna, Feed/LNB, and cables**					
HWCI-01.1	Reflector Dish	3.0 meter parabolic mesh dish	Telonics	HD008097-001	5985-01-589-9458	Aldergrove Masstown	1
HWCI-01.2	Dish Cradle	Cradle holding the reflector dish	Telonics	HD008098-001	5985-01-590-2820	Aldergrove Masstown	1
HWCI-01.3	Support Arms	Arms holding the Feed/LNB (four arms)	Telonics	HD008099-001	5985-01-590-2822	Aldergrove Masstown	4
HWCI-01.4	Feed/LNB	X-Band Feed/LNB Assembly	Telonics	CM006628-001	5985-01-589-5731	Aldergrove Masstown	1
HWCI-01.4.1	IF cable 1	IF/Power cable (Feed/LNB to antenna positioner)	Telonics	HD008161-001	5995-01-591-2768	Aldergrove Masstown	1
HWCI-01.5	Antenna Positioner	AZ/EL servo-motors and limit switches	Telonics	HD006816-001	5985-01-589-5777	Aldergrove Masstown	1
HWCI-01.5.1	Counterweight Arm 1	Counterweight Arm with IF connector to balance Dish and Cradle	Telonics	HD006539-001	5985-01-589-5794	Aldergrove Masstown	1
HWCI-01.5.2	Counterweight Arm 2	Counterweight Arm to balance Dish and Cradle	Telonics	HD006539-002	5985-01-589-5802	Aldergrove Masstown	1
HWCI-01.5.3	Counterweight	Counterweight to balance Dish and Cradle	Telonics	HD006540-001	5985-01-589-5808	Aldergrove Masstown	2
HWCI-01.6	Positioner Controller	AZ/EL servo-drives and RS-485 Decoders	Telonics	CM008110-001	6110-01-589-6605	Aldergrove Masstown	1
HWCI-01.6.1	Positioner Controller Cable	Control cable from the antenna controller assembly to the antenna positioner	Telonics	HD008189-001	5995-01-589-5745	Aldergrove Masstown	1
HWCI-01.6.2	Positioner Power Cable	Power cable from antenna controller assembly to the antenna positioner	Telonics	HD008190-001	5995-01-589-5784	Aldergrove Masstown	1
HWCI-01.6.3	Servo Drive	Servo Drive in positioner controller	Telonics	MO08526-001	5895-01-590-8670	Aldergrove Masstown	2
HWCI-01.7	Base	Antenna Base	Telonics	HD006463-001	5985-01-589-5707	Aldergrove Masstown	1
HWCI-01.8	Transformer Assembly	Isolation and boost transformers for supplying power to the antenna controller.	Telonics	TR008188-001	5950-01-591-2748	Aldergrove Masstown	1
HWCI-03	**Receiver**	**EOS-MODIS Mk II Receiver and cables**				Aldergrove Masstown	
HWCI-03.1	Aqua/Terra Receiver	EOS-MODIS Mk II Receiver with Aqua and Terra de-modulators	Telonics	CM006586-001	5820-01-589-6977	Aldergrove Masstown	1

