COSPAS-SARSAT
DATA DISTRIBUTION PLAN

C/S A.001
Issue 8 – Revision 1
February 2019

COSPAS-SARSAT DATA DISTRIBUTION PLAN

History

Issue	Revision	Date	Comments
1	-	April 1986	Issue of original Cospas-Sarsat Operations Plan.
2	-	November 1988	Approved by the Cospas-Sarsat Council (CSC-1).
3	-	December 1990	Approved by the Cospas-Sarsat Council (CSC-5).
4	-	December 1997	Approved by the Cospas-Sarsat Council (CSC-19) and updated by the Secretariat.
5	-	October 2009	Approved by the Cospas-Sarsat Council (CSC-43).
6	-	October 2010	Approved by the Cospas-Sarsat Council (CSC-45).
6	1	October 2011	Approved by the Cospas-Sarsat Council (CSC-47).
6	2	October 2012	Approved by the Cospas-Sarsat Council (CSC-49).
6	3	October 2013	Approved by the Cospas-Sarsat Council (CSC-51).
6	4	October 2014	Approved by the Cospas-Sarsat Council (CSC-53).
7	-	December 2015	Approved by the Cospas-Sarsat Council (CSC-55).
7	1	December 2016	Approved by the Cospas-Sarsat Council (CSC-57).
8	-	February 2018	Approved by the Cospas-Sarsat Council (CSC-59).
8	1	February 2019	Approved by the Cospas-Sarsat Council (CSC-61).

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1. INTRODUCTION

1.1 Overview

The primary purpose of the Cospas-Sarsat System is the 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 radiobeacons operating on 406 MHz. The position of the distress and other related information are transmitted to appropriate Distress authorities by the responsible Cospas-Sarsat Mission Control Centre (MCC).

Distress authorities include:

a) SAR authorities for all types of distress beacons, except ship security beacons; and

b) competent authorities for ship security beacons.

Distress alert data (or alert data) includes data from all Cospas-Sarsat distress radiobeacons specified in documents C/S T.001 (Specification for First Generation Beacons or FGBs) and C/S T.018 (Specification for Second Generation Beacons or SGBs), including data from ELT(DTs) and cancellation messages.

1.2 Document Objective

The Cospas-Sarsat System is operated in accordance with the 1988 International Cospas-Sarsat Programme Agreement (ICSPA) and related documents. The purpose of this document is to:

a) establish basic data distribution principles; and

b) define the corresponding procedures to be implemented by Cospas-Sarsat MCCs for distributing Cospas-Sarsat alert data and System information.

1.3 Document Organization

The Cospas-Sarsat policy with regards to MCC operations is contained in the text of this Cospas-Sarsat Data Distribution Plan (DDP).

A brief description of the Cospas-Sarsat operational concept is given in section 2. Section 3 describes the basic approach for exchanging System information between MCCs and distributing to Distress authorities alert data and notification of country of beacon registration (NOCR) messages.

Sections 4 and 5 to this document provide:

a) a detailed description of the operational procedures to be applied by MCCs (section 4); and

b) a description of the Cospas-Sarsat Space and Ground Segments (section 5).

1.4 Reference Documents

a.	C/S A.002	Cospas-Sarsat Mission Control Centres Standard Interface Description,
b.	C/S A.003	Cospas-Sarsat System Monitoring and Reporting,
c.	C/S A.005	Cospas-Sarsat Mission Control Centre Performance Specification and Design Guidelines,
d.	C/S G.004	Cospas-Sarsat Glossary,
e.	C/S P.011	Cospas-Sarsat Programme Management Policy,
f.	C/S T.001	Specification for Cospas-Sarsat [First Generation] 406 MHz Distress Beacons
g.	C/S T.002	Cospas-Sarsat Local User Terminal Performance Specification and Design Guidelines,
h.	C/S T.004	Cospas-Sarsat LEOSAR Space Segment Commissioning Standard,
i.	C/S T.009	Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines,
j.	C/S T.013	Cospas-Sarsat GEOSAR Space Segment Commissioning Standard,
k.	C/S T.015	Cospas-Sarsat Specification and Type Approval Standard for 406 MHz Ship Security Alert (SSAS) Beacons,
l.	C/S T.017	Cospas-Sarsat MEOSAR Space Segment Commissioning Standard,
m.	C/S T.018	Cospas-Sarsat Specification for Second-Generation 406-MHz Distress Beacons,
n.	C/S T.019	Cospas-Sarsat MEOLUT Performance Specification and Design Guidelines,
o.	C/S R.012	Cospas-Sarsat 406 MHz MEOSAR Implementation Plan

- END OF SECTION 1 -

2. GENERAL OPERATIONAL CONCEPT

2.1 General Alert Data Flow

The distribution of Cospas-Sarsat alert data throughout the world is summarized as follows:

- the LUTs receive the beacon signals relayed by the satellites; and
- the signals are processed, and alert data is sent to the associated MCC for distribution.

Each MCC distributes alert data according to this Cospas-Sarsat Data Distribution Plan (DDP), and according to its own unique requirements and procedures, to any country within its service area which has agreed to accept such services. Alert data is provided to Distress authorities, including SPOCs, which are Rescue Coordination Centres (RCCs) or other recognized national points of contact that will use the data to enable fast and effective rescue of persons in distress.

Any MCC receiving alert data relating to a distress beacon located outside its service area will relay that information to another MCC or responsible Distress authorities in accordance with the principles listed in section 2.2 and the agreed procedures detailed in this document.

