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SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

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Title - Sujet GROUND SEGMENT SOLUT. (MEOSAR PROJ)	
Solicitation No. - N° de l'invitation W8474-16ME03/A	**Amendment No. - N° modif.** 010
Client Reference No. - N° de référence du client W8474-16ME03	**Date** 2016-07-04
GETS Reference No. - N° de référence de SEAG PW-$$ST-005-29512	
File No. - N° de dossier 005st.W8474-16ME03	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2017-03-31**	**Time Zone** **Fuseau horaire** Eastern Daylight Saving Time EDT
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Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) **Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)** **Signature** **Date**	

This amendment serves to:

1 – Publicize the draft ConOps document; and
2 – Publicize the draft In-Service Support SOW.

Vendors are invited to provide comments on the draft ConOps document and draft In-Service Support Statement of Work to the contracting authority before August 2, 2016.

General Information for review by prospective vendors:

The proposed method of selection is "highest responsive combined rating of technical merit and price", with the following proposed weighting of financial and technical elements of both the Build and Commissioning and In-Service Support (ISS) Statements of Work (SOW):

40%*(bidder Build and Commissioning technical)
20%*(bidder ISS technical)
20%*(bidder Build and Commissioning financial)
20%*(bidder ISS financial)

With respect to Section 4 of the ISS SOW, *Schedule*, vendors are invited to suggest optimal ISS periods, based on the mission life of the equipment and their ISS experience, and considering the information provided.

With respect to Section 6.9 of the ISS SOW, *Performance Management*, vendors are invited to provide comments regarding the performance requirements as stated in the respective tables.

Canadian Mission Control Centre Concept of Operations (CMCC CONOPS)

System Description, Data Distribution and System Interface

23 June 2016 Version 1.1

Version 1.1

CMCC ConOps

History:

Version	Date	Comments
1.0	13 May 2016	Draft Release
1.1	23 June 2016	Various corrections including addition of para 1.7 and 3.2.2.

Note: Side bar indicates changed lines.

Table of Contents:

Chapter 1 Introduction

1.1 Overview

1.1.1 The purpose of the Canadian Search and Rescue Satellite Aided Tracking (SARSAT) ground segment is the timely provision of distress alert and location data for search and rescue (SAR), using spacecraft and ground facilities to detect and locate the signals of COSPAS-SARSAT distress radio beacons operating on 406 MHz.

1.1.2 The intent of this document is to detail the system description, interface description, and data distribution at a national level within Canada. Proprietary components are only described at a functional level. Non-proprietary and Department of National Defence (DND) components are describe at functional levels and occasionally at technical levels. Components outside of Canadian Mission Control Centre (CMCC) (such as the Joint Rescue Coordination Centre's (JRCC)) that the CMCC servers connect with are only described to the extent required for CMCC Operators and to detail the interface.

1.1.3 This document includes system and component descriptions, and how the distress alerts and other related information is generated, processed, and transmitted to the appropriate SAR Point of Contact (SPOC) by CMCC.

1.2 Objective

1.2.1 The purpose of this document is to describe the following aspects for CMCC operational purposes:

a. The Canadian SARSAT Ground Segment. Details include (as applicable to the individual components):

i. Components and their details;
ii. Geographic location;
iii. Manufacturer and support available;
iv. General component function; and
v. Other operator level configuration information.

b. Data distribution principles used within Canada;
c. Message formats and communication standards required to transmit data between CMCC and supported Rescue Coordination Centre (RCC)s, SPOCs, and internal support tools; and
d. Differences in operations of the Canadian ground segment when CMCC assumes the responsibilities of the USMCC or the USMCC assumes the responsibilities of the CMCC.

1.3 Scope

1.3.1 This document describes aspects of the system that are hosted on the Search and Rescue Network (SARNet), including their links to each other and outside agencies. This includes:

a. Underlying network and connections;
b. CMCC (servers and MCC software);
c. Local User Terminals (LUT)s (hardware and associated software);
d. RCCs /SPOCs (limited to the SARSAT and CMCC aspects);
e. CMCC Case Form
f. Canadian Beacon Registry Verifier (CBRV); and
g. Canadian Beacon Registry (CBR).

1.4 Document Organization

1.4.1 This document details the national level characteristics of Canadas SARSAT system including:

a. General descriptions of system components;
b. Procedures for data distribution in Canada; and
c. System interface description. The interfaces between all components are described to the extent possible. As some interfaces, such as all command and control of LUTs are proprietary, they are not defined in technical detail, but rather in functional capability.

1.4.2 Where applicable, references to other documents are included.

1.5 Document Amendments and Updates

1.5.1 Amendments to this document must be recommended by the CMCC Chief Operator and approved by the CMCC Officer in Charge (OIC).

1.6 Reference Documents

1.6.1 C/S A.001 COSPAS-SARSAT Data Distribution Plan (DDP)

1.6.2 C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID)

1.6.3 C/S A.003 COSPAS-SARSAT System Monitoring and Reporting

1.6.4 C/S A.005 COSPAS-SARSAT Mission Control Centre (MCC) Performance Specification and Design Guidelines

1.6.5 C/S A.006 COSPAS-SARSAT Mission Control Centre Commissioning Standard

1.6.6 C/S G.004 COSPAS-SARSAT Glossary and Acronyms and Terminology

1.6.7 CMCC Standard Operating Procedures (SOPs)

1.6.8 CMCC OCC 600 Configuration Manual – under development expected to be available by Nov 2016".

1.6.9 CMCC GEOSort Regions

1.6.10 USMCC "National Rescue Coordination Center (RCC) and Search and Rescue Point of Contact (SPOC) 406 MHz Alert and Support Messages for the MEOSAR System"

1.6.11 Canadian Aeronautical and Maritime Search and Rescue Manual (CAMSAR)

1.7 Note on Reference 1.6.8 CMCC OCC 600 Configuration Manual

1.7.1 As part of the commissioning of the current MCC software, it was noted that the documentation of the Canadian SARSAT system was insufficient. Consequently the CONOPS document was prepared to capture the CMCC operating details. A companion document to record the system configuration, the CMCC OCC 600 Configuration Manual will also be developed. The CMCC 0CC 600 Configuration Manual will provide the details of the configuration and is planned for completion by 30 Nov 2016. The MEOSAR Phase I contract requires [the contractor] to include this information as part of the software information in the Hardware and Maintenance Manual.

Chapter 2 System Components

2.1 CMCC (as a Canadian Armed Forces (CAF) Unit)

2.1.1 CMCC is the CAF unit that provides the SARSAT service to Canada (both the MCC functions and the beacon registry functions) and manages and supports the SARNet.

2.1.2 CMCC encompasses Canadian Beacon Registry (CBR), MCC, Search and Rescue Network Operations Control Centre (SARNOCC); as well as all IT owned and operated by these sections.

2.1.3 The individual sections and their functions are defined in further detail later.

2.2 CMCC (as a SARSAT MCC)

2.2.1 As a SARSAT entity, CMCC is the Canadian MCC which includes the operators, processes (manual and automatic), and IT systems. These enable CMCC to provide all required functions to Canada and to interface with the other entities via the COSPAS-SARSAT (C/S) network. CMCC has two physical sites and each site can support 24/7 operations. Each site has a MCC system installed and given that the network connections are functional, either system can be operated from either site. The primary site is located at 142 Yukon Street, Room 100 at 8 Wing Trenton, and the secondary site is located at 187 Pinnacle Street, Belleville. The office in Belleville is on the second floor, North West corner of the Armories.

2.2.2 Commissioned MCC. Within the C/S context, CMCC is a fully commissioned MCC according to the standard at C/S A.006 COSPAS-SARSAT Mission Control Centre Commissioning Standard. The Canadian SARSAT MCC was tested by the USMCC to ensure it functioned properly and was able to fulfill all required duties.

2.2.3 Support for SARSAT Ground Segment. SARNOCC is the first point of contact for 24/7 support. They will assist with troubleshooting to find what component is failing, and then continue to assist or pass it to the responsible agency. SARNOCC is responsible for the SARNet and IT hardware. The Contractor is responsible for all their components. Detailed callout procedures are contained in the CMCC Standard Operating Procedures (SOPs).

2.2.4 Remote Desktop Software. SARNOCC has installed remote desktop software (RAdmin Server) on all desktops and servers. It enables the remote use and management of IT infrastructure. This software is DND approved, is supplied by DND, and is installed and configured by SARNOCC. For access from outside the SARNet, authorized users can login via SARNOCCs Citrix server and then use RAdmin to login to any authorized computer to perform nearly all functions as if you were located at the computer.

2.2.5 Backup Agreement. IAW C/S A.001 COSPAS-SARSAT Data Distribution Plan (DDP), CMCC has a bilateral agreement with the USMCC for mutual backup. When CMCC is unable to fulfill its C/S responsibilities, the USMCC distributes data direct to Canadian RCCs. When the USMCC is unable to fulfill its C/S responsibilities, CMCC distributes data direct to US RCCs and SPOCs while AUMCC assumes the USMCCs nodal MCC responsibilities. The in-depth details of this arrangement are further discussed in later sections of this document as well as in the CMCC Standard Operating Procedures (SOPs).

2.3 CMCC (as SARSAT MCC servers)

2.3.1 Server Names. The CMCC has four MCC servers. Two are operational servers, one is a test server, and one is a MEOSAR D&E server. The servers are CMCC1, CMCC2, CMCC3, and CMCC4 which are further defined in Chapter 6.

2.3.2 Server Roles. Of the two operational servers (CMCC1 and CMCC2), one will be active and the other is in hot standby. To differentiate these roles, the terms CMCCA and CMCCB are used which are further defined in Chapter 6.

2.3.3 MCC Software. The software currently used is OCC 600. The OCC 600 software is a client-server based system.

2.3.4 Client side software. CMCC has a total of six OCC600 clients. Two are located in Trenton at the operations desk and can connect to either CMCC1 or CMCC2.Two are located in Belleville that can connect to either CMCC2 or CMCC1. The client for the test server is located in Trenton. When running a test version of software, the test client can only connect to the test server. The sixth client is held by SARNOCC and is used for training, tech support, and as a spare. If all servers and clients are running the same version of software, then any operator interface (OI) can be used to connect with any CMCC server.

2.3.5 Server side software. The OCC 600 server software acts as a data receipt, processing, and distribution center for all SARSAT data handled by CMCC. Data that is received from MCCs and LUTs is validated, processed, and distributed according to the data type. The servers are presently each installed on individual physical servers. In the future, CMCC will be transitioning towards virtual servers. The OCC 600 server software also completes most command and control functions.

2.3.6 LUTs. These functions are further discussed in the LUT paragraphs in this chapter (paragraphs 2.6 through 2.10).

2.4 MCC Communication Routes

2.4.1 CMCC uses File Transport Protocol (FTP) over Intra/Internet and Aeronautical Fixed Telecommunication Network (AFTN) connections for the receipt and sending of data. Fax, email, and File Copy (FCopy) are used as transmit-only functions. Fax and email are used to transmit to RCCs and SPOCs if the preferred FTP or AFTN are not available. Email and FCopy are used for distribution of data to internal addressees.

2.4.2 Subject Indicator Type (SIT) messages are the C/S defined messages that are used to automatically transmit and receive data between C/S entities. These messages are defined in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) and in Chapter 4 Interface Description.

2.4.3 FTP is an open internet protocol based communication that includes a high level of integrity verification. C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) discusses FTP communications including industry and C/S standards. All national and international FTP connections must follow these standards.

2.4.3.1 FTP/V is FTP over a Virtual Private Network (VPN). This is effectively a private network built by using hardware and/or software configuration over the intranet and/or internet. This is more secure than just FTP over the open internet, as only members of the VPN have easy access to the data.

2.4.3.2 FTP/FR is FTP over Frame Relay. Frame Relay is a different communication medium, much like Public Switch Telephone Network (PSTN) and internet protocol phones are different.

2.4.3.3 Secure forms of FTP. Secure FTP (SFTP) and FTP Secure (FTPS) are two different ways of encrypting FTP communications. These methods add significant levels of security to communications. Using secured communications is now industry standard.

2.4.3.4 The SARNet has partial backup lines between the operational LUTs and Trenton via PSTN using dialup modems. This backup is part of the network configuration and is invisible to the LUTs and MCC servers. The FTP protocol is still used via this backup connection.

2.4.4 AFTN is an international standard format of communication typically used for exchange of aviation information. At CMCC, it has a unique setup in that the OCC server will FTP an outbound message to a separate server that hosts the AFTN software (combination of proprietary software and NavCanada software). This AFTN software translates the message into an AFTN format and transmits it across the AFTN network. When an inbound message is received, the AFTN software converts it to a standard text file (.txt) and uses FTP to send the message to the OCC server. NavCanada and DND are presently upgrading the AFTN network from a serial based to an internet protocol based system. When this happens, the OCC 600 will be reconfigured to communicate directly via the AFTN network.

2.4.5 Fax is setup as a send only function. The phone line will not accept calls and the fax modem will not answer any incoming calls. Fax is restrictive in that sending one message takes approximately 50 seconds. This creates a bottle-neck if too many routes are relying on fax. Despite this, fax is used as a primary communication method with some US SPOCs.

2.4.6 Email transmission is completed via the OCC 600 sending a file to the SARNet email server using Simple Mail Transfer Protocol (SMTP) protocols. CMCC1 and CMCC3 send to the Trenton email server while CMCC2 sends to the Belleville email servers.

2.4.6.1 Email routes are used as a primary communication method with the Transport Canada Situation Centre for distribution of Ship Security Alert System (SSAS) alerts in Canada.

2.4.6.2 Email routes are used to distribute messages to the Chief Operator.

2.4.6.3 For RCCs, email routes can be configured as an emergency measure in the event that multiple routes are on secondary communications which causes a bottle neck for the fax system. Email routes are presently enabled to US Coast Guard RCCs as an interim measure until such time as the FTP link is re-established. CMCC has also established a procedure to ensure that all key messages sent via email are always followed up with a phone call.

2.4.7 FCopy uses software that creates a text file containing the message and saves the file in a folder. This is used as a method to temporarily store messages on the servers when it is undesirable to send the messages to the actual destinations.