ID	Name	Description	Manufacturer	Part Number	NSN	Location	Quantity per Site
HWCI-03.1.1	I/Q cables	Feed cables (to bit/frame synchronizer card)	Telonics	WI008086-001	5995-01-591-2749	Aldergrove Masstown	2
HWCI-03.1.2	G/T Test Cable	G/T cable from receiver to GSI unit. This cable allows the GSI unit to measure the sun strength during sun scan	Telonics	WI008086-001	5995-01-591-2749	Aldergrove Masstown	1
HWCI-03.1.3	USB Cable	Control cable (to ingest server)	Telonics	WI008678-002		Aldergrove Masstown	1
HWCI-04	**MODIS GSI Unit**	**Global Satellite Ingest Unit with UMS bit/frame synchronizer and cables**				Aldergrove Masstown	
HWCI-04.1	GSI Base Unit	Chassis, power supply, and processor card with two 32MB SIMMS and a single-ended SCSI interface	Telonics	CM008084-001	7025-01-591-2750	Aldergrove Masstown	1
HWCI-04.2	Bit/Frame Sync Card	Universal Multi-Sync programmable Bit/Frame Synchronizer Card	Telonics	CM007120-001	5998-01-589-7005	Aldergrove Masstown	1
HWCI-05	**Fiber Optic (FO) Interface**	**Outdoor FO Assembly, Cables, and Indoor FO components**				Aldergrove Masstown	
HWCI-05.1	Outdoor FO Assembly	HWCI-05.1 Outdoor FO Assembly Outdoor Fiber Optic Interface Assembly, includes IF Fiber Optic Transmitter (Encore WiBa series), RS-485 Fiber Optic Transceiver (Black Box), Bias-T unit, and Enclosure (mounts to antenna pedestal)	Telonics	CM008574-001	5895-01-589-6993	Aldergrove Masstown	1
HWCI-05.1.1	Serial Cable 1	Serial cable (to antenna controller)	Telonics	HD008158-001	5995-01-589-6958	Aldergrove Masstown	1
HWCI-05.1.2	IF Cable 2	IF cable (to Antenna Positioner)	Telonics	HD008161-002	5995-01-597-4854	Aldergrove Masstown	1
HWCI-05.4	IF Fiber Optic Receiver Assembly	Indoor IF Fiber Optic Receiver Chassis (4U) with Power supply and IF/FO Receiver	Telonics	CM008576-001	6030-01-590-2839	Aldergrove Masstown	1
HWCI-05.4.1	IF/FO Receiver	Fiber Optic Receiver Module (goes in 4U chassis)	Emcore	10481B-FA	6030-01-590-1017	Aldergrove Masstown	1
HWCI-05.4.2	IF Cable 3	IF cable (to EOS-MODIS receiver)	Telonics	WI008085-001	5995-01-593-3605	Aldergrove Masstown	1
HWCI-05.5	RS-485 Fiber Optic Unit	Indoor RS-485 Fiber 2U Chassis containing a RS-485 FO Transceiver and a RS-485/232 Adapter	Telonics	CM008575-001	6080-01-593-3538	Aldergrove Masstown	1
HWCI-06	**Ingest Server**	**Dell PowerEdge R710, 6GB memory, 2 x250GB Hard Drives, SCSI adapter, serial adapter, and dual power supplies**				Aldergrove Masstown	

ID	Name	Description	Manufacturer	Part Number	NSN	Location	Quantity per Site
HWCI-06.1	PowerEdge R710	PowerEdge R710	Dell	224-4846	7035-20-004-2745	Aldergrove Masstown	1
HWCI-07	**GPS NTS**	**Network Time Server with GPS antenna and receiver**				Aldergrove Masstown	
HWCI-07.3	NTS Unit	Network Time Server Unit (with GPS receiver)	Symmetricom	NTS-150	7730-01-539-0692	Aldergrove Masstown	1
HWCI-08	**Rack**	**42U Rack with UPS and PDU**				Aldergrove Masstown	
HWCI-08.1	42U Rack	42U Rack	Dell	224-4943	5975-01-579-7382	Aldergrove Masstown	1
HWCI-08.2	UPS	Rack-mountable UPS, 2700W, 3U, 120V.	Dell	330-7507	6130-01-582-8567	Aldergrove Masstown	1
HWCI-09	**Network Switch**	**Rack-mountable 16-Port Gigabit Switch with Webview**	**Linksys**	**SRW2016**	7050-01-555-9128	Aldergrove Masstown	1
HWCI-10	**KVM Console 1**	**Rack-Mount KVM Console**				Aldergrove Masstown	
HWCI-10.1	KVM Console	1U KMM Console w/ Keyboard and 17" LCD	Dell	310-9961	7025-01-569-8895	Aldergrove Masstown	1
HWCI-11	**Primary Processing Server**	**Dell PowerEdge R710 with 6GB memory, 2 x 250GB hard drives, SCSI adapter, and dual power supplies**				Esquimalt Halifax	
HWCI-11.1	PowerEdge R710	PowerEdge R710	Dell	224-4846	7035-20-004-2745	Esquimalt Halifax	1
HWCI-12	**Secondary Processing Server**	**Dell PowerEdge R710 with 6GB memory, 2 x 250GB hard drives, SCSI adapter, and dual power supplies**				Esquimalt Halifax	
HWCI-12.1	PowerEdge R710	PowerEdge R710	Dell	224-4846	7035-20-004-2745	Esquimalt Halifax	1
HWCI-13	**NAS**	**NX3000 Network Attached Storage with SCSI card, and five (5) 450GB hard drives (1 spare)**				Esquimalt Halifax	
HWCI-13.1	NAS	NX3000 Network Attached Storage	Dell	224-9502	7035-01-582-0802	Esquimalt Halifax	1
HWCI-13.4	Hard Disk 2	450GB 15K RPM Serial-Attach SCSI 3.5" Hot Plug Hard Drive (spare)	Dell	341-8720	7025-20-005-6954	Esquimalt Halifax	1