2.2 Alert Data Distribution Principles

The exchange of alert data between MCCs in the Cospas-Sarsat System and its distribution to Distress authorities is based on the following principles:

Cospas-Sarsat alert data should be:

- validated at the MCC to ensure the reliability of distress information provided to Distress authorities;
- distributed in a timely manner to the appropriate Distress authorities, as determined by the rules defined in this Data Distribution Plan; and
- provided to Distress authorities in accordance with the applicable Cospas-Sarsat procedures, or procedures agreed bilaterally between an MCC and the Distress authorities in its service area.

In the case of maritime emergencies, any MCC not able to deliver the alert to the responsible Distress authority should forward the alert to a RCC in the same country as the MCC.

In the case of inland emergencies, any MCC not able to deliver the alert to the responsible Distress authority should deliver the alert to an ARCC in the same country as the MCC and could also contact the control tower of an international airport in the country concerned.

In addition, MCCs should follow the Cospas-Sarsat agreed procedures to:

- filter out redundant alert messages;

- confirm the position of distress beacons and notify all recipients of incorrect positions after position has been confirmed (except for ELT(DT)s); and
- ensure through appropriate backup arrangements, the uninterrupted distribution of alert data.

2.3 Service Area of a Cospas-Sarsat MCC

An MCC's service area is that part of the world within which a Cospas-Sarsat alert data distribution service is provided by that MCC, in accordance with document C/S P.011 "Cospas-Sarsat Programme Management Policy".

An MCC service area is defined by the list of SPOCs to which that MCC distributes Cospas-Sarsat alert data. The list of countries / regions included in the service area of each MCC is provided at section 5.3 of this document.

Nothing in this document or other Cospas-Sarsat System documents prevents the parties from adopting other arrangements more suitable for the distribution of Cospas-Sarsat alert data at some future date.

It is essential that MCCs establish appropriate arrangements with all the countries / SPOCs in their service area on communication links to be used for the distribution of alert data. If such arrangements have not been made for a particular country in the MCC service area, the MCC shall notify its own national SAR authorities of any Cospas-Sarsat alert in that country's SRR, for handling in accordance with national SAR procedures.

As new SPOCs are identified, either through agreements with Cospas-Sarsat or via other channels, they will be incorporated into existing MCC service areas by mutual consent of the SPOC national authority and the appropriate MCCs. All MCCs should be notified of new SPOCs.

2.4 Data Distribution Regions

A data distribution region (DDR) comprises two or more MCC service areas. Cospas-Sarsat alert data and System information are exchanged between DDRs through a single MCC which acts as the point of contact for that DDR. This MCC is identified as the nodal MCC of the DDR. However, bilateral arrangements can be implemented between adjacent MCC service areas included in different DDRs to facilitate the exchange of alert data in overlapping service areas or adjacent search and rescue regions.

The DDR structure of the Cospas-Sarsat data distribution network is defined in section 4.1, together with the specific arrangements for the exchange of alert data in each DDR.

2.5 General Flow of System Information

System information assists in the operation of the Cospas-Sarsat System. This information includes Cospas-Sarsat satellite ephemeris and calibration data that affect location processing, messages

used for commanding the satellite SAR instruments, and notification messages providing the status of System elements. The flow of System information through the Cospas-Sarsat System is detailed in section 3.5.

- END OF SECTION 2 -

3. PROCEDURES

3.1 General Procedures for the Distribution of Cospas-Sarsat Alert Data

3.1.1 Introduction

Alert data (or "alert") is the generic term for Cospas-Sarsat alert and position data derived from 406 MHz distress beacon signal processing. Alert data derived from beacon signals contains the beacon identification and may contain beacon position information and other coded information. Alert data includes cancellation messages transmitted by SGBs and FGB ELT(DT)s, which indicate that the distress condition associated with a beacon activation has ceased.

Beacon signals are relayed via three search and rescue (SAR) satellite systems, low Earth orbit (LEOSAR), geostationary Earth orbit (GEOSAR) and medium Earth orbit (MEOSAR). Position data can be derived in three ways:

- by Doppler processing via the tracking of a LEOSAR satellite receiving 406 MHz beacon transmissions,
- by difference of arrival (DOA) processing using time of arrival (TOA) and frequency of arrival (FOA) measurements received from multiple MEOSAR satellites relaying the same beacon transmissions,
- by position data encoded in beacon messages.

MCCs receive alert data from their LUTs or from other MCCs and distribute this alert data to the appropriate Distress authority in their service area or forward the alert data to another MCC. Alert data received from a single LEOSAR satellite pass or in a single MCC message shall be processed in TCA or detection time order. MCCs shall transmit Cospas-Sarsat alert data in accordance with the principles for data distribution listed in section 2.2. The corresponding procedures are outlined in Figure 3-1 for all beacon types except ELT(DT)s, in Figure 3-2 for ELT(DT)s, and in the following sections. These procedures are further detailed at section 4.2.