2.4.8 CMCC Routes and their normal priority are:

Route	Operational	Priority	Description
AFRCC	Yes	1	AFRCC AFTN
	Yes	2	AFRCC Fax
	Yes	3	AFRCC Email

Route	Operational	Priority	Description
	No		AFRCC Test
AKRCC	Yes	1	AKRCC AFTN
	Yes	2	AKRCC Fax
	Yes	3	AKRCC Email
	No		AKRCC Test
ARUBSS	Yes	1	Aruba SSAS Fax
	No		Aruba SSAS Test
AUMCC	Yes	1	AUMCC FTP
	Yes	2	AUMCC AFTN
	No		AUMCC Test
BARBSS	Yes	1	Barbados SSAS Fax
	Yes	2	Barbados SSAS Fax
	No		Barbados SSAS Test
BELZSS	Yes	1	Belize SSAS Fax
	No		Belize SSAS Test
BERMSS	Yes	1	Bermuda SSAS Fax
	No		Bermuda SSAS Test
BERMUDA	Yes	1	BERMUDA AFTN
	Yes	2	BERMUDA Fax
	No		BERMUDA FTP (under development)
	No		BERMUDA Test
BHAMSS	Yes	1	Bahamas SSAS Fax
	No		Bahamas SSAS Test
BVISS	Yes	1	Virgin Is GB SSAS Fax
	No		Virgin Is GB SSAS Test
CAICSS	Yes	1	Caicos Is SSAS Fax
	No		Caicos Is SSAS Test
CAYMSS	Yes	1	Cayman Is SSAS Fax
	No		Cayman Is SSAS Test
CDN_SSAS	Yes	1	TC Situation Ctr Email
	Yes	2	TC Situation Ctr Fax
	No		TC Situation Ctr Test
CGD01BOSTON	Yes	3	CGD01 BOSTON FTP (B)
	Yes	3	CGD01 BOSTON FTP (C)
	Yes	2	CGD01 BOSTON Fax
	Yes	1	CGD01 BOSTON Email
	No		CGD01 BOSTON Test
CGD05NORFOLK	Yes	3	CGD05 NORFOLK FTP (B)
	Yes	3	CGD05 NORFOLK FTP (C)
	Yes	2	CGD05 NORFOLK Fax
	Yes	1	CGD05 NORFOLK Email
	No		CGD05 NORFOLK Test
CGD07MIAMI	Yes	3	CGD07 MIAMI FTP (C)

Route	Operational	Priority	Description
	Yes	3	CGD07 MIAMI FTP (B)
	Yes	2	CGD07 MIAMI Fax
	Yes	1	CGD07 MIAMI Email
	No		CGD07 MIAMI Test
CGD08NEWORLEANS	Yes	3	CGD08 NEW ORLEANS FTP (B)
	Yes	3	CGD08 NEW ORLEANS FTP (C)
	Yes	2	CGD08 NEW ORLEANS Fax
	Yes	1	CGD08 NEW ORLEANS Email
	No		CGD08 NEW ORLEANS Test
CGD09CLEVELAND	Yes	3	CGD09 CLEVELAND FTP (B)
	Yes	3	CGD09 CLEVELAND FTP (C)
	Yes	2	CGD09 CLEVELAND Fax
	Yes	1	CGD09 CLEVELAND Email
	No		CGD09 CLEVELAND Test
CGD11PACAREA	Yes	3	CGD11 PACAREA FTP (B)
	Yes	3	CGD11 PACAREA FTP (C)
	Yes	2	CGD11 PACAREA Fax
	Yes	1	CGD11 PACAREA Email
	No		CGD11 PACAREA Test
CGD13SEATTLE	Yes	3	CGD13 SEATTLE FTP (B)
	Yes	3	CGD13 SEATTLE FTP (C)
	Yes	2	CGD13 SEATTLE Fax
	Yes	1	CGD13 SEATTLE Email
	No		CGD13 SEATTLE Test
CGD14HAWAII	Yes	3	CGD14 HAWAII FTP (C)
	Yes	3	CGD14 HAWAII FTP (B)
	Yes	2	CGD14 HAWAII Fax
	Yes	1	CGD14 HAWAII Email
	No		CGD14 HAWAII Test
CGD17JUNEAU	Yes	3	CGD17 JUNEAU FTP (C)
	Yes	3	CGD17 JUNEAU FTP (B)
	Yes	2	CGD17 JUNEAU Fax
	Yes	1	CGD17 JUNEAU Email
	No		CGD17 JUNEAU Test
CGDC3CEN	Yes	1	CGDC3 CEN FTP (B)
	Yes	1	CGDC3 CEN FTP (C)
	No		CGDC3 CEN Test
CMCC_COp	Yes	1	CMCC Chief Operator Email
	No		CMCC Chief Operator Test
CMCC1	Yes	1	CMCC1 FTP
	Yes	2	CMCC1 AFTN
	No		CMCC1 Test
CMCC2	Yes	1	CMCC2 FTP
	Yes	2	CMCC2 AFTN

Route	Operational	Priority	Description
	No		CMCC2 Test
CMCC3	Yes	1	CMCC3 FTP
	No		CMCC3 Test
CMCCFax	Yes	1	CMCC Fax
	No		CMCC Fax Test
COLMSS	Yes	1	Colombia SSAS Fax
	No		Colombia SSAS Test
COLUMBIA	Yes	1	COLUMBIA AFTN
	Yes	2	COLUMBIA Fax
	No		COLUMBIA Test
COMSUBPAC	Yes	1	COMSUBPAC FTP (C)
	Yes	1	COMSUBPAC FTP (B)
	No		COMSUBPAC Test
COSESNA	Yes	1	COSESNA AFTN
	Yes	2	COSESNA Fax
	No		COSESNA Test
CTEC	Yes	1	CTEC LUTserver FTP
	No		CTEC LUTserver Test
CUBASS	Yes	1	Cuba SSAS Fax
	No		Cuba SSAS Test
DOMINICAN_REP	Yes	1	DOMINICAN REPUBLIC AFTN
	Yes	2	DOMINICAN REPUBLIC Fax
	No		DOMINICAN REPUBLIC Test
ECSS	Yes	1	Ecuador SSAS Fax
	No		Ecuador SSAS Test
ECUADOR	Yes	1	ECUADOR AFTN
	Yes	2	ECUADOR Fax
	No		ECUADOR Test
GED	Yes	1	Edmonton GEO FTP
	No		Edmonton GEO Test
GOW1	Yes	1	Ottawa GEO1 FTP
	No		Ottawa GEO1 Test
GOW2	Yes	1	Ottawa GEO2 FTP
	No		Ottawa GEO2 Test
GRENSS	Yes	1	Grenada SSAS Fax
	No		Grenada SSAS Test
GUATSS	Yes	1	Guatemala SSAS Fax
	No		Guatemala SSAS Test
GUYANA	Yes	1	GUYANA AFTN
	Yes	2	GUYANA Fax
	No		GUYANA Test
GUYSS	Yes	1	Guyana SSAS Fax
	No		Guyana SSAS Test
HAITSS	Yes	1	Haiti SSAS Fax

Route	Operational	Priority	Description
	No		Haiti SSAS Test
HONDSS	Yes	1	Honduras SSAS Fax (1)
	Yes	2	Honduras SSAS Fax (2)
	No		Honduras SSAS Test
JAMASS	Yes	1	Jamaica SSAS Fax
	No		Jamaica SSAS Test
LANTAREA	Yes	3	LANTAREA FTP (C)
	Yes	3	LANTAREA FTP (B)
	Yes	2	LANTAREA Fax
	Yes	1	LANTAREA Email
	No		LANTAREA Test
LCH	Yes	1	Churchill LEO FTP
	No		Churchill LEO Test
LED	Yes	1	Edmonton LEO FTP
	No		Edmonton LEO Test
LGO	Yes	1	Goose Bay LEO FTP
	No		Goose Bay LEO Test
LOCAL	Yes	1	LOCAL route
LOW	Yes	1	Ottawa LEO FTP
	No		Ottawa LEO Test
MARSECGUAM	Yes	3	GUAM (MARSEC) FTP (B)
	Yes	3	GUAM (MARSEC) FTP (C)
	Yes	2	GUAM (MARSEC) Fax
	Yes	1	GUAM (MARSEC) Email
	No		GUAM (MARSEC) Test
MARSHSS	Yes	1	Marshal Islands SSAS Fax
	No		Marshal Islands SSAS Test
MEXICO	Yes	1	MEXICO Fax
	No		MEXICO Test
MRSCQB	Yes	1	QUEBEC FTP
	Yes	2	Quebec Fax
	No		QUEBEC Test
NANTILLES	Yes	1	NANTILLES Fax
	No		NANTILLES Test
NANTSS	Yes	1	Curacao SSAS Fax
	No		Curacao SSAS Test
NAVAFTN	Yes	1	NAVAFTN
	No		NAVAFTN Test
NICASS	Yes	1	Nicaragua SSAS Fax (1)
	Yes	2	Nicaragua SSAS Fax (2)
	No		Nicaragua SSAS Test
NOCR	Yes	1	U406 Desktop Cases
	No		NOCR Test
PALASS	Yes	1	Palau SSAS Fax

Route	Operational	Priority	Description
	No		Palau SSAS Test
PANAMA	Yes	1	PANAMA AFTN
	Yes	2	PANAMA Fax
	No		PANAMA Test
PANSS	Yes	1	Panama SSAS Fax
	No		Panama SSAS Test
RCCBEL	Yes	1	BELLEVILLE FTP
	No		BELLEVILLE Test
RCCHAL1	Yes	1	Halifax FTP
	Yes	2	Halifax Fax
	No		HALIFAX Test
RCCHAL2	Yes	1	Halifax Alt Site FTP
	Yes	2	Halifax Alt Site Fax
	No		Halifax Alt Site Test
RCCTRE	Yes	1	TRENTON FTP
	Yes	2	TRENTON Fax
	No		TRENTON Test
RCCVIC	Yes	1	VICTORIA FTP
	Yes	2	Victoria Fax
	No		VICTORIA Test
SANJUAN	Yes	3	SAN JUAN FTP (C)
	Yes	3	SAN JUAN FTP (B)
	Yes	2	SAN JUAN Fax
	Yes	1	SAN JUAN Email
	No		SAN JUAN Test
TRINSS	Yes	1	Trinidad SSAS Fax
	No		Trinidad SSAS Test
USMCC	Yes	1	USMCC FTP Primary Site
	Yes	2	USMCC AFTN Primary Site
	No		USMCC FTP Wallops Island
	No		USMCC AFTN Wallops Island
	No		USMCC Test
USMCCFax	Yes	1	USMCC Fax
	No		USMCC Fax Test
VENEZUELA	Yes	1	VENEZUELA AFTN
	Yes	2	VENEZUELA Fax
	No		VENEZUELA Test
VENZSS	Yes	1	Venezuela SSAS Fax
	No		Venezuela SSAS Test

2.5 SARNet

2.5.1 The Canadian SARSAT Ground Segment resides on the SARNet, a subnet on the General Purpose Network (GPNet).

2.5.2 The SARNet is the internal network that connects and supports all Canadian SAR IT software. This includes the SARSAT ground segment and RCC software.

2.5.3 The support is provided primarily by SARNOCC. Because the SARNet resides on the GPNet, Canadian Forces Network Operation Centre (CFNOC) provides additional network support such as router and virtual private network (VPN) configuration. Shared Services Canada supports through the provision of server and network hardware.

2.5.4 The SARNet resources are accessible from outside the network via a web interface using Citrix software. Access is limited by network administrators. Authorized users can login to the website and can run software based on their access rights. Some key software available includes Microsoft Office, RAdmin, and SARMaster.

2.6 LUTs - General

2.6.1 Terminology. When referring to the CMCC servers, the terms MCC and OCC 600 are intentionally used in specific cases. When the term MCC is used, it is referring to a function that any properly configured MCC software should do. When the term OCC 600 is used, it is referring to a function that is very specific to the OCC 600 software, and is proprietary in nature.

2.6.2 LUT Data. All LUTs have two distinct types of data that they send and receive; Alert data and Command and Control data. The specifics of these are further defined for each LUT type.

2.6.3 LEOLUTs. Canada has four LEOLUTs. One in Edmonton (3163 LED), one in Churchill (3162 LCH), and one in Goose Bay (3161 LGO) that are normally in operation. The fourth in Ottawa (3168 LOW), is used for space segment testing and as an operational backup.

2.6.4 GEOLUTs. Canada has three GEOLUTs. One in Edmonton (3166 GED), and one in Ottawa (3169 GOW2) that are normally in operation. The third, also in Ottawa (3167 GOW1), is used for space segment testing and as an operational backup.

2.6.5 MEOLUTs. Canada has one experimental MEOLUT. It is located in Ottawa (3165 MOW) and is a four channel MEOLUT. This MEOLUT will be upgraded to six channels in early 2016, and be commissioned into the operational C/S system. Once the upgrade is complete, the LUT will be supported under a contract.

2.6.6 LUT-MCC Communications. Communications between all Canadian LUTs and the MCC servers are primarily via FTP. The operational LUTs have a PTSN dial up backup to Trenton only (CMCC1 and CMCC3).

2.7 Existing LUTs - Command and Control (Common Features)

2.7.1 General. All command and control interfaces are proprietary and therefore are not defined in technical detail. They are instead defined by functionality.

2.7.2 LUT Operator Interface. All operational and backup LEOLUTs have a local installed version of the LUT OI. The same LUT OI is installed and configured on every OCC 600 client workstation to remotely access all operational LUTs. This software allows:

a. Access to data stored at the LUT. Data can be viewed, sorted, filtered, and copied;
b. Performing reboots. A 'Soft Reboot' (Stop and Start the LUT software) and a 'Hard Reboot' (full reboot of LUT servers); and
c. Numerous health monitoring functions.

2.7.3 Remote Desktop. Remote access to the LUTs is available through the use of RAdmin. This is used by operators on the operational LUTs when performing daily duties, and by tech support for remotely maintaining the LUTs.

2.7.4 Health Monitoring. Health Monitoring is performed through the use of the Remote LUT OI, and via status messages that are sent to the OCC 600. These status messages include LUT warnings, alarms, and LUT status that the OCC 600 uses in its command and control functions of the LUTs. The warnings and alarms are documented in the appropriate manual.

2.7.5 LUT Message Retransmit. Via the OCC 600, the operator can request that a LUT retransmit a set of one or more sequential messages.

2.8 LEOLUTs

2.8.1 Alert Data. Alert data is transmitted to the OCC 600 via a C/S based SIT message with proprietary formatting. All operational LEOLUTs are configured to send alert data to CMCC1, CMCC2, and CMCC3. LEOLUTs receive alert data from the GEOLUTs for the purposes of processing LEO/GEO merged data. This data is received via FTP/V and is a C/S based SIT message with proprietary formatting.

2.8.2 Command and Control (LEOLUT specific).

2.8.2.1 Calibration data – Orbit Vectors (SIT 215 or 216). LEOLUTs calculate their own very accurate orbit vectors. They do this by calculating an orbit vector for each pass tracked, and then using an averaged orbit vector to calculate Doppler positions. This average is approximately three days' worth of orbit vector history. Normally, orbit vectors are received from the USMCC and sent via SIT 215 to the LEOLUTs. The SIT215 orbit vectors are first validated by the LEOLUT and then added to the history file as an extra data point. When a valid SIT 216 is received at the MCC, it is forwarded to the LEOLUT in such a way that the LEOLUT does no validation, accepting blindly while dumping all previous orbit data. New solutions are then calculated based on the new single orbit vector until such time as the orbit history is rebuilt to a sufficient size. Any of the orbit vectors can also be manually sent from the OCC 600 to the LEOLUTs. If sent normally, they are treated like normal orbit vectors. If forced to the LUT, they are treated like a SIT 216. See CMCC Standard Operating Procedures (SOPs) for more details on forcing orbit vectors.

2.8.2.2 Calibration data – Search and Rescue Processor (SARP) or Time Calibration (TCAL) data (SIT 415 and 417). When valid SARP data is received at the MCC, it is forwarded to the LEOLUTs, validated, and added to the history file. SARP data can be manually sent from the OCC 600 to the LEOLUTs with an option to force. If not forced, the LEOLUT validates and adds to its SARP history. If forced, it dumps its history, does not validate and rather blindly accepts the new SARP data for use with calculating SARP sourced solutions.

2.8.2.3 SIT 510. Light-Emitting Diode (LED) is configured to send SIT 510s to CMCC1, CMCC2, and CMCC3. CMCCA forwards the messages to the C/S system.