ID	Name	Description	Manufacturer	Part Number	NSN	Location	Quantity per Site
HWCI-14	**Tape Storage Unit**	**LTO-4 tape drive with tape media and cleaning media**				Esquimalt Halifax	
ID	**Name**	**Description**	**Manufacturer**	**Part Number**	**NSN**	**Location**	**Quantity per Site**
HWCI-14.1	LTO Drive	LTO-4-120HH tape drive	Dell	223-5213	7025-01-576-8736	Esquimalt Halifax	1
HWCI-14.2	Tape Media	Tape media for LTO-4 drive, 800GB/1.6TB capacity	Dell	341-4641	7030-01-592-2254	Esquimalt Halifax	5
HWCI-14.3	Cleaning Media	Cleaning cartridge for LTO-4 drive	Dell	310-5084	7035-01-591-8305	Esquimalt Halifax	1
HWCI-15	**KVM Console 2**	**Rack-Mount KMM Console and KVM Switch**				Esquimalt Halifax	
HWCI-15.1	KVM Console	HWCI-15.1 KVM Console 1U KMM Console w/ Touchpad Keyboard and 17” LCD	Dell	310-9961	7025-01-569-8895	Esquimalt Halifax	1
HWCI-15.3	KVM Switch	PowerEdge 180AS 8-port Console Switch	Dell	221-8096	7025-01-546-5155	Esquimalt Halifax	1
HWCI-16	**Operator Workstation**	**T7500n Mini-Tower, 12GB Memory, 2 x 250GB hard drives, dual video card, DVD, mouse, keyboard, and two 22” LCDs**				Esquimalt Halifax	
HWCI-16.1	T7500n Mini-Tower	T7500n Mini-Tower (include HWCI-16.1.1 to HWCI-16.1.4)	Dell	224-5229	7021-20-004-5081	Esquimalt Halifax	1
HWCI-16.2	LCD Monitor	Dell 22” 2209WA Flat Panel Monitor	Dell	320-7825	7025-20-002-4536	Esquimalt Halifax	2
HWCI-17	Network Switch 2	Rack-mountable 16-Port Gigabit Switch with Webview	Linksys	SRW2016	7050-01-555-9128	Esquimalt Halifax	1

APPENDIX 3

SYSTEM SITE SOFTWARE INVENTORY

ID	Name	Version	Description	Software Supplier	Installation Media
CSCI-01	RHEL WS	6.7	Red Hat Enterprise Linux 6 (64-bit)	RedHat	RHEL 6.7 (64-bit) Installation DVD
CSCI-02	RHEL 2S	6.7	Red Hat Enterprise Linux 6 (64-bit)	RedHat	RHEL 6.7 (64-bit) Installation DVD
CSCI-03	RHEL AS	4	Red Hat Linux 4AS (Release 4, Update 8)	RedHat	RHEL 4 AS, DVD
CSCI-04	Windows Storage	2008 Standard SP 1	Windows Storage Server 2008 X64 Standard Edition	Dell	2008 Standard SP 1
CSCI-05	SeaDAS	6.4	NASA SeaDAS Software	NASA	Electronics and also in GI-MODIS/SEADAS DVD
CSCI-05-1	Viewer/Interface		NASA SeaDAS Viewer/Interface		
CSCI-05-2	Programs		NASA SeaDAS programs/scripts		
CSCI-06	STracker	2.0.8	Over-flight Scheduling and Antenna Tracking	Global Imaging	GI-MODIS/INGEST DVD
CSCI-07	Ingest and QLD		Ingest and monitoring program	Global Imaging	GI-MODIS/INGEST DVD
CSCI-07-1	MODIS ingest	1.6.0	Modis Ingestion program (modis_ingest)		
CSCI-07-2	QLD	1.3.0	Quick Look Display of incoming granules program (xprogress)		
CSCI-08	Level0	N/A	L0 Generation and Distribution	Global Imaging	GI-MODIS/INGEST DVD
CSCI-08-1	L0 Generation	1.2, 1.6, 1.3	Scripts l0_gen, rawtol0, and program xccsds		
CSCI-08-2	L0 Distribution	1.3	Sript l0_dist		
CSCI-09	MODIS Processing	N/A	Automatic and Manual MODIS Processing	Global Imaging	GI-MODIS/SEADAS DVD
CSCI-09-1	MODIS Scripts	Various	MODIS Processing Scripts		
CSCI-09-2	Automatic	1.2.0	Automatic Processing Script		
CSCI-09-3	Manual	1.0.2	Manual Processing Script		
CSCI-09-4	Store/Restore	3.2	NAS Store/Restore Program		
CSCI-09-5	Storage Cycling	3.2	Product cycling program prd_cycle		
CSCI-09-6	Archive	3.1.1	Archive L0 Data to LTO Tape		
CSCI-10	Browse/Monitor	1.1	Log Browsing and Monitoring Program	Global Imaging	GI-MODIS/SEADAS DVD
CSCI-11	Operator	1.0.3	Operator Interface	Global Imaging	GI-MODIS/SEADAS DVD
CSCI-12	Utilities	N/A	Various Scripts and Programs	Global Imaging	GI-MODIS/SEADAS DVD
CSCI-12-1	Automatic Update Orbital Elements	1.8	Automatic Download and update of Orbital Elements		
CSCI-12-2	Manual Update Orbital Elements	1.6	Manual Update of Orbital Elements		
CSCI-12-3	Product Sharing	5639 2016-03-30	Program to push L2, L3, and Images Products from the PE ES NAS to a Zine Interface Point (IZP)		
CSCI-13	Anti-Virus		Anti-Virus Software	Central Command	GI-MODIS/SEADAS DVD