3.1.2 Geographical Sorting of Alert Data

Except for ship security alert data (described in section 3.2.6), unlocated alert data (described in section 3.2.8), alert data are distributed according to the geographical sorting of the available position(s). The geographical distribution of alert data to SAR authorities is organized as follows:

a) Beacon position is within an MCC's service area:

An MCC that receives alert data for a beacon position in its own service area forwards the alert data to the appropriate SPOC or national RCC, in accordance with the applicable Cospas-Sarsat or national procedures.

b) Beacon position is within another MCC's service area:

An MCC that receives alert data for a beacon position in another MCC's service area forwards the alert data to the appropriate MCC, in accordance with the applicable Cospas-Sarsat procedures as described in sections 4.1 and 4.2.

c) Unlocated alerts:

There will be occasions when a LEOLUT or MEOLUT is unable to calculate a location for a beacon or a beacon is detected by a GEOLUT, and the only information available is the beacon message. If this data does not contain an encoded position, the alert is unlocated. In these cases, the only information available will be the digital identification contained in the beacon message which includes a country code designating the country of registration of the beacon. MCCs shall transmit this information to the country of registration according to the procedure described in section 3.2.8.

3.1.3 Message Formats

Alert messages are exchanged between MCCs using standard formats which permit automatic processing and retransmission of all data. These message formats are defined in the Cospas-Sarsat Mission Control Centres Standard Interface Description (C/S A.002). The lists of message formats that are implemented at each MCC are provided at section 5.1.

3.1.4 Beacon Identification

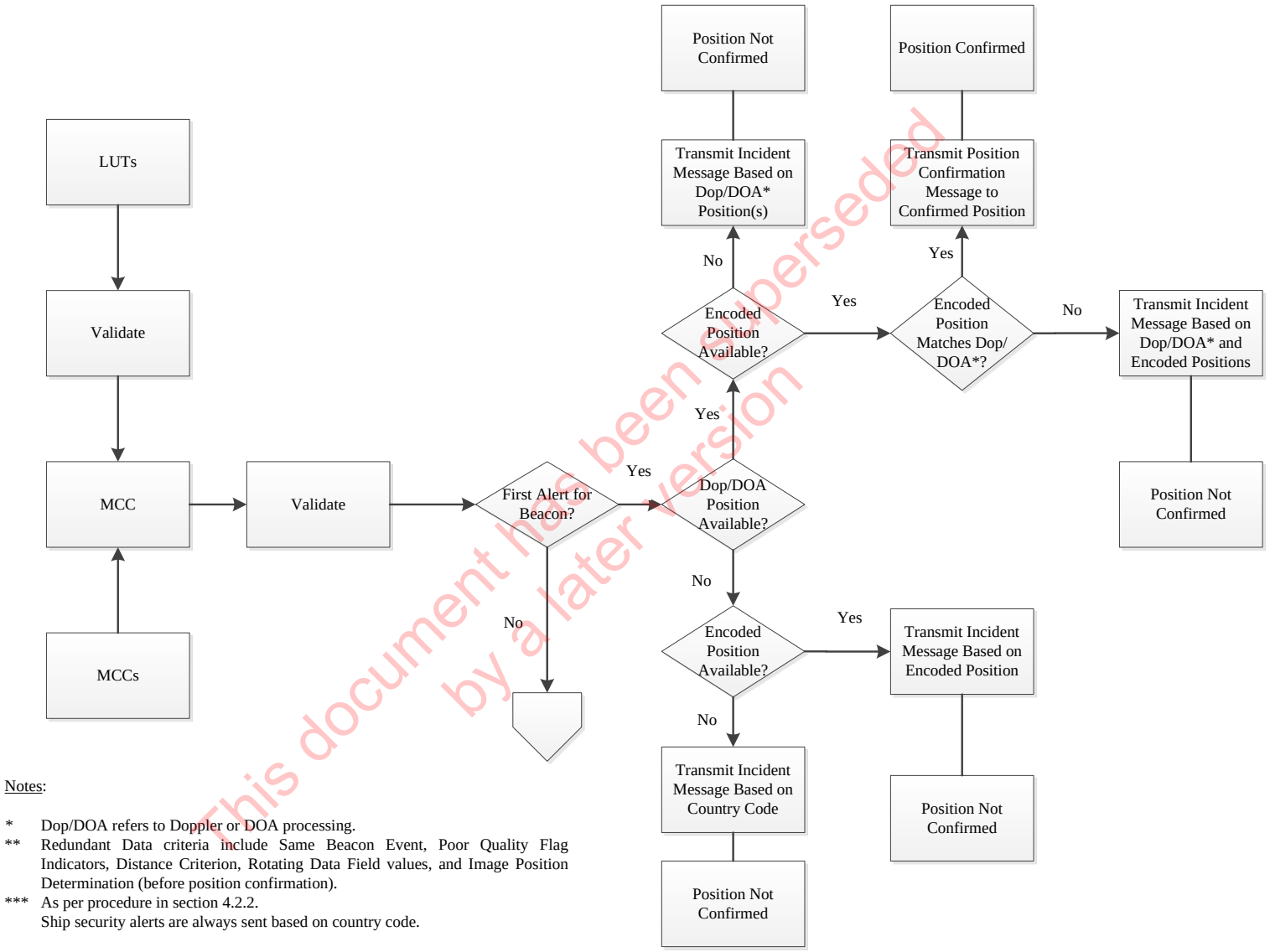
MCCs when transmitting narrative messages and making reference to beacon identification shall provide the identification as specified below:

a) FGB: 15 hexadecimal characters comprising bits 26 to 85 of the beacon message. If a location protocol beacon is involved, the coarse position fields shall be set to the specified default values.

b) SGB: either:

- 15 hexadecimal characters (bits 1 – 48 of the 23-hex ID, per Table “Hex ID Contents” of document C/S T.018) with suffix “000”, or
- 23 hexadecimal characters (bits 1 – 92) per Table “Hex ID Contents” of document C/S T.018.