2.8.2.4 Pass Schedule. Although the LEOLUTs are capable of calculating their own individual pass schedule, they receive the nationally optimized pass schedule from CMCCA daily at approximately 13:30 UTC.

2.9 GEOLUTs

2.9.1 Alert Data. Alert data is transmitted to the OCC 600 via a C/S based SIT message with proprietary formatting. All operational GEOLUTs are configured to send alert data to CMCC1, CMCC2, and CMCC3. GEOLUTs send alert data to the LEOLUTs for the purposes of processing LEO/GEO merged data. This data is sent via FTP/V and is a C/S based SIT message with proprietary formatting.

2.9.2 Beacon Self-Test Data. Canada uses data from beacon self-tests performed by beacon users to assist with CBR functions. This data is transmitted by FTP/V to the CBRV, described in paragraph 2.17, via a SARSAT based SIT message with proprietary formatting.

2.9.3 Command and Control. All command and control functions for GEOLUTs are IAW paragraph 2.7 Existing LUTs - Command and Control (Common Features).

2.10 MEOSAR Development

2.10.1 Canada is actively involved in developing the new MEOSAR system and acquiring the capability.

2.10.2 CMCC has and continues to be involved with the Development and Evaluation (D&E) C/S phase of the international MEOSAR system. The tools used to assist with this are the MEOLUT in Ottawa, CMCC4 (the MEOSAR D&E server in Trenton), and the incoming MEOSAR data feed from the USMCCs MEOSAR D&E system.

2.10.3 Planned Space Segment: Subject to approval, Canada is planning to provide SAR Repeaters for future GPS satellites.

2.10.4 Planned Ground Segment: The MEOSAR Project Ground Segment is split into two phases:

a. Phase I. The purpose of Phase I is to bring as much MEOSAR capability online as fast as possible due to the risk of LEOSAR satellite failure. This phase includes upgrades to the MEOLUT in Ottawa (including commissioning) and the enabling of MEO processing on the OCC 600 (including commissioning). Once complete, Canada will have one commissioned MEOLUT and a commissioned LEO/GEO/MEO (LGM) MCC. While under development, the LGM MCCs will be numbered CMCC5 and CMCC6. These numberings will only be temporary during pre-integration and commissioning. A detailed Transition Plan will further detail this transition.

b. Phase II Plan. Subject to approval, Phase II will add two additional MEOLUTs to Canadas SARSAT GS with one in eastern Canada and one in western Canada.

2.11 MEOLUT (Phase I)

2.11.1 Alert Data. Alert data is transmitted to CMCC4 via a C/S based Subject Indicator Type (SIT) message with proprietary formatting. Once installed, alert data will also be transmitted to CMCC5 and CMCC6. Exact configuration is TBD.

2.11.2 Command and Control. TBD

2.11.3 Calibration data. TBD

2.11.4 LUT Operator Interface. It is expected that the LUT OI on the MEOLUT will have the same functionality as for the LEO/GEOLUTs.

2.11.5 Remote Desktop. RAdmin will be used for remote access to the MEOLUT as soon as the MEOLUT is migrated to the SARNet as part of Phase I install.

2.11.6 Pass Schedule. TBD

2.11.7 Beacon Self-Test Data. Once the MEOLUT is upgraded, it will be capable of distributing this data to the CBRV. Exact details are TBD.

2.11.8 This section will have further details added once Phase I capability is fully realized and functioning in a supported fashion.

2.12 MEOLUTs (Phase II Plan)

2.12.1 Phase II is planned to provide Canada with the final solution for a MEOSAR capability. Exact details remain uncertain until Phase II receives final government approvals and the planned open competition is completed.

2.12.2 Phase II MEOLUT Network Considerations. Certain considerations guided the proposed design of the MEOLUT Network in Canada.

a. the MEOSAR system will be exchanging a significantly larger volume of data;
b. there is limited staff for monitoring and maintenance of the network;
c. important system goal of saving lives;
d. CMCC and USMCC have a mutual backup plan and therefor access is required to each other's MEOLUT data; and
e. USMCC uses a central message server for this networking and they prefer to link into a single point (plus a backup site) when networking with the Canadian MEOLUTs.

2.12.3 Canadian MEOLUT Network Planned Concept.

a. Bandwidth use, new connections, and new VPNs are limited by a hub and spoke design with the central FTP servers at the current CMCC sites;
b. FTP servers will be installed at each site to ensure redundancy;
c. Each FTP server will also host a network based Location Processor (LP) which will be commissioned as a networked MEOLUT;
d. These LPs will complete location processing using all networked TOA/FOA data;
e. Each MEOLUT will run as a stand-alone LUT and send TOA/FOA data to the central FTP servers;
f. The central FTP servers will forward the Canadian data to the US central FTP servers, receive data from the US, and forward all received data to the hosted LP;
g. Calculated alerts from data received through MEOLUT networking will be sent to the MCC servers. The final routing method between the central LPs and CMCC1, CMCC2, and CMCC3 has yet to be decided;
h. The LPs will be configurable such that routes can be configured for accepting inbound and sending outbound message traffic. These routes will be by FTP/V with support for FTP, FTPS and SFTP. Configurability will allow the sending of alert data and status, warnings, and alarms to any CMCC server. Configurability will also allow, via the MEOLUT LOI and

ROI, the transmission of data to configured routes to be put on hold (messages generated but not transmitted) if required by CMCC operations;

i. The FTP server will be configurable such that routes can be configured for accepting inbound and sending outbound message traffic. These routes will be by FTP/V with support for FTP, FTPS and SFTP. Configurability will allow the forwarding of messages from any configured route to any configured route;

j. Routes will be configured to include all Canadian MEOLUTs including LPs at the CMCC sites and all US MEOLUT Network server(s).

k. Routes may be configured for additional international MEOLUTs or MEOLUT Network servers if Canada chooses to exchange data with other administrations.

2.13 Canadian RCCs

2.13.1 In Canada there are three Joint Rescue Coordination Centres (JRCC), one Maritime Rescue Sub Centre (MRSC), and one SPOC (Ship Security Alert System (SASS) destination). They are:

a. JRCC Victoria;
b. JRCC Trenton;
c. JRCC Halifax;
d. MRSC Quebec; and
e. Transport Canada Situation Centre (destination for SASS alerts).

2.13.2 JRCCs are jointly staffed by the CAF and the Canadian Coast Guard (CCG), while the MRSC is staffed by CCG only. The Transport Canada Situation Centre is staffed 24/7 by Transport Canada.

2.13.3 The Canadian Area of Responsibility (AOR) is divided into three regions, each with its own JRCC. MRSC Quebec covers marine SAR in a large portion of the St Lawrence River. This MRSCQB area overlaps portions of JRCC Trenton and Halifax's AORs.

2.13.4 The Geographic Sorting (GEOSort)areas are further detailed in paragraph 5.4 GEOSort Regions.

2.14 US RCCs and SPOCs

2.14.1 IAW C/S A.001 COSPAS-SARSAT Data Distribution Plan (DDP), Canada and the United States have a bilateral agreement to provide each other with C/S service to their national AOR if their own facilities are out of service.

2.14.2 CMCC distributes USMCC AOR alerts to various routes as listed below. These are further detailed in Chapter 3 Data Distribution.

2.14.3 CMCC supports the following US destinations:

RCCs	AFRCC
	AKRCC
	Coast Guard District 01 – Boston
	Coast Guard District 05 – Norfolk
	Coast Guard District 07 – Miami
	Coast Guard District 08 – New Orleans
	Coast Guard District 09 – Cleveland
	Coast Guard District 11 – Alameda
	Coast Guard District 13 – Seattle
	Coast Guard District 14 – Hawaii
	Coast Guard District 17 – Juneau
	MARSEC Guam
	San Juan
SPOCs	Belize
	Bermuda
	Columbia
	Costa Rica
	Curacao
	Dominican Republic
	Ecuador
	El Salvador
	Guatemala
	Guyana
	Honduras
	Mexico
	Nicaragua
	Panama
	Venezuela
SASS	Aruba
	Barbados
	Belize
	Bermuda
	Bahamas
	British Virgin Islands
	Caicos Islands
	Cayman Islands
	Colombia
	Cuba
	Ecuador
	Grenada

	Guatemala
	Guyana
	Haiti
	Honduras
	Jamaica
	Marshal Islands
	Curacao
	Nicaragua
	Palau
	Panama
	Trinidad
	Venezuela

2.14.4 The USMCC provides their current GEOSort areas which are further detailed in paragraph 5.4 GEOSort Regions.

2.15 CMCC Case Form

2.15.1 The CMCC Case Form is the tool that CMCC Operators use to track all case related details. It holds extensive details on each individual case and allows CMCC to report on all SARSAT required statistics. It also logs CMCC related down times of equipment for the tracking and reporting of serviceability.

2.15.2 Basic Functionality. The Case Form contains a log of all operator actions for the case and stores all associated data. It performs certain actions based on the C/S data. Numerous check items are tracked to assist in C/S reporting. Before allowing the operator to close the case, error checking is performed to ensure all required data is gathered.

2.15.2.1 All SARSAT data is manually populated. This dataset includes:

a. Beacon history;
b. Satellite visibility; and
c. Copies of associated SIT messages including beacon registration data.

2.15.2.2 Based on the Beacon Hexadecimal Identification (Hex ID), the Case Form performs certain actions including:

a. For Canadian beacons, searches the CBR for registration data, imports it, and displays it for the operators use;
b. Decodes of the hex ID for operator viewing;
c. For Canadian Emergency Locator Transmitters (ELTs), performs a cross reference check of the 24 bit mark to the appropriate tail number of the

aircraft. For these beacons, if this cross referenced tail mark does not match the tail mark from the CBR file, a flag is raised for the operator; and

d. For Canadian ELTs and based on the cross referenced tail mark, the CBR is searched for aircraft with a matching tail mark and any linked beacon hex ID is displayed for the operator. This is referred to as a Reverse Lookup.

2.15.3 Future development. The Case Form is currently undergoing a major re-write. The new version will contain the same basic functionality with a few significant improvements. These include:

a. It will receive and import messages from the OCC 600 including alert data for all beacons that CMCC is alerted to, foreign sourced SIT 925s, and a copy of all operator generated messages sent to a Canadian SPOC;
b. For received alert messages, it will attach the alert to an open case if available, attach it to a recently closed case if the Time of Closest Approach (TCA) fits between the open and closed times for a recent case, or if no case exists, it will create a new case and carry out the automatic functions like the current Case Form does including searching the CBR for Canadian registration data;
c. For received SIT 925s, it will automatically attach the message to the appropriate open case, or if no open case exists, present the operator with the option of manually attaching to a current case (open or closed), or creating a new case;
d. For received SIT 915s, it will present the operator with the option of manually attaching to a current case (open or closed), or creating a new case;
e. For Canadian registered beacons, it will automatically generate a SIT 925, and send it to the OCC 600. For most beacons, it will be able to set the destination of the SIT 925 for the correct SPOC using the position, or for an unlocated beacon, certain registration data. This will allow the OCC 600 to automatically forward it to the correct SPOC. Where it cannot set the destination, it will default to 3160 and the operator can manually forward from within the OCC 600;
f. For foreign sourced SIT 925s when the case has a Canadian RCC designated, the SIT 925 will be sent to the correct RCC via the OCC 600; and
g. It will have buttons for the operator to command the creation of certain prefilled messages, such as a SAR Incident Report and Request for Beacon Information for a foreign beacon in Canada. The Case Form will prefill the message body, allowing the operator to fill in the remaining items, select the destinations, and send the message via the OCC 600. As the destination will be correctly set, the OCC 600 will then automatically forward them to the appropriate RCC (directly) or MCC (via the USMCC or AUMCC).

2.15.4 This section will be expanded on significantly prior to the new Case Form becoming operational.

2.16 CBR

2.16.1 The CBR contains the beacon, owner, aircraft/vessel/land use details, and emergency contact information for all registered Canadian beacons. There are two websites and databases; civil data, and military data. Beacon owners and CBR staff access the data via the website. The civil database has per-transaction replication to copies in Trenton and Belleville. The military website is hosted internally and has per-transaction replication so there are identical copies in both Trenton and Belleville.

2.16.2 CMCC has access to the CBR data via the websites. The CMCC Case Form automatically pulls data from the nearest available copy of the database (normally Trenton or Belleville copies).

2.16.3 Future development: The website is being re-written to allow it to be hosted on a government web server. Once this is complete, the two databases are to be amalgamated into one.

2.17 Canadian Beacon Registry Verifier (CBRV)

2.17.1 General. The CBRV receives beacon self-test data (beacon data burst when user completes a beacon 'self-test') from the operational GEOLUTs. The software stores the data and generates numerous reports to assist the CBR staff and beacon owners in maintaining accurate and complete registration files.

2.17.2 Detailed Processing. For each beacon tested by the beacon user, the CBRV crosschecks the CBR database to see if the beacon is registered. If registered with a valid email for the owner, an email is sent indicating that the test was received and the currency of the file (< or > 1 year since beacon registration was last updated). If too many beacon bursts are detected in a short period, an email is sent to the CBR to indicate a malfunctioning beacon. The CBR staff runs regular reports on unregistered beacons by using any decoded information, attempting to track down the beacon to ensure it is registered.

2.17.3 CBRV Impact. The impact of the CBRV has been overwhelmingly positive from the Canadian public, various organizations, and Transport Canada. There has been a noticeable shift from beacon owners to start using the website to update their files rather than always calling CBR staff. This has resulted in higher registration rates and better quality data in the registration files.

Chapter 3 Data Distribution

3.1 General

3.1.1 CMCC distributes alert data to Canadian RCCs following the requirements of C/S A.001 COSPAS-SARSAT Data Distribution Plan (DDP) with continued transmission enabled by default.

3.1.2 Conflict solutions before position confirmation are distributed automatically while conflict solutions after position confirmation are not distributed.

3.2 Unlocated Alerts

3.2.1 Unlocated alerts for Canadian coded beacons are distributed based on:

a. For registered ELTs, the primary airport location;
b. For unregistered ELTs with 24 bit encoding, the address of the aircraft owner as registered with Transport Canada;
c. For registered Emergency Position Indicating Radio Beacon (EPIRB)s, the Home Port location;
d. For unregistered EPIRBs, JRCC Halifax;
e. For register Personal Locator Beacon (PLB)s, owners address; and
f. All others are not distributed until further information can be found at which time the operator will distribute to the appropriate RCC.

3.2.2 Unlocated alerts for Saint-Pierre et Miquelon (CC 361) are sent to JRCC Halifax. CMCC Operator will request registration data from FMCC.

3.3 CMCC Case Form (Future Development)

3.3.1 All Case Form generated messages will be sent to the OCC 600 with the destination field set to the appropriate destination. The OCC 600 will then automatically forward as required.

3.4 SSAS Alerts

3.4.1 All Canadian SSAS alerts are sent to the Transport Canada Situation Center for resolution of the security issue. Based on location, the appropriate JRCC is also informed so that they can assist with any follow-on rescue if required.

3.5 CMCC Backup of USMCC

3.5.1 When CMCC backs up the USMCC, CMCC distributes data IAW USMCC “National Rescue Coordination Center (RCC) and Search and Rescue Point of Contact (SPOC) 406 MHz Alert and Support Messages for the MEOSAR System”.