CSCI-13-1	Linux Anti-Virus	1.0.9.13	Symantec Antivirus (Linux)		
CSCI-13-2	Windows Anti-Virus	12	Symantec Endpoint Protection (Windows)		
CSCI-14	Remote Management	1.41	Remote Management Software (iDRAC GUI)	Dell	Dell Management Console, DVD

APPENDIX 4

SYSTEM SPARE PARTS

ID	HWCI	Name	Manufacturer	Part Number	NSN	Location	Qty
1200	HWCI-06.1	Dell PowerEdge R710 Linux Ingest Server	Dell		7035-20-004-2745	Aldergrove	1
2200	HWCI-16.1	Dell Precision T7500n LINUX WS	Dell		7021-20-004-5081	Aldergrove	1
4001, 4005, 4101	HWCI-05.1	Outdoor FO Interface Assy	Telonics	CM008574-001	5895-01-589-6993	Aldergrove	1
4002		Indoor RF FO Receiver Module	Emcore	10481B-FA	6030-01-590-1017	Aldergrove	1
4003	HWCI-05.4	Indoor RF FO Receiver Chassis	Emcore	10990A	5975-01-590-7044	Aldergrove	1
4004	HWCI-05.5	Indoor RS485 RF FO chassis 2U	Telonics	CM008575-001	6080-01-593-3538	Aldergrove	1
13001	HWCI-01.4	Feed/LNB	Telonics	CM006628-001	5985-01-589-5731	Aldergrove	1
13002	HWCI-01.6.3	Antenna Controller Servo Drive		MO008526-100	5895-01-590-8670	Aldergrove	1
13003	HWCI-01.6	Antenna Controller Assembly	Telonics	CM008110-001	6110-01-589-6605	Aldergrove	1
13004	HWCI-04.2	Bit/Frame Sync Card	Telonics	CM007120-001	5998-01-589-7005	Aldergrove	1
13005	HWCI-03.1	Aqua/Terra Receiver	Telonics	CM006586-001	5820-01-589-6977	Aldergrove	1
13006	HWCI-04.1	GSI Base Unit (SCSI chassis + card)	Telonics	CM008084-001	7025-01-591-2750	Aldergrove	1
Part of 4002 and 4003		Power Supply for indoor shelve	Emcore	1091G-NA	6130-01-593-3548	Aldergrove	1

APPENDIX 5

SYSTEM TEST EQUIPMENT

Location	**Quantity**
Halifax:	0
Masstown & Aldergrove:	
Agilent Technologies Oscilloscope (DS06102A)	1
Greenlee Digital Multimeter (DM-310)	1
Dell Latitude Laptop (E5500 P8400)	1
USB to Serial Converter	1
S-Tracker software for LINUX	1
Serial Cable	1
ES - Tool Kit	1
Esquimalt:	0