The SGB Identification shall be provided as 15 or 23 hexadecimal characters as specified.



Notes:

* Dop/DOA refers to Doppler or DOA processing.

** Redundant Data criteria include Same Beacon Event, Poor Quality Flag Indicators, Distance Criterion, Rotating Data Field values, and Image Position Determination (before position confirmation).

*** As per procedure in section 4.2.2.
Ship security alerts are always sent based on country code.

Figure 3-1: 406 MHz Alert Data Distribution Procedures – All non-ELT(DT)s (1/2)

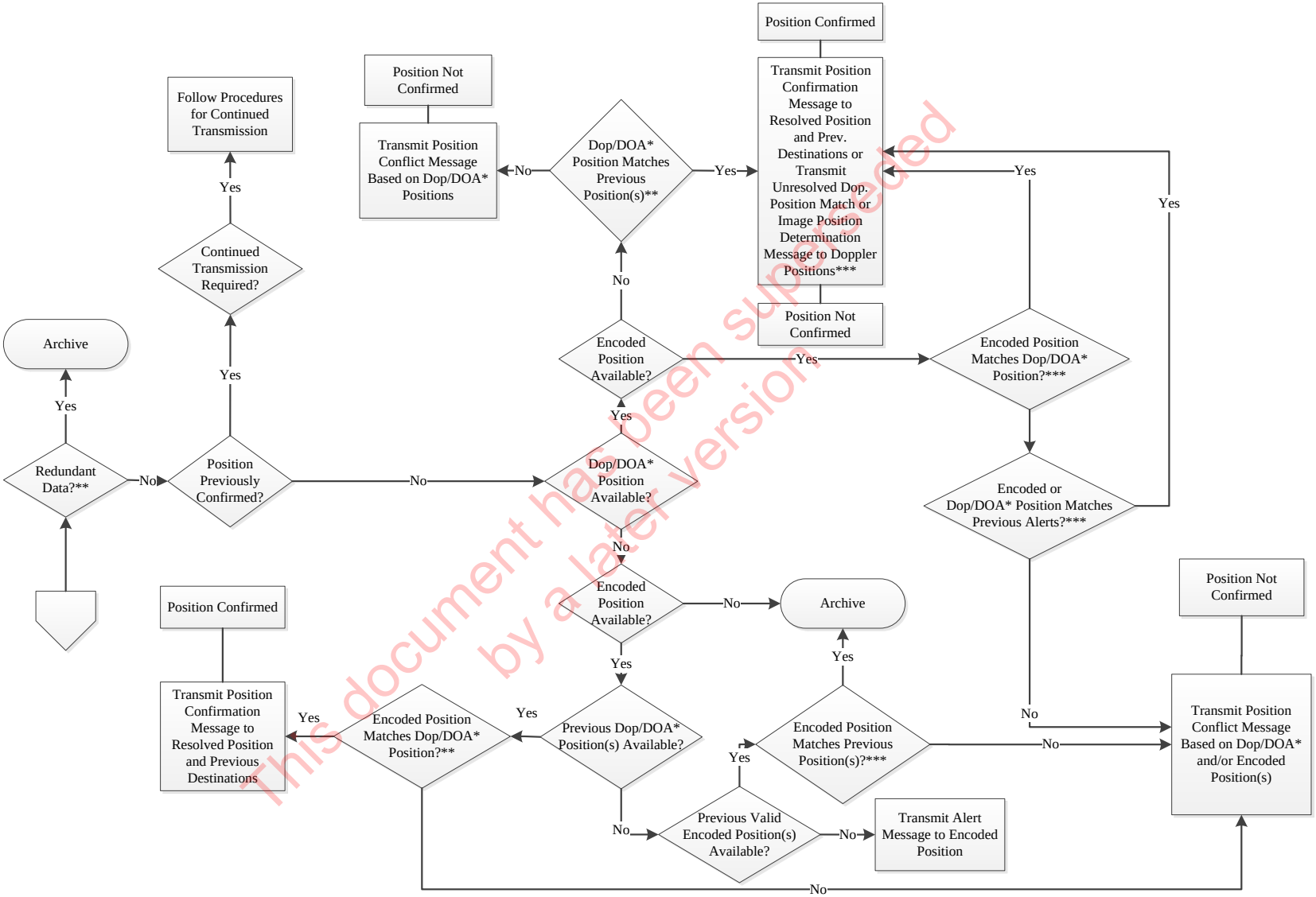


Figure 3.1: 406 MHz Alert Data Distribution Procedures – All non-ELT(DT)s (2/2)