3.6 USMCC Backup of CMCC

3.6.1 General. When the USMCC backs up CMCC, they distribute alerts and messages direct to Canadian RCCs.

3.6.2 Unlocated Alerts. Unlocated alerts are all sent to JRCC Halifax who must check the CBR for registration data and then handle the case or pass it to the correct RCC. The appropriate RCC can contact the USMCC to have future alerts sent to them. Unlocated alerts for Saint-Pierre et Miquelon (CC 361) are also sent to JRCC Halifax who will have to request registration data from FMCC (https://registre406.cnes.fr/) via telephone or email (fmcc@cnes.fr).

3.6.3 Narrative Messages. All narrative messages are all sent to JRCC Halifax. If requested, they will be sent to a specific RCC.

3.6.4 Registration Data Requests. All requests for Canadian registration data are sent to JRCC Halifax who will then search the CBR and forward the appropriate information to the requesting agency.

3.6.5 Message Formats:

a. Alert messages are sent in a SARMaster format. This applies to both LEO/GEO and MEO data;
b. Once the SAR Mission Management System (SMMS) Project delivers the new software to replace SARMaster, the USMCC will use CMCC defined formats as per Chapter 4 or a C/S defined SIT 185 for alert data depending on their capability at the time; and
c. Narrative messages are sent in C/S narrative formats.

3.6.6 Server Specific destinations. All messages sent to JRCC Victoria, JRCC Trenton, or MRSC Quebec are duplicated to the Belleville SARMaster server (FTP only). Messages sent to JRCC Halifax (Primary server) are duplicated to the JRCC Halifax secondary server (FTP only).

Chapter 4 Interface Description

4.1 General

4.1.1 The Canadian SARSAT system uses C/S based messages for all inbound and outbound communications. All messages are flat text based messages in accordance with C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID); specifically the section entitled MESSAGE FORMAT. Depending on the route, either SIT based or XML based messages are used.

4.1.2 Format details specific to the routes are:

a. MCC to MCC: messages are defined by C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID);

b. OCC 600 to/from provided LUTs: message formats are defined by the Contractor, are proprietary, are not documented, and are SIT-based messages as discussed in paragraph 4.4;

c. Phase II MEOLUTs to OCC 600: All alert data will use the appropriate C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) defined message. LUT status, warning, and alarm messages will be sent using a SIT 915 to help draw the operator's attention to any potential MEOLUT issues;

d. MCC to SPOCs: messages are via a C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) defined SIT 185 unless otherwise stated;

e. OCC 600 to Canadian RCCs (SARMaster): messages are defined by the Contractor, are proprietary, are not accurately documented, and use SIT Based Messages. MEOSAR data will be fit into the current SARMaster formats;

f. MCC to CMCC Case Form, and the future RCC software (SMMS Project): messages use appropriate SIT numbers as detailed in paragraph 4.2 CMCC Defined SIT Numbers and in a XML format as detailed in paragraph 4.5 XML Based Format Definitions. In order to accept messages from the USMCC during backup scenarios, future RCC software will also need to accept all C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) defined alert and narrative messages;

g. GEOLUTs to CBRV: messages are defined by the Contractor, are proprietary, are not documented, and are SIT Based Messages. Once the CBRV is amended to accept MEOSAR data, messages will use appropriate SIT numbers as detailed in paragraph 4.2 CMCC Defined SIT

Numbers and in a XML format as detailed in 4.5 XML Based Format Definitions;

h. MEOLUT (MOW 3165) to CBRV: following sufficient testing of the MEOLUT, it will be capable of distributing data to the CBRV via the same format used by the GEOLUTs. The actual distribution of data to the CBRV will only commence once CMCC is assured that the MEOLUT is producing accurate results. Once the CBRV is amended to accept MEOSAR data, messages will use appropriate SIT numbers as detailed in paragraph 4.2 CMCC Defined SIT Numbers and in a XML format as detailed in 4.5 XML Based Format Definitions;

i. Phase II MEOLUTs to CBRV: messages will use appropriate SIT numbers as detailed in paragraph 4.2 CMCC Defined SIT Numbers and in a XML format as detailed in 4.5 XML Based Format Definitions; and

j. MCC to US RCCs and SPOCs: messages are defined by the USMCC and use a modified SIT 185. These modifications are defined in the USMCC "National Rescue Coordination Center (RCC) and Search and Rescue Point of Contact (SPOC) 406 MHz Alert and Support Messages for the MEOSAR System".

4.1.3 The Contractor proprietary formats. The current OCC 600 and LUT software use C/S based SIT messages for all inbound and outbound communications. The formats are configurable within the limits of the data fields contained within the software.

4.2 CMCC Defined SIT Numbers

4.2.1 General. Current software will continue to use the Contractor's defined formats and SIT numbers as currently configured when communicating with other sourced software packages. How this is done is detailed in the CMCC OCC 600 Configuration Manual.

4.2.2 Current Development. Software currently in development (new CMCC Case Form and anticipated update to CBRV to accept MEOSAR data) will receive data from the OCC 600 and all MEOLUTs. These software packages must be designed to receive the data via a XML based message using CMCC assigned SIT numbers.

4.2.3 The Contractor's Defined SIT Numbers. The Contractor software uses defined proprietary SIT based formats that use SIT numbers:

a. OCC 600 / SARMaster: 170, 172, 173, 174, 175, 176, 177, 182, and 183; and
b. OCC 600 / LUTs (L/G/M): 661, 662, 663, 766, 772, 773, 775, 950, and 951.

4.2.4 CMCC Defined SIT Numbers. CMCC assigned SIT numbers for national use IAW the allocated ranges in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID). The meanings of the CMCC SITs are the same as their C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) base message. CMCC defined SIT numbers and required Message Fields (MF) are as specified in the table below:

C/S base SIT	CMCC SIT	MFs	Comments
122	152	As per C/S base SIT plus 22, 900 If encoded position is available, 901 required Optional: 901, 902	Used to transmit to a national destination via an XML based format.
142	162	As per C/S base SIT plus 22, 900 If encoded position is available, 901 required Optional: 901, 902	Used to transmit to a national destination via an XML based format.
123	153	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
143	163	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
124	154	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
144	164	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.

C/S base SIT	CMCC SIT	MFs	Comments
125	155	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
145	165	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
126	156	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
146	166	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
127	157	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
147	167	As per C/S base SIT plus 22, 900 and 901 Optional: 902	Used to transmit to a national destination via an XML based format.
122	752	As per C/S base SIT plus 903 Optional: 22, 77	Used for GEOLUT to CBRV in an XML format.
142	752	As per C/S base SIT plus 903 Optional: 22	Used for MEOLUT to CBRV in an XML format.
145	755	As per C/S base SIT plus 903 Optional: 22	Used for MEOLUT to CBRV in an XML format.

C/S base SIT	CMCC SIT	MFs	Comments
605 915 925	605 915 925	As per C/S base SIT	Internally, they may be used with SIT based or XML based messages.
915	650	As per C/S base SIT	Used as heartbeat test message to any internal destination. MF41 will only contain a short configurable phrase where the default is: PLEASE DO NOT RESPOND TO THIS AUTOMATED TEST MESSAGE FROM CMCC.

4.3 CMCC Defined MFs

4.3.1 The Canadian SARSAT system only uses MFs that are defined in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID), this section, or by the Contractor. All systems currently under development for use at or connection to CMCC are to only use data fields as defined in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) and this document.

4.3.2 There is certain data that is needed by CMCC and/or RCC operations and various tools. These additional MFs are defined in the following table.

MF	Name	Data Type	Character Set	Content and Description
900	Missed Detections	Integer	nn	00 to 99 (Default of 00) For LEO: Defines the number of sequential LEO satellite passes that had mutual visibility and did not detect the beacon. This field applies to both the A and B data as appropriate for each solution. For MEO this field is TBD. Once the Canadian MEOSAR system progresses, this field will be further defined.

MF	Name	Data Type	Character Set	Content and Description
901	SPOC	Text	aaa...aaa	Name of the SPOC responsible for the particular alert. Maximum 18 characters. Spaces and underscore "_" are not allowed.
902	SPOC List	Text	aaa…aaa	List of SPOCs that have received messages for the subject beacon. SPOC names are separated by a '_' (underscore).
903	Beacon Message Type	Integer	n	0 or 1 only (Default = 1) 0 = self-test 1 = operational

Legend:
n = numerals 0 to 9
a = upper case letters (A to Z)

4.4 SIT Based Format Definitions

4.4.1 General. These messages use the SIT formats as described in A.002 and specifically as described in '4. MESSAGE FORMAT' using MFs as defined in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID), this document, and in some cases by the Contractor.

4.4.2 Configurability. Some current software allows for configurability in fixed characters and the placement of the MFs within the message. The first and last lines in the message are as per C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID).

4.4.3 Future Development. All planned future software allows full character and MF configurability so that CMCC can ensure compatibility between various pieces of software. All future message formats that are SIT Based only use MFs defined in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) and this document using a layout format fully detailed in this document.

4.4.4 CMCC Defined Formats. Presently there are no CMCC defined SIT based formats. Narrative messages generated by the CMCC Case Form are sent to the OCC 600 via a C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) defined SIT 915 or SIT 925 as appropriate.

4.4.5 The Contractor Defined Formats. The Contractor's software uses defined proprietary SIT based formats.

4.4.6 USMCC Defined Formats. CMCC uses a customized SIT 185 to send alerts to the US RCCs and SPOCs when backing up the USMCC. These formats are in accordance with the USMCC "National Rescue Coordination Center (RCC) and Search and Rescue Point of Contact (SPOC) 406 MHz Alert and Support Messages for the MEOSAR System".

4.5 XML Based Format Definitions

4.5.1 Characters. These messages use characters as per C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID).

4.5.2 MFs. These messages use MFs as per paragraph 4.3 CMCC Defined MF and C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) but do not require the use of MFs 42 and 43. The format of MFs is as per C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) format including that all spaces are replaced with '_' (underscore) with one exception. MF41 may have spaces.

4.5.3 Schema or Format. The message schemas follow the guidelines as detailed in C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID) and specifically the section entitled MESSAGE CONTENT FOR MEOSAR DATA MESSAGES. Although this sample is not complete for all messages, it gives a good guideline. A sample SIT 145 and SIT 155 in XML format are available below. It also shows the XML opening and closing tags for repeated solution data. A full schema is being developed and will be included at a later date.

4.5.4 Future Development. All software being developed for use at CMCC that will receive data from the MCC servers or LUT servers will use CMCC defined XML based messages so that CMCC can ensure compatibility between various pieces of software. This software will only use MFs defined in paragraph 4.3 CMCC Defined MF and C/S A.002 COSPAS-SARSAT Mission Control Centres Standard Interface Description (SID).

4.5.5 Sample XML messages (Note: The nested portions are indented for readability and in the actual messages transmitted, this is not required):

a. SIT 145 from the MEOLUT 3165 (MOW) to the CBRV:

```
<?xml version="1.0" encoding="utf-8"?>
<COSPAS_SARSAT_DATA>
<MF1>01614_00000</MF1>
<MF2>3165</MF2>
<MF3>09_280_1518</MF3>
<MF4>755</MF4>
<MF5>1100</MF5>
<MF8>2</MF8>
<SOLUTION>
    <MF11>3165</MF11>
```

```
        <MF13>-00405.0_001.0_+99.99</MF13>
        <MF14A>09_280_1516_36.21</MF14A>
        <MF14B>09_280_1518_16.19</MF14B>
        <MF21>03</MF21>
        <MF22>ABC0123456789FF</MF22>
        <MF77>FFFE2F789ABCDEF012345600000000123456</MF77>
        <DATA>
            <MF24>+316</MF24>
            <MF25>+53.225</MF25>
            <MF26>-130.102</MF26>
            <MF78>007</MF78>
            <MF89>010.42</MF89>
            <MF79>35.12</MF79>
            <MF80>09</MF80>
            <MF81>04</MF81>
            <MF82>06.379410</MF82>
            <MF84>00</MF84>
            <MF88>012</MF88>
            <MF27>000_000.0_000.0</MF27>
            <MF83>301_302_303_304_000_000_000_000_000_000_000_000_000_000_00
                0_000_000</MF83>
            <MF903>0</MF903>
        </DATA>
    </SOLUTION>
    <SOLUTION>
        <MF11>3165</MF11>
        <MF13>+01923.0_999.9_+99.99</MF13>
        <MF14A>09_280_1517_10.01</MF14A>
        <MF14B>09_280_1517_10.01</MF14B>
        <MF21>01</MF21>
        <MF22>ABC0123456789FF</MF22>
        <MF77>FFFE2F789ABCDEF012345670000000123456</MF77>
        <DATA>
            <MF24>+316</MF24>
            <MF25>+58.451</MF25>
            <MF26>-140.810</MF26>
            <MF78>002</MF78>
            <MF89>103.57</MF89>
            <MF79>34.39</MF79>
            <MF80>05</MF80>
            <MF81>05</MF81>
            <MF82>99.999999</MF82>
            <MF84>00</MF84>
            <MF88>012</MF88>
            <MF27>000_000.0_000.0</MF27>
            <MF83>301_302_303_304_000_000_000_000_000_000_000_000_000_000_00
                0_000_000</MF83>
            <MF903>0</MF903>
        </DATA>
    </SOLUTION>
    </COSPAS_SARSAT_DATA>
```

b. SIT 155 from CMCC 3160 to the CMCC Case Form:

```
<?xml version="1.0" encoding="utf-8"?>
```

```
< COSPAS_SARSAT_DATA>
    <MF1>01614_00000</MF1>
    <MF2>3160</MF2>
    <MF3>09_280_1518</MF3>
    <MF4>155</MF4>
    <MF5>1055</MF5>
    <MF6>011</MF6>
    <MF8>1</MF8>
    <MF901>1102</MF901>
    <MF902>1102_1103</MF902>
    <SOLUTION>
        <MF11>3161</MF11>
        <MF12>-9</MF12>
        <MF13>-00330.1_030.5_+00.00</MF13>
        <MF14>16 099_1106_18.04</MF14>
        <MF15>2</MF15>
        <MF16>9</MF16>
        <MF17>12.839</MF17>
        <MF18>0000</MF18>
        <MF21>03</MF21>
        <MF22>278837D488FFBFF</MF22>
        <MF23>93C41BEA447FDFFD37EC7783E0F66C</MF23>
        <DATA>
            <MF24>+316</MF24>
            <MF25>+53.225</MF25>
            <MF26>-130.102</MF26>
            <MF27>284_017.0_001.2</MF27>
            <MF28>50</MF28>
            <MF29>16_099_1202</MF29>
            <MF30>1</MF30>
            <MF31>001.7_001.5</MF31>
            <MF900>00</MF900>
        </DATA>
        <DATA>
            <MF24>+316</MF24>
            <MF25>+52.225</MF25>
            <MF26>-138.102</MF26>
            <MF27>284_017.0_001.2</MF27>
            <MF28>50</MF28>
            <MF29>16_099_1202</MF29>
            <MF30>1</MF30>
            <MF31>001.7_001.5</MF31>
            <MF900>00</MF900>
        </DATA>
    </SOLUTION>
</COSPAS_SARSAT_DATA>
```

Chapter 5 CMCC General Configuration (Servers and OI)

5.1 General

5.1.1 This section will cover the functional level description of various configuration items not covered elsewhere. Specific configuration items are detailed in the CMCC OCC 600 Configuration Manual.