APPENDIX 6

PREVENTIVE MAINTENANCE TASKS

Table 6-1 First Line Hardware Preventive Maintenance

Component	Action	Site	Qty/Site	Frequency	Reference
NTS-150	Verify signal LEDs and GPS lock	Remote	1	Weekly	Maintenance Manual (AD-1), Section 9.1.4
Ingester	Verify Clock Synchronization	Remote	1	Weekly	Maintenance Manual (AD-1), Section 6.5
Ingester	Verify Orbital Element Download	Remote	1	Weekly	Maintenance Manual (AD-1), Section 8.2
Ingester	Monitoring Tracking & Ingestion	Remote	1	Daily	Operator Manual (AD-2), Section 3.1.1
UPS	Check Status	Remote	1	Monthly	Maintenance Manual (AD-1), Section 6.1.2, 9.1.8
Processors	Verify Clock Synchronization	Base	2	Weekly	Maintenance Manual (AD-1), Section 6.5
Processors	Verify Orbital Element Download	Base	2	Weekly	Maintenance Manual (AD-1), Section 8.2
Processors	Verify NFS Connectivity	Base	2	Automatic	Maintenance Manual (AD-1), Section 5.4.8
Processors	Verify Auto MODIS Processing	Base	2	Daily	Maintenance Manual (AD-1), Section 5.3.8
Workstation	Verify Clock Synchronization	Base	1	Weekly	Maintenance Manual (AD-1), Section 6.5
Workstation	Verify Orbital Element Download	Base	1	Weekly	Maintenance Manual (AD-1), Section 8.2
Workstation	Verify NFS Connectivity	Base	1	Automatic	Maintenance Manual (AD-1), Section 5.4.8
NAS	Verify Clock Synchronization	Base	1	Weekly	Maintenance Manual (AD-1), Section 6.5
NAS	Verify Status	Base	1	Weekly	Maintenance Manual (AD-1), Section 9.2.3

Table 6-2 Second Line Hardware Preventive Maintenance

Component	Description	Site	Qty/Site	Interval	Reference
UPS	Vacuum outside of UPS and test UPS batteries	Remote	1	1 year	Maintenance Manual (AD-1), Section 9.1.8
UPS	Replace UPS batteries	Remote	1	5 years	Maintenance Manual (AD-1), Section 9.1.8
Ingester	Inspect, clean fans and filters of the ingest server	Remote	1	1 year	Maintenance Manual (AD-1), Section 9.1.5 (1)
GSI Unit	Inspect, clean fan on the GSI unit	Remote	1	1 year	Maintenance Manual (AD-1), Section 9.1.3.4
Workstation	Inspect, clean fans and filters of the operator W/S	Base	1	1 year	Maintenance Manual (AD-1), Section 9.2.5 (1)
Radome	Visual inspection of radome	Remote	1	After snow storm 1 year	Maintenance Manual (AD-1), Section 9.1.1
Antenna	Visual inspection of antenna components	Remote	1	1 year	Maintenance Manual (AD-1), Section 9.1.2
Antenna	Exercise the antenna through its full azimuth and elevation range	Remote	1	1 year	
Site	Perform a site inspection, including elevation measurements over 360° azimuth, to identify any tree obstacle problem(s) and possible need for trimming	Remote	N/A	1 year	

(1) The Dell server or workstation must be shut down and all related equipment powered off and disconnected from the electrical outlet before performing the preventative maintenance.

Table 6-3 First Line Software Preventive Maintenance

Component	Description	Interval	Reference
Ingester	Log Cycling	3 months	Operator Manual (AD-2), Section 3.14.10
Processors	Log Cycling	3 months	Operator Manual (AD-2), Section 3.14.5, 3.14.6
Workstation	Log Cycling	3 months	Operator Manual (AD-2), Section 3.14.5, 3.14.7, 3.14.9
NAS	Windows Storage Server updates	Weekly As required	Maintenance Manual (AD-1), Section 6.4.3
Ingester, Processors, Workstation	Symantec Antivirus updates	Weekly	Maintenance Manual (AD-1), Sections 3.1.6, 3.2.6, 3.3.6, 3.4.6, 6.8
Ingester	System 9000 Software Backup	(1)	Maintenance Manual (AD-1), Section 7.1.1
Processors, Workstation	System 9000 Software Backup	(1)	Maintenance Manual (AD-1), Section 7.1.2

(1) System 9000 backup should be performed after patches have been installed or the configuration has been modified on the ingest server, processing servers, or workstation. This is only required if the system is not routinely backed up.

Table 6-4 Second Line Software Preventive Maintenance

Component	Description	Interval
Ingester, Processors, Workstation	Operating system security updated as per Maintenance Manual (AD-1), Section 7.5	As Required
Ingester, Processors, Workstation	Review the system logs in folder /var/log	1 year
Ingester, Processors, Workstation	Collect the information about the software (applied patches and dates of application) in folder /users/gae/patch	1 year
Ingester, Processors, Workstation	Review and check of the complete reception and processing chain by monitoring AQUA and TERRA passes, examining the ingestion and processing logs for errors, and examining generated products in SeaDAS viewer	1 year