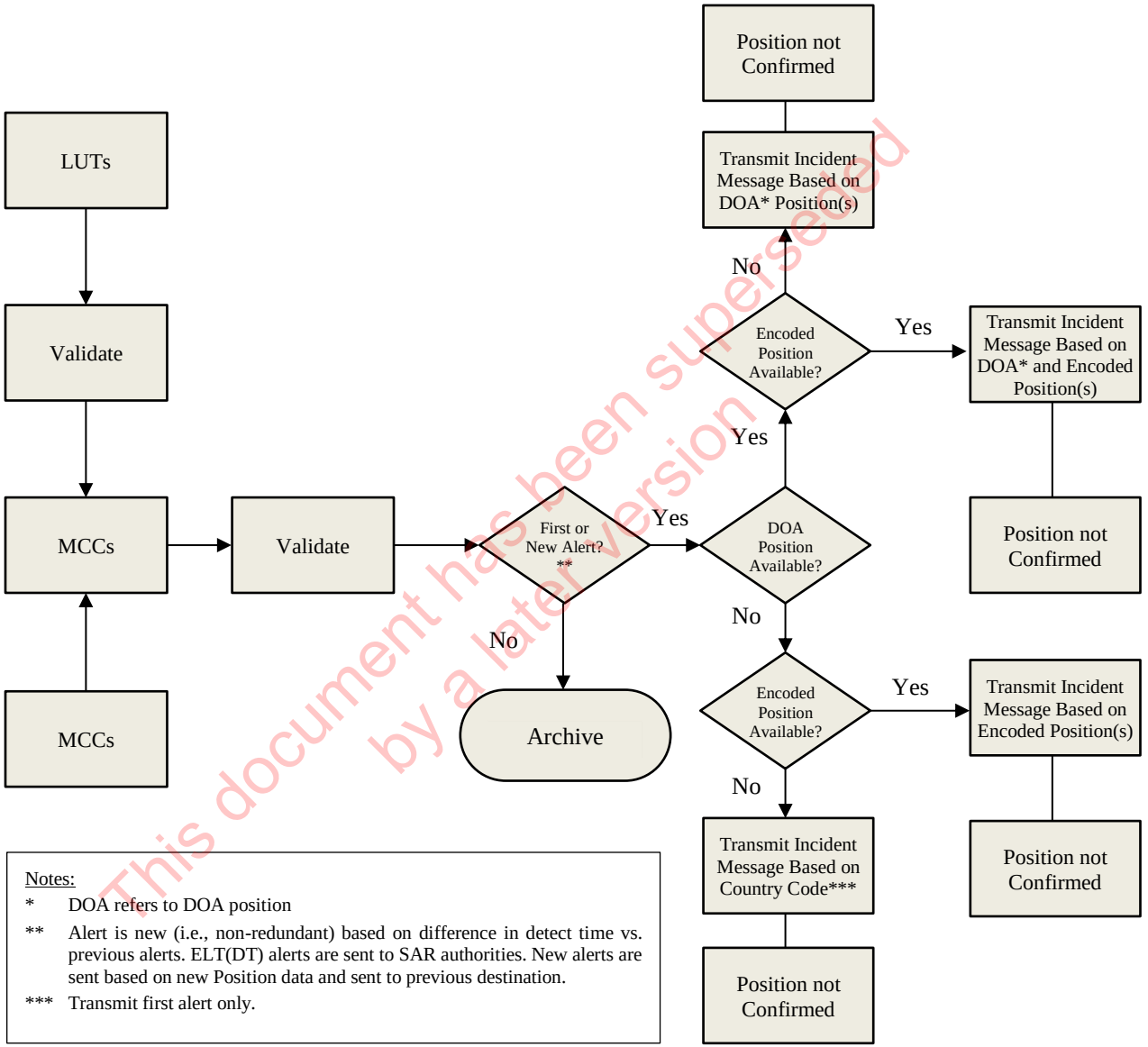


Figure 3-2: 406 MHz Alert Data Distribution Procedures - ELT(DT)s

3.2 Alert Data Distribution Procedures

3.2.1 Doppler, DOA and Encoded Positions

Position data provided by LEOLUT Doppler processing, provided by MEOLUT DOA processing, and encoded in beacon messages, constitute independent sources of beacon position information. All types of position data are used by MCCs in the filtering and geographical sorting process and distributed with alerts to RCCs and / or SPOCs, in accordance with the procedures described hereunder.

An MCC shall filter all Doppler position data generated for ELT(DT)s and SGBs. An MCC shall filter all DOA position data generated by a MEOLUT for ELT(DT)s, if the MEOLUT is not commissioned to provide DOA locations for fast-moving beacons.

An MCC shall verify that each alert location that it receives is inside the footprint of each satellite through which it was detected per the associated alert message, using the algorithm described in the Appendix "Determining the Satellite Footprint Check" in document C/S A.002. If a Doppler or DOA position fails this footprint check, then:

a) the Doppler or DOA position data shall be processed;

b) a warning shall be provided about the out of footprint position data in the alert distributed to a Distress authority (per document C/S A.002); and

c) the MCC operator shall be notified.

If an encoded position fails this footprint check, then the encoded position shall not be processed.

3.2.2 Validation of Beacon Message Data

Under various circumstances such as interference, weak beacon signals or high noise levels, the LUT processing can produce erroneous alert data (i.e., processing anomalies) which may cause false alerts.

The alert data produced by the LEOLUTs, GEOLUTs and MEOLUTs must be validated in accordance with the requirements of documents C/S T.002, C/S T.009 and C/S T.019, respectively. In addition, to avoid propagating invalid alerts through the Cospas-Sarsat Ground Segment, the procedure for validating alert data described at section 4.2 shall be implemented at the MCC level to satisfy the requirements of document C/S A.005.

3.2.3 Processing Multiple Alerts for the Same Beacon Identification

After validation, alert data received by an MCC shall be compared to previous information concerning the same beacon identification which has already been processed by that MCC, where the "same beacon identification" is based on the 15-hexadecimal beacon ID, per the section 3.1.4.