5.2 Server Setup

5.2.1 CMCC1, CMCC2, CMCC3, and CMCC4 are all separate physical servers in separate physical locations. CMCC1 and CMCC2 are only receiving LEOSAR and GEOSAR data. CMCC4 is receiving only MEOSAR data. CMCC3 is currently receiving LEOSAR and GEOSAR data but it may be used to also receive MEOSAR data in preparation for the LEO/GEO/MEO (LGM) system.

5.2.2 As part of the implementation of MEOSAR Phase I, the CMCC servers will be migrated to a virtual environment. The exact configuration and how the transition will take place will be further defined in a Transition Plan that will be developed by the MEOSAR Project.

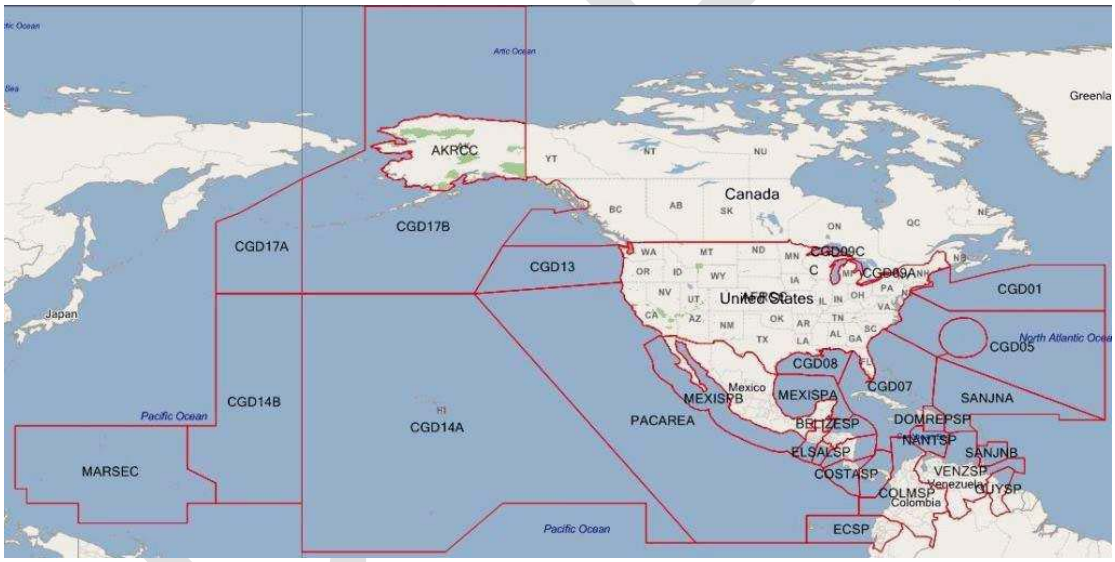
5.3 Roles and Permissions

5.3.1 General. Within MCC software, two key roles are defined as Administrator and Duty Operator. The Administrator will usually be the CMCC Chief Operator who is responsible for setting the baseline configuration, layout, templates, etc. and therefore requires a higher level of permissions. Tech support may also use the Administrator role within the software for some of their support duties. The Duty Operator will perform duties within their terms of reference and require the appropriate level of permissions within the software.

5.4 GEOSort Regions

5.4.1 Canada. The Canadian SAR area of responsibility contains four GEOSort areas. They are the three primary Search and Rescue Regions (SRR)s; JRCC Victoria, JRCC Trenton, and JRCC Halifax. The fourth SRR is for MRSC Quebec which overlaps portions of the Trenton and Halifax SRRs.

5.4.2 USMCC Backup. When backing up the USMCC, CMCC uses all the US supplied areas for their RCCs and SPOCs.



5.4.3 The full lists of points for the Canadian GEOSort Regions are published in the Canadian Aeronautical and Maritime Search and Rescue Manual (CAMSAR). This list of points does contain an error and this has been corrected for the 2016 update. Until its release, the correct points can be found in the CMCC GEOSort Regions.

5.5 C/S Identification Numbers for Internal Use

5.5.1 Like MCCs and LUTs have C/S identification numbers, internal destinations also need them. A range is used that will not conflict with C/S assigned numbers. The range 1000 to 1999 is free and is further sub-divided below. Unused numbers in this range are available for future expansion if required:

a. 1001 to 1006 – CMCC servers for internal designation;
b. 1050 to 1059 – Administrative destinations;
c. 1090 to 1095 – OCC 600 required routes;
d. 1100 to 1119 – Canadian RCCs and SPOCs;
e. 1200 to 1249 – US RCCs; and
f. 1300 to 1349 – US SPOCs.

5.5.2 Individual allocations:

Description	Route	C/S ID
CMCC1	CMCC1	1001 (1)
CMCC2	CMCC2	1002 (1)
CMCC3	CMCC3	1003 (1)
CMCC4 MEO D&E	CMCC4	1004 (1)
CMCC5 MEO Trenton(3)	CMCC5	1005 (1)
CMCC6 MEO Belleville(3)	CMCC6	1006 (1)
CMCC Chief Operator	CMCC_COp	1050
CTEC Message Server	CTEC	1051
U406 Desktop Cases	NOCR	1052
CMCC Fax	CMCCFax	1053
USMCC Fax	USMCCFax	1054
CMCC Case Form	CASEFORM	1055
Local route	LOCAL	1090
NAVAFTN	NAVAFTN	1091
JRCC Victoria	RCCVIC	1100
JRCC Victoria Alt Site (2)	RCCVIC	1101 (2)
JRCC Trenton	RCCTRE	1102
JRCC Trenton Alt Site (2)	RCCTRE	1103 (2)
JRCC National Backup Belleville	RCCBEL	1104
Transport Canada Situation Center	CDN_SSAS	1105
MRSC Quebec	MRSCQB	1106
MRSC Quebec Alt Site (2)	MRSCQB	1107 (2)
JRCC Halifax	RCCHAL1	1108
JRCC Halifax Alt Site	RCCHAL2	1109
CGD01 Boston	CGD01BOSTON	1201
CGD05 Norfolk	CGD05NORFOLK	1205

Description	Route	C/S ID
CGD07 Miami	CGD07MIAMI	1207
CGD08 New Orleans	CGD08NEWORLEANS	1208
CGD09 Cleveland	CGD09CLEVELAND	1209
CGD11 PACAREA	CGD11PACAREA	1211
CGD13 Seattle	CGD13SEATTLE	1213
CGD14 Hawaii	CGD14HAWAII	1214
CGD17 Juneau	CGD17JUNEAU	1217
AFRCC	AFRCC	1220
AKRCC	AKRCC	1221
CGDC3 CEN	CGDC3CEN	1222
COMSUBPAC	COMSUBPAC	1223
LANTAREA	LANTAREA	1224
Guam (MARSEC)	MARSECGUAM	1225
San Juan	SANJUAN	1226
Aruba SSAS Route	ARUBSS	1300
Barbados SSAS Route	BARBSS	1301
Belize SSAS Route	BELZSS	1302
Bermuda SSAS Route	BERMSS	1303
Bermuda	BERMUDA	1304
Bahamas SSAS Route	BHAMSS	1305
Virgin Island GB SSAS Route	BVISS	1306
Caicos Island SSAS Route	CAICSS	1307
Cayman Island SSAS Route	CAYMSS	1308
Colombia SSAS Route	COLMSS	1309
Columbia	COLUMBIA	1310
Cosesna	COSESNA	1311
Cuba SSAS Route	CUBASS	1312
Dominican Republic	DOMINICAN_REP	1313
Ecuador SSAS Route	ECSS	1314
Ecuador	ECUADOR	1315
Grenada SSAS Route	GRENSS	1316
Guatemala SSAS Route	GUATSS	1317
Guyana	GUYANA	1318
Guyana SSAS Route	GUYSS	1319
Haiti SSAS Route	HAITSS	1320
Honduras SSAS Route	HONDSS	1321
Jamaica SSAS Route	JAMASS	1322
Marshal Islands SSAS Route	MARSHSS	1323
Mexico	MEXICO	1324
Curacao	NANTILLES	1325

Description	Route	C/S ID
Curacao SSAS Route	NANTSS	1326
Nicaragua SSAS Route	NICASS	1327
Palau SSAS Route	PALASS	1328
Panama	PANAMA	1329
Panama SSAS Route	PANSS	1330
Trinidad SSAS Route	TRINSS	1331
Venezuela	VENEZUELA	1332
Venezuela SSAS Route	VENZSS	1333

Note 1: These IDs are only used when one CMCC server sends a message to another CMCC server. 3160 is used for CMCC servers by all other sending agencies.

Note 2: These have been added in anticipation of the SMMS Project providing proper backup servers for each Canadian RCC.

Note 3: While under development, the LGM MCCs will be numbered CMCC5 and CMCC6. These numberings will only be temporary during pre-integration and commissioning. A detailed Transition Plan will further detail this transition.

Chapter 6 Acronyms, Terms and their Definitions

6.1 General

6.1.1 All COSPAS/SARSAT terms are contained in C/S G.004 COSPAS-SARSAT Glossary and Acronyms and Terminology and are not contained in this list.

6.2 CMCC Specific

6.2.1 CMCC specific terms and acronyms are contained in the table below and are used throughout this document.

Acronym	Term	Definition
ACL	Access Control List	A network firewall tool used to limit which computers on one side of the firewall can connect with which computers or networks on the other side of the firewall.
CBR	Canadian Beacon Registry	The CBR is the Canadian repository for all owner and emergency contact information related to 406 MHz emergency beacons.
CBR Section	CBR Section	The section within CMCC that is responsible for all beacon registrations in Canada.
CBRV	Canadian Beacon Registry Verifier	A CMCC software tool written by DND (ATESS) that receives beacon test data for LUTs and verifies registration data for the associated beacon identification.
CCG	Canadian Coast Guard	
CFNOC	Canadian Forces Network Operation Centre	
CMCC	Canadian Mission Control Centre	The Canadian Armed Forces unit titled “Canadian Mission Control Centre.” It contains three sections which are the MCC, CBR, and SARNOCC. CMCC is a detachment of the 1 Canadian Air Division Headquarters.
CMCC1	CMCC Server	The Primary operational MCC server. Physically located in Trenton.
CMCC2	CMCC Server	The Secondary operational MCC server. Physically located in Belleville.
CMCC3	CMCC Server	A non-operational MCC server used for testing purposes. Physically located in Trenton.
CMCC4	CMCC Server	A non-operational MCC server used for MEOSAR D&E purposes. Physically located in Trenton.
CMCC5 / CMCC6	CMCC Server	While under development, the LGM MCCs will be numbered CMCC5 and CMCC6. These numberings will only be temporary during pre-integration and commissioning.

Acronym	Term	Definition
CMCCA	CMCC Server	The operational MCC server currently connected to the C/S network and performing the required MCC functions. Normally this is CMCC1.
CMCCB	CMCC Server	The backup MCC server currently not connected to the operational C/S network but in a constant standby posture, ready to become operational instantly. Normally CMCC2.
CRC	Communication Research Council	Canadian Government organisation involved in research and development, including MEOSAR research and development.
GEO	Geostationary Earth Orbit	
GPNET	General Purpose Network	DND general purpose intranet.
JRCC	Joint Rescue Coordination Centre	In Canada, these are Joint Rescue Coordination Centers which are staffed by both CAF (Air Controllers) and CCG (Marine Controllers) members.
LCMM	Life Cycle Maintenance Manager	
LEO	Low Earth Orbit	
LGM MCC	Low Earth Orbit / Geostationary Earth Orbit / Medium Earth Orbit Mission Control Centre	MCC fully capable of processing LEOSAR, GEOSAR, and MEOSAR data IAW C/S standards.
LP	Location Processor	The LUT server that receives raw data and processes the beacon location. It then transmits this location to the configured destination(s).
LUT	Local User Terminal	A ground receiving station in the Cospas-Sarsat system that detects, characterises and locates emergency beacons, and forwards the appropriate information to an MCC.
MCC Section	MCC Section	The section within CMCC that is responsible for the CMCC Operations.
MEO	Medium Earth Orbit	
MEOLUT	Medium Earth Orbit Local User Terminal	A ground receiving station in the Cospas-Sarsat MEOSAR system that detects, characterises and locates emergency beacons, and forwards the appropriate information to an MCC.
MOW	MEOLUT Ottawa	MEOLUT Ottawa is located in Shirley's Bay near Ottawa and has a C/S ID of 3165.
MRSC	Marine Rescue Sub Centre	A Canadian RCC that is staffed by CCG and is marine only. Only one remains in Canada which is MRSC Quebec.
OI	Operator Interface	Any software used by an operator to interface with the underlying system. Examples are the OCC 600 OI and the Remote LUT OI.

Acronym	Term	Definition
SARNOCC	Search and Rescue Network Operations Control Centre	The section within CMCC that is responsible for supporting the SARNet and associated IT infrastructure.

DRAFT STATEMENT OF WORK

IN SERVICE SUPPORT (ISS)

FOR

MEDIUM EARTH ORBIT SEARCH AND RESCUE (MEOSAR) GROUND SEGMENT SYSTEM

June 15, 2016

TABLE OF CONTENTS

1 BACKGROUND

1.1 COSPAS-SARSAT is the international programme that provides both the Search and Rescue Satellite Aided Tracking (SARSAT) distress detection system and coordinates Search and Rescue (SAR) organizations that assist persons in distress. The SARSAT system uses both Geosynchronous Earth Orbit (GEO) satellites and Low Earth Orbit (LEO) satellites. COSPAS-SARSAT is augmenting its programme with Medium Earth Orbit (MEO) satellites equipped with Search and Rescue repeaters. This augmented system is called MEOSAR.

1.2 The Minister of National Defence (MND), through the Canadian Government and as part of his mandate, has responsibilities related to search and rescue matters in Canada. The Department of National Defence (DND) has been assigned the responsibility, on behalf of the Minister, for the MEOSAR project.

1.3 The current Canadian SARSAT system receives and processes signals from all available Low Earth Orbit (LEO) and Geostationary (GEO) satellites at their respective Local User Terminals (LUTs), and sends alert data to the Canadian Mission Control Centre (CMCC) servers.

1.4 The primary site is located in Trenton, Ontario with the secondary site in Belleville, Ontario. Both sites are identical to provide complete redundancy, and one is always staffed on a 24/7 basis 365 days a year.

1.5 The DND has been mandated to augment its SARSAT Ground Segment (GS) system to include ground stations that will forward MEOSAR information to the operational CMCC to meet its obligations under the International COSPAS-SARSAT Programme Agreement.

2 OBJECTIVE

2.1 The objective is to support, maintain and upgrade the MEOSAR ground segment system to meet Canada's SAR obligations.

3 SCOPE

3.1 The scope of this Statement of Work (SOW) is the provision of In Service Support (ISS) for the MEOSAR Ground Segment system delivered under the statement of work for the Build and Commissioning of the Medium Earth Orbit Local User Terminals (MEOLUTs) for the MEOSAR Ground Segment (MEOLUT SOW). This will include all hardware and software supplied by the Contractor and/or their sub-contractors and suppliers at all the sites and for all system parts and software, and any additional hardware, software, support equipment, tools and documentation provided under all ISS work.

3.2 The ISS scope will cover all necessary life cycle support equipment and services, including but not limited to engineering support, maintenance support, material support, configuration management support, facilities support, and related project management functions, and DND personnel training necessary to maintain and operate the MEOSAR GS throughout its mission.

3.3 The ISS scope includes:

3.3.1 Preventative and corrective maintenance, repair and overhaul, consumable material replacement, and engineering support services of all delivered systems, including the MEOLUTs, and all back-up generators, UPS, line conditioning equipment, and back-up generators supplied as part of the GS system at each site, the MEOLUT Network and Network Location Processor, the MEOLUTs' Local Operator Interface (LOI), the MEOLUT Remote Operator Interface (ROI) and the MEOLUT Coverage Area Simulation Tool (CAST);

3.3.2 The operation and maintenance of an Electronic Information Environment (EIE), including an electronic ticket system, for configuration management and tracking all life cycle support service and customer requests and tickets as part of monitoring system and customer support performance; and

3.3.3 The operation and maintenance of a customer and technical support service desk, including an electronic problem management or ticket system and issuance of electronic tickets regarding all customer requests and issues.

3.4 The ISS work must ensure all systems are maintained at levels that meet or exceed all of their site accepted performance requirements as delivered at Site Acceptance Test (SAT) for the MEOLUT SOW and as required by COSPAS-SARSAT throughout the duration of the ISS timeframe.

3.5 The ISS work must ensure all customer support interactions must meet or exceed expected levels of response time performance as stated further in this document.

3.6 This work may include taskings related to the system engineering and integration of new interfaces and technologies into the baselined MEOSAR GS and EIE. As such, new technologies, equipment and capabilities integrated into the baseline MEOSAR GS and EIE become integral components of the system and form part of the scope of this SOW thereafter.

3.7 The Scope also covers the execution of all systems engineering tasks to maintain and repair all systems and upgrade all hardware and software, including**:**

3.7.1 Software and electrical engineering, to maintain MEOLUT signal processing capability and improve performance;

3.7.2 Computer and network systems engineering, to support and maintain the MEOLUT Network and interfaces to the CMCC servers;

3.7.3 Software and computer engineering, to support and maintain the, ROI, LOI and MEOLUT Coverage Area Simulation Tool (CAST); and

3.7.4 Software and database programming, to support and maintain the EIE.

3.8 Updating of all associated documentation required for operation, configuration management, and maintenance of the MEOSAR Ground Segment and operator interfaces and support tools.

3.9 The overhaul of the MEOLUTs and the COSPAS- SARSAT commissioned elements of the GS system arising from the following listed factors or other causes:

- Environmental damage (water, wind, precipitation, lightning, ice, dust);
- Fire;
- Earthquake;
- Transportation accident (air, land, sea);
- Wear and obsolescence; and
- Modification of applicable COSPAS-SARSAT standards and National Requirements.

3.10 Excluded from the scope of the ISS work is the provision of maintenance services for the following equipment:

3.10.1 All Government Furnished environmental, fire and safety equipment, and communications equipment, modems, routers, not installed by the Contractor, and the associated telecommunications services;

3.10.2 The electrical utility services beyond the system's equipment power distribution panel.

3.10.3 MEOSAR GS Site maintenance such as snow clearing, grass cutting, and maintenance of site fencing and gates not provided by the Contractor.

3.11 The contractor will not be reimbursed for any cost reimbursable travel associated with this statement of work unless otherwise stated.

4 SCHEDULE

4.1 The ISS timeframe will extend over (n) m-year periods.

4.2 An interim ISS period will start at the time of successful site acceptance of the first MEOLUT by Canada. Once final commissioning of the MEOLUTs and acceptance by Canada of the MEOLUT network and all associated LOIs, ROI, and software tools is completed, the steady state ISS portion commence for a period of M-years, with the option to exercise up to y-optional M-year ISS periods , as shown in

4.3 Table 1.

Project Element	Timeframe
1st Site Accepted MEOLUT by Canada	Contract Award + X months
Start Interim In-Service Support (ISS)	Upon acceptance of 1st Site Accepted MEOLUT
Start Steady State ISS	Upon MEOSAR GS Acceptance by Canada
ISS Option 1	Contract Award + M years (if exercised)
ISS Option y	Contract Award + M years(if exercised)

Table 1: ISS Timeframe

5 DOCUMENTS

5.1 Applicable Documents

Applicable documents and materials identified are in scope and will apply where they are referenced. The latest approved COSPAS-SARSAT document version will be in force at any specific time during this SOW. In the event that the same requirement is specified in different applicable documents and/or different sections of this SOW, the Contractor must satisfy the most stringent specification/requirement.

5.1.1 COSPAS-SARSAT (C/S) MEOLUT and related MEOSAR technical and operational specifications, standards and guidelines[1]:

C/S T.001	Specification for COSPAS-SARSAT 406 MHz Distress Beacons
C/S T.012	COSPAS-SARSAT 406 MHz Frequency Management Plan
C/S T.015	COSPAS-SARSAT Specification and Type Approval Standard for 406 MHz Ship Security Alert System (SSAS) Beacons
C/S T.016	Description of the COSPAS-SARSAT MEOSAR Space Segment
C/S T.017	COSPAS-SARSAT MEOSAR Space Segment Commissioning Standard
C/S T.019	COSPAS-SARSAT MEOLUT Specifications and Design Guidelines
C/S T.020	COSPAS-SARSAT MEOLUT Commissioning Standard
C/S T.022	COSPAS-SARSAT Draft Reference Beacon Specification and Guidelines
C/S P.011	COSPAS-SARSAT Programme Management Policy
C/S P.015	COSPAS-SARSAT Quality Manual
C/S A.001	COSPAS-SARSAT Data Distribution Plan
C/S A.002	COSPAS-SARSAT MCC Standard Interface Description
C/S A.003	COSPAS-SARSAT System Monitoring and Reporting
C/S A.005	COSPAS-SARSAT Mission Control Centre (MCC) Performance Specification and Design Guidelines
C/S R.018	COSPAS-SARSAT Demonstration and Evaluation Plan for the 406MHz MEOSAR System
C/S A.006	COSPAS-SARSAT Mission Control Centre (MCC) Commissioning Standard
C/S G.007	Handbook on Distress Alert Messages for Rescue Coordination Centres (RCCs), Search and Rescue of Points of Contact (SPOCs) and IMO Ship Security Competent Authorities
C/S R.012	COSPAS-SARSAT 406 MHz MEOSAR Implementation Plan

[1] These documents are available from **http://cospas-sarsat.org**

5.1.2 Canadian Security Guidelines, Health and Safety Regulations, DND Instructions to Contractors, and SARSAT GS System Description, Specifications and Operations:

PGS	Policy on Government Security[2]
COHSR	Canada Occupational Health and Safety Regulations[3]
A-LM-184-001/JS-001	Special Instructions For Repair and Overhaul Contractors[4]
MEOLUT SOW	Build and Commissioning of the Medium Earth Orbit Local User Terminals (MEOLUTs) for the MEOSAR Ground Segment[5]
CMCC ConOps	Canadian Mission Control Centre Concept of Operations Requirements[6]

[2] PGS Guidelines can be found on the Treasury Board of Canada Secretariat (TBS) website http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16578
[3] This document can be found at http://laws.justice.gc.ca/eng/regulations/sor-86-304
[4] Document can be found http://publications.mil.ca/pod/pubs/pubSearch.jsp
[5] The draft MEOLUT SOW was posted on buy and sell. The final version will be included in the RFP
[6] The CMCC ConOps Requirements will be available at http://smms.forces.gc.ca/

6 REQUIREMENTS

6.1 GENERAL

6.1.1 The Contractor must be able to perform Preventative Maintenance (PM) and Corrective (CM) Maintenance, on a routine and on-going basis, remotely and on-site when needed, of the MEOSAR GS system to ensure the GS system meets or exceeds all the technical, functional, processing, and performance requirements when the system was delivered, accepted and commissioned, as per the MEOLUT SOW document.

6.1.2 The Contractor must provide Software Maintenance, on a routine and on-going basis, to ensure the MEOSAR GS system meets or exceeds the in force COSPAS-SARSAT technical, operational and system performance requirements at any moment of time within the ISS timeframe.

6.1.3 The Contractor must provide free flow Repair and Overhaul (R&O) Services, in accordance with A-LM-184-001/JS-001 and as per the Logistics Statement of Work in Annex A of this document, to ensure the MEOSAR GS system meets or exceeds the in force COSPAS-SARSAT technical, operational and system performance requirements.

6.1.4 The Contractor must provide ISS as per section 6.1.1, 6.1.2 and 6.1.3, including replacement of equipment and replenishment of spare parts due to obsolescence or end of life, for the MEOLUTs, the MEOLUT Operator Interfaces, the MEOLUT Network, the Network Location Processor, their interfaces and connections to the CMCC servers, the MEOLUT CAST, and on-going configuration management services to ensure that all GS systems hardware, software, and documentation remain available, reliable, current and accurate.

6.1.5 The Contractor must update the GS system as required for compliance with all COSPAS-SARSAT approved changes in accordance with the schedule mandated by the COSPAS-SARSAT Council. This update process must be incorporated by the Contractor as part of the ongoing configuration management services.

6.1.6 The Contractor must provide task authorized services on an “as and when” requested basis. These services may include specific task authorized maintenance requiring mobile repair parties (MRP) in order to restore the system to operational status, Technical Investigations & Engineering Studies (TIES), Special Investigation and Technical Studies (SITS), Additional Work Arisings (AWAs) and training requirements, as required by DND.

6.1.7 The Contractor must deliver, assemble, integrate, interconnect, install, test, configure and commission the GS system and EIE hardware and software as

required with any PM, CM, R&O, TIES, and AWA services, tasks, repairs, and upgrades.

6.1.8 The contractor must document all changes to the system hardware and software and to all additional hardware, software, support equipment and tools supplied by the Contractor and/or their sub-contractors when performing all ISS work.

6.1.9 The contractor must record and evaluate the performance of the system after all major corrections, repairs and upgrades executed under paragraphs 6.1.3 through 6.1.7, to prove that the MEOSAR GS performance meets or exceeds all requirements stated in 6.1.1 and 6.1.2.

6.1.10 The Contractor must resolve and address all requests and issues submitted by CMCC and Life Cycle Material Manager (LCMM) personnel, and complete all repair and overhaul issues within the time requirements defined in the performance management section 6.9 of this SOW.

6.1.11 The Contractor must provide and maintain an Electronic Information Environment (EIE) for system performance and ISS quality management which includes at a minimum databases that:

6.1.11.1 Store and allow access to all electronic versions of all delivered GS system technical, operational, user, and training documents and manuals as per the MEOLUT SoW, and store and provide access to electronic versions to all current and updated versions of these system documents, and of any new documents created as part of the ISS work;

6.1.11.2 Provide performance analysis results of the MEOSAR GS system for COSPAS-SARSAT and CMCC quality management system (QMS) purposes using the archived data provided at the MEOLUT sites and the CMCC Networked Location Processor (NLP);

6.1.11.3 Chronicle, record, monitor, and manage at a minimum all customer requests and issues, and contractor generated responses, repairs, tasks and services performed as part of an electronic trouble ticket system; and

6.1.11.4 Provide performance analysis results on the response times of technical support services provided by the Contractor.

6.1.12 The Contractor must provide customer and technical support services by providing assistance to help solve technical issues efficiently and effectively mainly using secure internet, secure web support, e-mail and toll free telephone, integrated to the EIE, so as to assist DND users in the resolution of their hardware and software operational, technical, and configuration queries, and to assist DND personnel in the performance of their duties when using the MEOSAR GS system.

6.1.13 The Contractor must provide a 24 hour/7 days a week/365 days a year toll free telephone customer and technical support service with access to the EIE, including the electronic trouble ticket system, with triage answering service to respond to the call immediately, or if line is busy, able to return the phone message query within five minutes of the initial call, and ensure that:

6.1.13.1 The initial telephone and on-line customer support service representative is fluent and proficient in English, and is conversant with the GS system basic operation and components.

6.1.13.2 All other technical support service specialists have:

- A college diploma or degree in engineering technology, or a university degree in engineering, computer science or applied sciences;
- Fluent and proficient in English;
- All required security clearances; and
- Contractor training on the design and operation of the delivered MEOSAR GS system and its associated hardware and software and capable to initiate basic repairs via remote access to the GS system

6.2 REMOTE TERMINAL SUPPORT

6.2.1 All delivered GS systems supported under this SOW must be accessible by a Contractor remote terminal for monitoring, diagnostic, and maintenance purposes. Access to the system components must be password protected. The remote terminal must be located at the Contractor's facility or carried by the Contractor's maintenance personnel for use outside the Contractor's facilities.

6.2.2 The remote terminal must have sufficient processing speed, memory, and storage capacity in order to run all required monitoring, diagnostic, maintenance, and communications programs, and be compatible with the operating system, application software, and security requirements as per the MEOLUT SOW and activities performed under this SOW.

6.2.3 All transactions conducted with the system through the remote terminal must be recorded in a log file as part of the EIE in the Contractor's format of choice.

6.2.3.1 At a minimum, the log file must contain:

- The system site and system element accessed (e.g. MEOLUT Edmonton, NLP Trenton, CAST, etc.);
- The name of the Contractor maintenance resource;

- A description of the problem and its cause;
- A description of the repair action taken;
- Applicable cross reference to the ticketing system;
- An indication of whether the repair action was temporary or permanent;
- A description of the results of the repair action taken; and
- The time the Contractor logged off.

6.2.3.2 These records must be retained by the Contractor for at least six months after the remote terminal access date and must be made available to DND upon request. A summary of transactions must be reported monthly.

6.3 PREVENTATIVE AND CORRECTIVE MAINTENANCE (PM CM)

6.3.1 The word "operational" used in reference to MEOLUT(s), for the daily performance of SARSAT operations by the CMCC, indicates that the data produced by those MEOLUTs meet all CMCC operational and COSPAS-SARSAT performance requirements. Operational MEOLUTs are formally commissioned and meet functional requirements and levels of performance in accordance with COSPAS-SARSAT MEOSAR technical and operational documentation.

6.3.2 The word "failure" when used in reference to an operational MEOLUT indicates that it has become non-operational and immediate Corrective Maintenance (CM) work is required to return the facility to operational status.

6.3.3 The word "critical" when used in reference to Preventative Maintenance (PM) work indicates that the work must be carried out immediately to prevent a MEOLUT from entering an imminent failure condition; and when used in reference to CM work, to return a MEOLUT in a failure condition back to "operational" status.

6.3.4 The Contractor must provide Preventative Maintenance (PM) services on a routine basis to ensure the GS is operational, and Corrective Maintenance (CM) services on an on-going basis to ensure the GS system is maintained at, and restored to, "operational" status.

6.3.5 The Contractor must conduct PM services in accordance with the procedures outlined in the GS system design documents and GS system manuals delivered as part of the MEOLUT SOW documentation. The system must remain "operational" during the completion of PM activities.

6.3.6 The Contractor must include, as part of its PM requirements, care and servicing of the system on an on-going basis, to ensure the MEOSAR GS is in operational status in accordance with 6.3.5, and provides systematic periodic inspections to detect problems and carry out correctional measures to avoid failures before they occur.

6.3.7 The Contractor must provide PM and CM services, including periodic hardware and software updates, to reduce the probability of failure or the degradation of the system below the, most recent and in force, mandatory COSPAS-SARSAT MEOSAR technical and operational requirements and specifications in accordance with 6.1.4 and 6.1.5 to ensure it remains in operational status.

6.3.8 The Contractor must not substitute replacement products or software elements in the system that could reduce, compromise, or alter the system's performance below that specified in 6.3.7.