Except for RLS test protocol beacons or for specified tests, MCCs shall filter alert data associated with test protocol beacon messages (including SGB messages with bit 43 =1 in the 154-bit main field)

3.2.3.1 Resetting Beacon Activation Status

If the satellite detection time or time of closest approach of a new alert is more than 18 hours after the detection time of the latest alert received by the MCC for the same beacon identification, then:

a) the new alert shall be treated as a new beacon activation (i.e., the beacon activation status word (Sw) is reset to zero, per section 4.2.5); and

b) all alerts with any associated detection time not after all associated detection times of the latest alert received by the MCC for the previous beacon activation shall be filtered from MCC processing of the new beacon activation.

MCCs may reset the beacon activation status (i.e., open a new alert site) prior to the expiration of this time threshold based on other criteria.

In addition, MCCs shall reset the beacon activation status after cancellation messages are processed, as specified in section 3.2.11.

3.2.3.2 Filtering of Redundant Data

Position data from LEOLUT, GEOLUT and MEOLUT alerts shall be matched using the distance criteria defined at section 4.2 of this DDP and the criteria for Position Confirmation described in section 3.2.4.

For ELT(DT)s, special procedures are used to filter redundant data, as described in section 3.2.3.2.2. Procedures related to Position Confirmation, Distribution of Alerts with Better Quality DOA Position, and Continued Transmission after Position Confirmation do not apply to ELT(DT)s unless noted otherwise.

MCCs shall distribute alert data that is otherwise redundant for all SGBs, including ELT(DT)s, if the Rotating Data field is usable (per validation rules in section 4.2.1.1.3), and either

a) no alert has previously been sent that contains the same Rotating Data field type (beacon message bits 155-158); or

b) both:

   i. the associated detect time of the Rotating Data field is at least 10 minutes after the most recent associated detect time for a previously sent alert that contained data for the same Rotating Data field type; and

   ii. there is at least one difference in the new Rotating Data field (bits 159-202) compared to the previously sent Rotating Data field of the same type with the most recent associated detect time.

3.2.3.2.1 Filtering of Redundant Data for Beacons except ELT(DT)s

Alert data produced by LEOLUTs is considered to be for the same beacon event when it has the same beacon identification (ID), same spacecraft and same time of closest approach (TCA) ± 20 minutes; otherwise LEOLUT alert data is considered to be for a different beacon event.

Prior to position confirmation, LEOLUT alert data for the same beacon ID is not redundant if it can be used to confirm the position, because either:

a) Doppler position data in the new alert matches Doppler position for a different beacon event in a previous LEOLUT alert; or

b) Doppler position data in the new alert matches DOA position in a MEOLUT alert; or

c) Doppler position data in the new alert matches encoded position in a previous alert; or

d) encoded position in the new alert matches either:

   i. Doppler position in the same alert, or

   ii. Doppler position in a previous alert, or

   iii. a DOA position.

Otherwise, LEOLUT alert data for the same beacon ID is deemed to be redundant if:

a) the new alert message does not include Doppler position data and the encoded position matches encoded position information received earlier by the MCC; or

b) position was previously confirmed, the new alert message includes Doppler position data, a Doppler position in the new alert matches the confirmed position, a Doppler position in the new alert matches a position in an alert previously sent for the same beacon event, and either:

   i. the new alert message does not include encoded position data, or

   ii. the encoded position data in the new alert message matches encoded position information received earlier by the MCC; or

c) the new alert message includes Doppler position data, each Doppler position in the new alert matches a Doppler position in one alert previously sent for the same beacon event and, either:

   i. the new alert message does not include encoded position data, or

   ii. the encoded position data in the new alert message matches encoded position information received earlier by the MCC; or

d) an alert with the same beacon ID has already been processed for the same beacon event and the new alert message does not include Doppler position data or encoded position data.

Before position confirmation, LEOLUT alert data for the same beacon event should not be considered redundant if it contains information on image position determination not previously received (see document C/S A.002, Appendix B.2 to Annex B entitled “Validating the Satellite Footprint and LEOSAR Image Position”).

Alert data produced by MEOLUTs is considered to be a dependent beacon event based on the criterion for setting the 'Dependent Beacon Event' flag defined at section 4.2.

Prior to position confirmation, MEOLUT alert data for the same beacon ID is not redundant if it can be used to confirm the position, because either:

a) DOA position data in the new alert matches DOA position for a non-dependent beacon event; or

b) DOA position data in the new alert matches a Doppler position; or

c) DOA position data in the new alert matches encoded position in a previous alert; or

d) encoded position in the new alert matches either:

   i. DOA position in the same alert, or

   ii. DOA position in a previous alert, or

   iii. a Doppler position.

Otherwise, MEOLUT alert data for the same beacon ID is deemed to be redundant if either:

a) the new alert message does not include DOA position data and the encoded position matches encoded position information received earlier by the MCC; or

b) the new alert message includes DOA position data, the DOA position in the new alert matches a DOA position in an alert previously sent for a dependent beacon event and, either:

   i. the new alert message does not include encoded position data, or

   ii. the encoded position data in the new alert message matches encoded position information received earlier by the MCC; or

c) an alert with the same beacon ID has already been processed for a dependent beacon event and the new alert message does not include DOA position data or encoded position data.