6.3.9 The Contractor must conduct PM site visits at least twice per year for inspection purposes. Site visits must be coordinated by the Contractor with the contract Technical Authority (TA) and CMCC in order to minimize impact on operations for operational system equipment.

6.3.10 The Contractor must submit a site maintenance trip report for each PM and CM visit. These reports must be prepared and forwarded to the TA for approval with a copy to the Procurement Authority (PA).

6.4 SOFTWARE MAINTENANCE

6.4.1 As part of PM and CM, routine Software Maintenance must also be included since the MEOSAR GS has embedded and shareware software that from time to time requires fault diagnosis and correction, changes to defeat viruses or malware, changes to implement revised interfaces, and/or enhancements to improve functionality or performance during the contract period.

6.4.2 The Contractor must perform routine software maintenance, including software installation, software configuration, data load and/or unload, backup and recovery, release replication and distribution, and update of software configuration status information.

6.4.3 The Contractor must provide descriptive release notes for each software patch or version update to assist with understanding installation, configuration, and utilization of software, and record all changes and updates within the EIE.

6.4.4 The Contractor must perform regression testing, to ensure that the coding and software changes do not create problems elsewhere in the GS system and the system maintains operational status as per 6.1.4.

6.4.5 As part of the routine software maintenance, the Contractor must provide life-cycle software updates to the MEOSAR GS and EIE software to address reliability, performance and obsolescence issues in accordance with 6.1.5, 6.1.7 and 6.1.11.

6.5 REPAIR AND OVERHAUL (R&O) SERVICES

6.5.1 The Contractor must conduct the R&O activities in accordance with section 6.1.3.

6.5.2 Any item repaired or overhauled by the contractor must meet the standards of performance described in section 6.1 and in accordance with 6.5.1. When such standards are not described or when the standards described are considered by the contractor to be inadequate or too stringent, the Contractor must advise the designated TA and promptly submit, through the National Defence Quality Assurance Representative (NDQAR), for DND approval, the standards of performance and reliability to which they propose to repair/overhaul any repairable item. These standards must not be used until approved by DND.

6.5.3 Prior to the replacement of catalogued components with non-approved or with different components from those delivered or listed in the Contractor's spares list or equipment specifications, the Contractor must prepare and submit to DND a justification for the deviation in writing and in accordance with 6.5.1. The Contractor must only proceed with the utilization of such components on the authority of the TA or designated TA.

6.5.4 The contractor or its subcontractors must only resort to cannibalization to affect repair, on the authority of the TA or designated TA.

6.6 TASK AUTHORIZED MAINTENANCE SERVICES

6.6.1 The Contractor must perform authorized maintenance service tasks as needed and when requested by DND as per section 6.1.6 and in accordance with A-LM-184-001/JS-001 for all GS System and EIE hardware and software.

6.6.2 In situations where these maintenance service tasks would require the Contractor's personnel to travel to a site to effect repairs using a Mobile Repair Party (MPR) as per A-LM-184-001/JS-001, the Contractor must obtain pre-approval to dispatch a MRP through the DND 626 task authorization process.

6.6.3 The contractor must provide a proposal with an estimate of the expected level of effort including the required MRP and a detailed itinerary to the TA or other designated TA. The course of action may be amended as necessary after onsite inspection by the MRP.

6.6.4 An approved DND task authorization must be obtained from and provided by the Contracting Authority (CA) or the Procurement Authority (PA) to perform the identified course of action. The Contractor must then complete the approved course of action to correct the fault.

6.6.5 After any assessment, the Contractor must inform the designated TA and TA of any discrepancies in the technical and engineering data noted from all ISS maintenance work, including MRPs, and group these together for corrective action consideration under a Technical Investigation and Engineering Studies (TIES) or Special Investigation and Technical Studies (SITS) task.

6.6.6 The scope of work normally covered under TIES is recommendations regarding ways to reduce costs, investigate failures, and improve contractor provided GS system performance. These must be submitted in proposal format to the TA and must include cost of the work proposed, justification for the work, and the business case to support the work as a TIES.

6.6.7 When determined by the TA or designated TA, and authorized by CA or PA, the Contractor must undertake the TIES activity. This activity includes the provision of system and maintenance support and management services. It includes the requirement analysis and planning to ensure current reliability and availability specifications can be met, the scheduling of maintenance, the identification of spares and support, as well as the development of policies and maintenance procedures. It also includes the contract management activities as well as the validation / acceptance of deliverables when the maintenance activity is contracted.

6.6.8 The scope of work normally covered under SITS is to cater for equipment not meeting specification standards or due to repetitive failures. When authorized by the CA or PA, the Contractor must undertake the SITS activities and must provide relevant data to these investigations as and when required.

6.6.9 The Contractor must satisfy Additional Work Arisings (AWAs) requirements that are not specified in this SOW, if and when requested by DND, for example, to meet new operational requirements and national specifications as requested by the TA or designated TA.

6.6.10 When requested, the Contractor must provide for the proposed AWAs an estimate of the level of effort, including any required travel, in order to modify the GS and EIE system software or hardware beyond the current operational GS and EIE systems and in force COSPAS-SARSAT specifications to meet the AWAs requirements.

6.6.11 The Contractor must follow the DND 626 task authorization process and obtain approval by the CA or PA prior to commencement of the AWA activity.

6.6.12 The Contractor must provide with each task authorised activities a report detailing the process and outcome as per section 7.1 of this SOW and in accordance with A-LM-184-001/JS-001.

6.7 TRAINING

6.7.1 The Contractor must prepare and deliver the required updated Operation and Maintenance Training Plans (OMTP) and Training Material to support CMCC and LCMM in meeting their operational requirements while using the MEOSAR GS and EIE system through their entire life cycles.

6.7.2 The Contractor must provide an annual refresher course on the MEOLUT ROI, NLP and CAST at CMCC in Trenton to Canada's Operators consisting of up to ten (10) students, covering operation and use of ROI, the NLP and CAST.

6.7.3 The Contractor must provide an annual refresher course on the use of the EIE consisting of up to ten (10) students at CMCC in Trenton to DND personnel.

6.7.4 The Contractor must provide an annual refresher course on the operation and maintenance of the MEOLUTs and MEOLUT network consisting of up to ten (10) students at one of the MEOLUT sites for LCMM and first line maintenance support staff.

6.7.5 The Contractor must be able to provide on request by DND training above and beyond the annual refresher courses. Such requested training will fall under Task Authorised Maintenance Services process as per section 6.6. The Contractor must follow the DND 626 task authorization process and obtain approval by the CA or PA prior to providing any additional training under this process.

6.7.6 The Contractor must provide all training by qualified instructors as per the OMTP in English and if and when requested in French.

6.8 ELECTRONIC INFORMATION ENVIRONMENT (EIE)

6.8.1 The Contractor must provide and maintain at its or subcontractor's premises, within Canada, an Electronic Information Environment (EIE) system with an Information Management / Information Technology (IM/IT) capability for effective, efficient, accurate, secure and timely capture, creation, exchange, and storage of all system data and outputs as described in section 6.1.11.

6.8.2 The EIE system databases related to GS system performance must allow CMCC Operators and representatives of Canada to access:

6.8.2.1 A list of all current publications for the provided GS system as well as access to previous versions of documentation as per section 6.1.11.1;

6.8.2.2 Spare parts recommendations and/or stock list; and

6.8.2.3 All required reports such as up-times, monitoring and maintenance reports;

6.8.3 When system issues or technical problems (TP) arise, these will generate a ticket to be recorded by the Contractor as part of its delivered EIE Electronic Ticketing System (ETS).

6.8.4 All system and issues or TPs are to be classified as major or minor tickets, and must be assigned one of the following priority levels:

6.8.4.1 Low: These are issues where possible changes have been identified that could be applied to improve or enhance the system and its performance, or are cosmetic or relate to appearance, have been noted from day-to-day operations, but do not impact normal operations. These generate low level priority tickets;

6.8.4.2 Medium: These TPs are minor defects or maintenance issues that in their current state have limited effect on normal MEOSAR day-to-day operations, but need to be addressed to avoid future negative impact. These generate low or medium level priority tickets;

6.8.4.3 High: These TPs are major defects that affect normal DND day-to-day operations at various levels for MEOSAR but the system is still operational. These generate high level priority tickets; or

6.8.4.4 Critical: Critical TPs are any major or critical defects that results in a failure condition impacting the MEOSAR system in a manner that the GS is non-operational and normal DND operations regarding MEOSAR are seriously impacted. These generate critical level tickets.

6.8.5 When notified of a system issue or TP, the customer and technical support help desk in 6.1.13 shall acknowledge the request via phone discussion with the CMCC Duty Operator within 5 minutes of being alerted, and discuss the issue with the CMCC operator to confirm symptoms, and severity (Major/Minor priority, Critical / non-critical issue) and generate a ticket. Technical support must provide an initial response and initial troubleshooting within 30 minutes from the request to attempt to repair the system remotely.

6.8.6 The ETS must be accessible by the telephone customer and technical support help-desk and:

6.8.6.1 Accept the creation of a new ticket by sending an email to a contractor specified address. The subject, body, and attachments of the email must become the new ticket in the ticketing system; and

6.8.6.2 Push emails to a configurable email list when tickets are created and updated. Configuration should allow the user to choose between the frequency of emails such as per ticket update, daily summary of updates, or weekly summary of updates.

6.8.7 The ETS must generate tickets and chronicle, record, monitor, all transactions related to ISS work, including, at a minimum, all customer requests, issues and technical problems, and all contractor generated responses, maintenance (software and hardware), repairs, tasks and services performed.

6.8.8 The ticket data recorded must contain at a minimum, but not limited to, the following fields:

- Ticket number;
- Date and time submitted;
- User that opened the ticket;
- User that added an update;
- Ticket update times;
- Affected system component;
- Software or hardware version as applicable;
- Ticket type;
- Ticket status;
- Priority;
- Subject or Summary;
- Description of issue and associated text data;
- Attachments;
- Repair type; and
- Estimated time of repair.

6.8.9 The ETS must allow CMCC Operators and representatives of Canada to:

- Login to view all ticketing system data;
- Create and update tickets;
- Attach files;
- Download tickets in pdf format; and
- Print clearly, and readable by the human eye, tickets to letter sized paper.

6.8.10 Should a ticket or TP classified as "Critical" be resolved by a temporary solution, then the EIE must be capable of raising new TP classified as “High” with a new ticket, so as to address the development of a permanent solution.

6.8.11 The Contractor may propose to close a ticket at any time in which case it should be indicated to be pending closure. However, to close a trouble ticket requires the consent of the TA or designated TA.

6.8.12 Tickets must be reviewed by Canada, and once closed to be archived as part of the EIE.

6.9 PERFORMANCE MANAGEMENT

6.9.1 The Contractor must ensure that the MEOLUTs, the MEOLUT network, the MEOLUT Local and Remote Operator Interfaces and support tools must meet all performance requirements as stated in section 6 of the MEOLUT SOW.

6.9.2 DND requires a capability to measure the GS system availability and performance and in terms of the timeliness and effectiveness with which it provides ISS and supports the capability for MEOSAR operations to be conducted.

6.9.3 To evaluate the GS system availability and performance the Contractor must ensure that the EIE system is capable of executing and recording performance measurements for the GS system and the response time of customer and technical support from the ETS.

6.9.4 The measurement of performance metric values must be a feature of the EIE using data captured within the GS system functions and ETS system.

6.9.5 Availability (A) must be expressed as a percentage and is calculated by dividing the amount of actual operational time (OT) by the time required to be in operation (OTR). The time required to be in operation (OTR), expressed in hours, is inclusive of all maintenance downtime. The actual operational time (OT) is OTR minus the system downtime, planned and unplanned, (DT) reported in hours. Downtime is that period of time when a system fails to meet its functional requirements as per this SOW. Therefore, availability (A) is calculated as:

$$A = (OT/OTR) * 100 = (1 - (DT/OTR)) * 100$$

6.9.6 The availability measurement must be performed for the following GS elements:

- MEOLUT Sites, including all associated MEOLUT system equipment and software, Qty2;
- CMCC ROI, Qty 2;
- MEOLUT Network System and NLP, Qty 2;
- Customer and Technical Support Help Desk, Qty 1; and
- EIE (including ETS and electronic documentation), Qty 1.

6.9.7 Required availability for the GS elements as listed in Table 2 must be attained. These values are to be calculated as per section 6.9.5 over a time period of one calendar month and calculated at the end of each month.

6.9.8 The complete MEOSAR GS system, including all MEOLUTs and MEOLUT Network Servers and the CMCC ROI all available concurrently, must be operational 24 hours-a-day, 7 days-a-week, 365 days a year, with an average overall availability of 95 percent or as per the Contractor's bid, whichever is greater, and as calculated per section 6.9.5.

Item	Required Availability
Help Desk	99.5%
EIE	99%
Each CMCC ROI	99%
Each MEOLUT Network Server	99%
Each NLP	99%
Each MEOLUT	98%
Complete MEOSAR GS system	95%

Table 2: Availability Performance Requirements

6.9.9 The GS system must meet the performance requirement values referenced in section 6.1 of this SOW.

6.9.9.1 In addition, the following 3 critical performance requirements from 6.9.5, per MEOLUT and NLP, over Canada's AOR must also be included in the GS performance measurement:

- Beacon Detection Probability for test, reference, and orbitography beacons;
- Single Burst Independent Location Accuracy;
- Independent Location in 10 minutes Accuracy;

6.9.10 Beacon Detection Probability and Independent Location Accuracy performance for the MEOLUTs in standalone mode and networked (i.e. using the NLP or equivalent networked processing capability) as listed in Table 3 must be met.

These values are the average over a time period of one calendar month and calculated at the end of each month.

Item	Acceptable Performance at EOC	Required FOC Performance
Beacon Detection Probability per MEOLUT	99%	99.9%
Beacon Detection Probability combined/networked	99.9%	99.999%
Single Burst Independent Location Accuracy	90% within 10 km	90% within 5km
Independent Location Accuracy in 10 minutes	95% within 10 km	95% within 5km 98% within 10km

Table 3: Detection and Location Performance

6.9.11 The value of each performance metric must be calculated at 24:00 hrs of the last day of each month of the Contract, beginning at times indicated in the ISS SOW, based upon all of the applicable data captured within the EIE over the previous:

- Month (28, 29, 30 or 31 days)
- Quarter (90, 91 or 92 days);
- Year, 365 or 366 days; and
- Any other continuous period of time as required and entered by the user.

6.9.12 The Technical Problem Response and Resolution Times for a single instance of a TP, expressed in hours, must be calculated as the elapsed clock-hours from the date/time that the TP is released by an authorized DND representative to the Contractor for investigation until the date/time that the TA accepts a Contractor recommended solution to that problem.

6.9.13 The Contractor must ensure that the EIE and ETS perform all requirements as per section 6.8 and within the Technical Problem Response and Resolution Times listed in Table 4.

Classification	Contractor Acknowledgement Time (Hrs)	Contractor Response Time (Hrs)	Contractor Resolution Time (Hrs)
Low	72	144	n/a
Medium	24	72	240
High	1	8	24
Critical	0.25	0.5	8

Table 4: Technical Problem Response and Resolution Timelines (All times listed in Hours)

7 TASKS & DELIVERABLES

7.1 GENERAL

7.1.1 The Contractor must safeguard Government of Canada assets in accordance with applicable Government of Canada security policies and standards. This includes all equipment and all information in both electronic and paper form.