However, prior to position confirmation, a dependent beacon event alert shall be transmitted if:

a) the time of the latest beacon burst used to compute the new DOA position is more than five (5) minutes after the time of the latest beacon burst used to compute all previously sent DOA positions; or

b) the new alert has better quality DOA position, per the procedure "Distribution of Alerts with Better Quality DOA Position" in section 3.2.3.3; or

c) the new alert is a position conflict alert and no more than four (4) position conflict alerts have been sent that contain DOA position.

Prior to position confirmation, GEOLUT alert data for the same beacon ID is not redundant if it can be used to confirm the position, because encoded position in the new alert matches either Doppler or DOA position in a previous alert.

Otherwise, GEOLUT alert data produced by GEOLUTs for the same beacon ID identification is deemed to be redundant if:

a) the new alert message does not include encoded position data; or

b) the encoded position data in the new alert message matches encoded position data received in an earlier message.

To minimize redundant message traffic in the Ground Segment, MCCs shall not distribute alert data which have been determined as redundant in accordance with the procedure described at section 4.2. MCCs shall distribute alert data which have not been determined to be redundant.

The matching test for new encoded position data shall be performed with all encoded position data previously received and forwarded (i.e., not deemed redundant) for the same beacon ID, taking into account whether the encoded position is coarse (i.e., without usable encoded position in the second protected field of the beacon message) or refined (i.e. with usable encoded position in the second protected field of the beacon message), as follows:

a) if the new encoded position is refined, and:

   i. no previous refined encoded position has been sent, then the new encoded position is sent regardless of the difference with any previously sent coarse encoded position (and the alert will be distributed as a "position update"), else

   ii. another refined encoded position was previously sent, then the new encoded position is sent if it:

      a. does not match any previously sent refined encoded position, or

      b. it has a detect time more recent than any previously sent refined encoded position and does not match any previously sent refined encoded location with the most recent detect time; and

b) if the new encoded position is coarse, and:

   i. it matches the position encoded in the first protected field of a previously sent beacon message, then it shall be deemed redundant, else

   ii. the new encoded position is sent if it does not match any previously sent encoded position (coarse or refined).

LEOSAR, GEOSAR and MEOSAR data deemed to be redundant shall not be used to determine whether subsequent data is redundant.

3.2.3.2.2 Filtering of Redundant Data for ELT(DT)s

To meet ICAO requirements to locate crashed aircraft, alerts for ELT(DT)s are distributed frequently during the period soon after beacon activation. To support the distribution of ELT(DT) alerts, a reference time is associated with each alert for an ELT(DT) as follows:

Table 3-1: Reference Times per Data Type for ELT(DT)s

Alert Type	Reference Time
LEOSAR	Detect Time or TCA provided by the LEOLUT (per document C/S A.002 Message Field #14)
GEOSAR	Detect Time provided by the GEOLUT (per document C/S A.002 Message Field #14)
MEOSAR	Time of last beacon burst (per document C/S A.002 Message Field #14b)

The MCC shall send a new alert received for an ELT(DT) if:

a) no previous alert has been sent for the beacon Identification (i.e., beacon activation status word (Sw) is zero); or

b) the new alert contains a DOA position and no previous alert with DOA position has been sent; or

c) the new alert contains an encoded position and no previous alert with encoded position has been sent; or

the reference time of the new alert is within 15 minutes of the earliest reference time for all previously received alerts, and either:

i. it differs by at least three (3) seconds from the reference time for all previously sent alerts; or

ii. it differs by at least three (3) seconds from the reference time for all previously sent alerts with DOA position and the new alert contains DOA position; or

iii. it differs by at least three (3) seconds from the reference time for all previously sent alerts with encoded position and the new alert contains encoded position; or

d) the new alert contains DOA or encoded position, and the reference time of the new alert differs by at least 10 minutes from the reference time for all previously sent alerts; or

e) based on service area information available to the MCC, the new alert contains DOA or encoded position located in an area for which the associated MCC or associated Distress authority has not previously been sent an alert.

The time thresholds specified above shall be configurable separately.

In addition, the MCC shall distribute alerts for an ELT(DT) that contain a cancellation message as specified in section 3.2.11.

MCCs shall distribute alert data for ELT(DT)s to SAR authorities, as specified in section 3.1.2. Subsequent ELT(DT) alerts shall be distributed based on new position data and to previous destinations. The distribution of alerts for ELT(DT)s for each beacon activation shall be configurable per SAR authority.

3.2.3.2.3 Distribution of Alerts with Better Quality DOA Position

Before or after position confirmation, a new alert with DOA position shall be transmitted for all types of beacons except ELT(DT)s, if the expected horizontal error (Message Field #89 in document C/S A.002) is available (i.e., set to a non-default value) for a previously transmitted DOA position and the expected horizontal error of the new DOA position is:

a) less than 150 nm (277.8 km);

b) at least 2 nm (3.704 km) less than the lowest expected horizontal error for all previously transmitted DOA position alerts for FGBs;

c) at least 1.9 nm (3.519 km) less than the lowest expected horizontal error for all previously transmitted DOA position alerts for SGBs; and

d) at least 50% less than the lowest expected horizontal error for all previously transmitted DOA position alerts.

Each of the above criteria shall be independently configurable.

3.2.4 Confirmation of Beacon Positions

The objective of this process is to confirm the position of a beacon on the basis of information provided by two independent sources.