7.1.2 The Contractor must provide and deliver all electronic copies of manuals, reports and design documents in Microsoft (MS) Office 2010 and/or PDF format.

7.1.3 The Contractor must provide and deliver updates to the following documentation:

7.1.3.1 All standalone technical and operational manuals for all equipment, systems, interfaces, and software that are supplied and integrated by the contractor as part of the MEOLUTs, the MEOLUT LOI and ROI, the MEOLUT Network and associated Network Location Processor, and the MEOLUT CAST electronically and hard copies in both of Canada's official languages (English and French), delivered as part of the MEOLUT SOW;

7.1.3.2 All meetings and meetings' related correspondence, documentation, and project administrative documents in English;

7.1.3.3 All maintenance, repair and overhaul, and performance reports including PM CM trip reports and technical and design documents and updates as part of the ISS services and all in English as electronic copies;

7.1.3.4 For PM visits the report must include at a minimum:

- Name of site, type of work (e.g. MEOLUT PM), date of work, personnel in attendance, and Contractor approval authority for report;
- All inspections performed and results;
- All tests performed and results;
- All software versions loaded;
- A list of spares and materials used for the maintenance activity with NATO Stock Number, Serial Number and Model Number (if available);
- A list of any other parts repaired/replaced and the disposition of defective parts;
- All onsite spare parts with NATO Stock Number (if available), including quantity required and quantity on site;
- Pictures or images of site and equipment, screenshots and plots (e.g. downlink spectrum) as possible; and
- Any notes, recommendations, or additional information of concern.

7.1.3.5 For CM visits the report must include at a minimum:

- Name of site, the trouble ticket number, type of work (e.g. MEOLUT CM), the personnel in attendance, and Contractor approval authority for report;
- The time of the failure;
- The time the Contractor was notified and by whom;
- The nature of the failure (symptoms, cause, severity; hardware and/or software affected);
- The chronology (when the CM work began, its duration, when ended);
- The maintenance activities completed including any inspections and/or tests performed and results, and any software versions loaded;
- A list of spares and materials used for the maintenance activity with NATO Stock Number, Serial Number and Model Number (if available);
- A list of any other parts repaired/replaced and the disposition of defective parts;
- An indication of whether the repair action was permanent or temporary; and
- A list of any further actions needed (if any).

7.1.3.6 All TIES and SITS Reports as stipulated under a DND 626 task authorization process when so directed, in English;

7.1.3.7 Requirements Verification and Validation Matrix as part of the ISS work;

7.1.3.8 A Performance Verification and Validation Matrix for all systems; and

7.1.3.9 Summary of Document Versions Matrix to verify all documentation has been updated accordingly.

7.1.4 A Contractor Management Office must be established by the Contractor to provide the oversight and coordination function of the integrated support services. This group must provide the main interface with the DND LCMM.

7.1.5 ISS Program Management comprises program level support and related project management activities and tasks required to meet all program goals and produce required outputs under this SOW.

7.1.6 During the set up phase of the ISS, the Contractor's Project Manager must be the primary point of contact between the Contractor, Contracting Authority (CA), and the designated Technical Authority (TA).

7.1.7 The recording and measurement of all performance metrics will occur at the commencement of the ISS phase. However, the Contractor will not be held accountable for meeting performance requirements during the set-up phase and until the first MEOLUT is commissioned.

7.1.8 The Contractor must identify the configuration of the MEOSAR GS, its equipment and any associated items by describing it in an Equipment Breakdown Structure (EBS) that breaks out its elements in a top-down manner.

7.1.9 The Contractor must develop, deliver and update an ISS Management Plan (IMP) that describes the Contractor's strategy, plans, methodologies and processes for meeting the requirements of the ISS Contract.

7.1.10 The Contractor must review the accuracy of the IMP at intervals of not less than six months, make revisions if applicable, and then re-submit to the TA. The successive revisions of the IMP must reflect the lessons learned and areas where business processes must be improved.

7.1.11 As part of the IMP the Contractor must at a minimum:

7.1.11.1 Provide all test cases and procedures, verification, validation and compliance matrices and Configuration Items (CIs), including software, firmware and hardware, to perform all required ISS services;

7.1.11.2 Track product compliance by means of a Requirements Traceability Matrix;

7.1.11.3 Store and control master copies of documents generated through Contract work, performing version control, and controlling their release;

7.1.11.4 Submit (or provide access to) documents to the TA for information, or for review and acceptance, and manage revisions resulting from the review process;

7.1.11.5 Implement authorized document revisions, updating the document's change page, and ensuring correct and current data are issued for use;

7.1.11.6 Prevent unauthorized change or accidental corruption of technical data;

7.1.11.7 Protect stored documents from environmental damage;

7.1.11.8 Comply with all security requirements, and protect technical data from unauthorized access; and

7.1.11.9 Provide a means of disaster recovery, including maintaining and keeping current a secure backup of all technical documentation and MEOSAR GS and EIE software.

7.1.12 The Contractor must provide written evidence that they conform to the required level of spares as stated in their bid to reduce the risk of falling below required operational Availability.

7.1.13 The Contractor must develop and deliver a Contract Status Report (CSR). The CSR is the Contractor's principal statement and explanation of the status of the Support provided for the Contract at the end of each reporting period.

7.1.14 The CSR will be used by the DND LCMM to assist with monitoring the performance of the Contractor under the Contract and as a historical record of performance.

7.1.15 If Canada notifies the Contractor, on the basis of any CSR, or part thereof, that the Contractor has failed to achieve performance to the levels required under the Contract, the Contractor must advise Canada of the measures proposed to achieve the levels of performance required. Further, subsequent reports must reflect the results of such measures, as are necessary to re-establish Contract performance.

7.1.16 If the MEOSAR GS or EIE is improved through modifications, or if the number of associated equipment is changed, Canada will formally amend the Contract, thus making clear any adjustment in the Contractor's scope of responsibility.

7.1.17 The Contractor must be responsible for assessing and reporting on its performance.

7.1.18 The Contractor must report performance results formally to Canada twice per government fiscal year (01 April to 31 March and less formally on a monthly basis throughout the fiscal year as part of the Monthly Review Meetings (MRMs). The reported performance will be validated by Canada.

7.1.19 The Contractor must produce, submit and update a Risk Assessment and Mitigation Plan (RAMP) for ISS works, identifying risks associated with the MEOSAR GS, technology obsolescence, and all other risks that impact the contractor IMP.

7.1.20 The Contractor must update the Recommended Spare Parts List (RSPL) that includes all the spare parts required to maintain the MEOLUTs in accordance with the COSPAS-SARSAT availability requirements and specifications.

7.1.21 The Contractor must update and provide the Availability Analysis document that supports the RSPL in identifying the critical components of the system, their Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR), and the MEOLUT availability as a whole entity.

7.1.22 The Contractor must update and provide the Operations and Maintenance Training Plan (OMTP) that includes all training material required to train the operators, users and maintainers of the system.

7.1.23 The Contractor must update all Operations, Management, Maintenance, User Configuration and Interface Description manuals containing all information required to operate, manage, maintain, and configure the complete Ground Segment System.

7.2 QUALITY MANAGEMENT SYSTEM (QMS)

7.2.1 The Contractor must have a Quality Management System (QMS) that defines and controls the system processes and product quality for Support provided under this Contract.

7.2.2 The Contractor, and major subcontractors, must have in place a QMS compliant with the requirements in ISO 9001:2008, or demonstrated equivalent.

7.2.3 During progress of work under the Contract, Canada may at its discretion perform Audit and Surveillance activities in relation to the Work performed, including a QMS Audit of the following:

7.2.3.1 Process Audit; or

7.2.3.2 Product Audit.

7.2.4 The Contractor must ensure that all work performed by a subcontractor meets the requirements of the QMS to be applied by the Contractor.

7.2.5 The Contractor must maintain records pertaining to the planning and verification of the quality of the Support for a minimum period of seven (7) years after completion of the Contract period.

7.2.6 All work is subject to Government Quality Assurance (GQA) performed at the Contractor's or any subcontractor's facility, and at work sites outside of these

facilities, by the Director of Quality Assurance, or by its designated Quality Assurance Representative (QAR).

7.2.7 Each piece of repaired and/or overhauled equipment must undergo inspection and testing that substantiates that it conforms to the requirements of the Contract, is fully serviceable, and performs in accordance with its technical specification and as described in its operations manual.

7.2.8 The Contractor must manage the Quality Program for the Contract in accordance with the approved IMP.

7.3 MEETINGS

7.3.1 The Contractor must ensure that the necessary data, personnel and facilities are available for all meetings.

7.3.2 As appropriate, meetings may be held at the Contractor or DND facilities at the discretion of the TA.

7.3.3 The Contractor's Program Manager must be present at all meetings. If the Program Manager does not have final approval authority for decision making and changes, then the person that has that final approval authority must also be present at all meetings.

7.3.4 The meeting agenda must provide information about the items to be presented or discussed at the meetings.

7.3.5 The meeting minutes must provide detailed record of the discussions, Action Items, and decisions taken during the meeting.

7.3.6 No change in the interpretation of the Program, SOW, cost, or schedule, as defined in the Contract, may be authorized by the minutes of a meeting. If decisions made at any meeting require changes to the contract, these decisions must be executed through a formal contract amendment by the CA.

7.3.7 The Contractor must provide a draft agenda 10 working days prior all meetings for DND comments; DND will provide comments (if any) five working days prior to the meetings

7.3.8 The Contractor must provide the draft meeting minutes for all meetings five working days after each meeting is held; DND will provide comments (if any) five working days after receipt of the minutes. Meetings must be archived to the EIE.

7.3.9 **Kick-Off Meeting (KOM):**

7.3.9.1 The Contractor must host a Kick-off Meeting no later than twenty-one (21) calendar days after contract award to review and secure a common understanding of the requirements expressed in the following documents:

- The Contract;
- The SOW, including each appendix;
- The ISS Management Plan (IMP) Data Item Description (DID)
- Any other contractual or programmatic issues associated with the project as agreed between the TA, CA and the Contractor.

7.3.10 **Monthly Review Meetings (MRM):**

7.3.10.1 The Contractor must hold Monthly Review Meetings or Teleconference (MRM) with the first starting 30 working days following the KOM, between the Contractor, TA or designated TA, and other parties as determined by the TA;

7.3.10.2 The Contractor must provide conference call numbers and any video conference capability as required. Should the Contractor or DND decide that a face-to-face MRM is required, the MRM must be held in either Ottawa, or Trenton Ontario, Canada;

7.3.10.3 The Contractor must submit a Monthly Status Reports (MSR) five working days before each MRM. The MSRs will be discussed at the MRMs and must provide information about the items to be presented or discussed at the MRMs;

7.3.10.4 The Contractor must submit as part of the MSR a monthly activity report along with the monthly invoices to the TA, CA and PA. The report may be in the Contractors own format but must contain:

- A list of all PM and CM activities and reports conducted within the month;
- A list of all open task authorizations and their status;
- A list of all task authorizations closed during the month and a brief summary of their results;
- An annual financial summary of the task authorizations for the period 1 Apr YY to present;
- A list of ticket activity within the month including new, closed, and pending tickets;
- A list of the actual installed system software versions;
- A report on the status of spares at all sites or a reference to such a report (e.g. a recent PM and CM trip report);

- The performance metrics for the MEOSAR GS and EIE system as listed and required in section 6.9;
- Newly identified risks; and
- Any other points of concern or note that should be brought to the TA's attention

7.3.10.5 All MRM must review and update the Risk Assessment and Mitigation Plan (RAMP) and record any newly identified risks; and

7.3.10.6 The Contractor must record and produce teleconference minutes in their own format within 10 working days of each teleconference meeting.

7.3.11 **Configuration Control Board (CCB) Meetings**

7.3.12 The Contractor must organize and participate in Configuration Control Board (CCB) Meetings at intervals of no greater than six (6) months, or as otherwise agreed with Canada. A minimum of two CCB meetings must be held per year.

7.3.13 CCB meetings will be held at a time that is mutually agreeable to the Contractor, the TA, the CMCC staff, the PA, and the CA. These CCB meetings must be held in either Ottawa, or Trenton Ontario, Canada.

7.3.14 In preparation for each CCB meeting, the Contractor must provide a ETS ticket summary to the TA and the CMCC staff at least five working days prior to the review meeting

7.3.15 The CCB Meetings must:

7.3.15.1 Discuss contract status, management, and financial aspects of the Contract, drawing information from the MSRs and CSR;

7.3.15.2 Discuss the status of the MEOSAR GS and its associated equipment (serviceable in storage, serviceable in use, unserviceable) and spares.

7.3.15.3 Include an In Service Support Performance Review to discuss the Service Support delivered since the last reporting period, drawing information from the MSRs and CSR;

7.3.15.4 Discuss issues and/or discrepancies arising from CSR if required; and

7.3.15.5 Identify and determine the actions required for longer-term planning of Contract management activities and the provision of support. This includes a look ahead at all MEOSAR ISS Work for the following year.

7.3.16 **Contract Performance Review Meetings (CPRM):**

7.3.16.1 The Contractor must organize and participate in Contract Performance Review Meetings following CCB Meetings, or as otherwise agreed with Canada.

7.3.16.2 Contract Performance Reviews must involve appraisal by Canada of the Contractor team's performance based on the MSR and CSR documents and monthly performance review of the MEOSAR GS and EIE systems

7.3.16.3 Upon completion of each performance review, the TA, CA and Contractor must meet to review the performance measurement results, process, and choice or metrics and values, to determine if efficiencies or improvements can be made in terms of process and results.

7.3.17 **Other Meetings:**

7.3.17.1 Meetings may be called by Canada or the Contractor for any proposed contract amendments, contractual discussions, or whenever DND or the Contractor deems it necessary. If the Contractor calls a formal meeting, the Contractor must submit for approval a recommended agenda to the TA/PA/CA at least five working days prior to the formal meeting.

7.4 COSPAS - SARSAT COMMISSIONING

7.4.1 The Contractor must perform all commissioning procedures and complete all documentation required for COSPAS-SARSAT commissioning of its MEOLUTs in accordance with C/S T.020 and C/S P.011 documents when required after ISS changes and repairs dictate re-commissioning.

7.4.2 The Contractor must present all commissioning procedures and submit test results for review evaluation and approval by DND TA, QAR and CMCC operators before submitting the commissioning documentation to the COSPAS-SARSAT Secretariat.

7.4.3 The Contractor must demonstrate that the each MEOLUT complies with the appropriate COSPAS-SARSAT commissioning standards and guidelines for both Standalone and Network modes.

7.4.4 The Contractor must provide all necessary software and documentation required to facilitate the commissioning process including:

7.4.4.1 Operation of a Government Furnished Beacon Simulator or third party Beacon Simulator in view of the MEOLUT for commissioning tests; and

7.4.4.2 Implementation and execution of all necessary beacon simulator scripts needed to perform all C/S T.020 tests using the Beacon Simulator.

7.4.5 The MEOLUTs and associated interfaces will be accepted as commissioned only after the submitted commissioning report to the COSPAS-SARSAT Secretariat has been reviewed by the COSPAS-SARSAT Joint Committee and formally approved by the COSPAS-SARSAT Council (CSC). The contractor must be present at the Joint Committee session/meeting to support Canada in presenting its Commissioning report.

7.5 WARRANTIES

7.5.1 The Contractor must warrant all hardware and software changes delivered as per the Standard Acquisition Clauses & Conditions (SACC).