A Doppler location always includes two sets of position data, the ‘true’ and the ‘image’ solutions which are symmetrical relative to the trace of the orbit. Each solution is associated with a probability which is generally sufficient to resolve the Doppler ambiguity. However, the actual characteristics of the 406 MHz transmission are not known by the receiving LUT and reliable ambiguity resolution of the Doppler solutions can only be achieved with a set of Doppler positions from a different beacon event, a DOA position, or an external source of data such as position data encoded in the beacon message. Ambiguity resolution is a specific type of position confirmation; the ‘true’ position is a type of confirmed position, the ‘image’ position is a type of incorrect position and an unresolved (Doppler) position is a type of unconfirmed position.

While a DOA position does not have inherent ambiguity, confirmation of a DOA position is required as errors may occur. Confirmation of a DOA position can only be achieved with a DOA position from a different beacon event, a Doppler position, or an external source of data such as position data encoded in the beacon message.

A beacon message with encoded position data provides a unique position which may be very accurate. However, errors may occur and confirmation of the encoded position via an independent source is desirable. As several alert messages from the same beacon received through different satellites and/or different LUTs can all originate from the same beacon transmission and, therefore, from the same navigational data, confirmation of encoded position data can only be provided by a Doppler or DOA position matching the encoded position.

Therefore, independent position information will consist of:

a) Doppler positions obtained from two different beacon events;

b) Doppler position and encoded position data; or

c) DOA positions obtained from two different beacon events; or

d) DOA position and encoded position data; or

e) Doppler position and DOA position.

The beacon position is confirmed only if two independent sets of position data match the distance criteria specified at section 4.2.

Alert data for beacons located outside an MCC's service area shall be forwarded until position is confirmed. Prior to position confirmation, alert data shall be transmitted to all previous message recipients. Once position is confirmed, a position confirmation message shall be transmitted to each MCC and/or SPOC that has the resolved position or a previous incorrect position in its MCC service area, or its SAR Region(s), respectively.

3.2.5 Continued Transmission after Position Confirmation

Continued transmission of alert data after position confirmation may be requested by an MCC or SPOC. An MCC requesting continued transmission by another MCC shall also request continued transmission by any nodal MCCs involved in the distribution of the continued transmission alert data.

After position confirmation, alert data shall not be geographically sorted according to the received position but sent to the same MCC or SPOC that has the resolved position in its MCC service area or its SAR Region, respectively, or requested continued transmission. Ship security alerts are not sent based on the received position, as described in section 3.2.6.

Alert data shall not be distributed after position confirmation to an MCC that has requested that it not receive alert data for its service area after position confirmation. Therefore, nodal MCCs (and Central DDR MCCs) shall be capable of filtering alert data after position confirmation based on the request of the destination MCC. MCCs that do not want to receive alert data after position confirmation shall notify other MCCs of this request and shall request the Secretariat to update the associated table on the Cospas-Sarsat website.

After position confirmation, MCCs shall send a new alert when:

a) a non-redundant encoded position is received (per section 3.2.3); or

b) Doppler position is received for a new beacon event; or

c) a Doppler position conflict alert is received for the same beacon event, provided that the new alert has sufficient quality (per section 4.2.4); or

d) the new alert has DOA position that matches the confirmed position and no alert with DOA position that matches the confirmed position has previously been sent; or

e) the new alert has better quality DOA position, per the procedure "Distribution of Alerts with Better Quality DOA Position" in section 3.2.3.3; or

f) a DOA position alert matching the confirmed position is received, provided that the time of the latest beacon burst used to compute the new DOA position is more than 15 minutes after the time of the latest beacon burst used to compute all previously sent DOA positions that matched the confirmed position; or

g) a DOA position conflict alert is received, and no DOA position conflict alert has previously been sent; or

h) a DOA position conflict alert is received, provided that the time of the latest beacon burst used to compute the new DOA position is more than 10 minutes after the time of the latest beacon burst used to compute all previously sent DOA position conflict alerts.

3.2.6 Exchange of Ship Security Alerts

Ship security alerts are initiated and transmitted by vessels whose security is threatened and who need to notify a competent authority designated by the flag state. The transmission of ship security alerts is based on the country code contained in the beacon identification, which is then used to route the alert to the appropriate MCC or competent authority.

MCCs will exchange ship security alerts using the formats specified in the document C/S A.002 and according to the ship security alert distribution procedures described in section 4.2 of this DDP.

An MCC shall transmit a ship security alert only to the MCC or competent authority associated with the country code. An MCC shall not transmit a ship security alert to the RCC or SPOC associated with the location of the alert.

3.2.7 Requesting Transmission of Alerts

MCCs, SPOCs or RCCs may request transmission of alerts by geographical area, or 15-hexadecimal beacon identifier (for FGBs or SGBs), or 23-hexadecimal beacon identifier (for SGBs) per the section 3.1.4. The MCC processing of such a request shall be based on the 15-hexadecimal beacon identifier per section 3.1.4.

If the request is by geographical area, then the request should specify the area for which new alerts would be provided, either as a radius in nautical miles around a position or as a rectangle defined by two opposing corner positions.

The request should indicate the MCCs that would receive alerts for that area in real time. A nodal MCC that receives a request for transmission shall forward the request to the appropriate MCCs, to ensure that the requested alerts are sent.

The requesting agency should indicate when transmissions are to be discontinued.

3.2.8 Exchange of Unlocated Alerts

When a LEOLUT or MEOLUT is unable to calculate a location for a beacon, or a beacon message is detected by a GEOLUT, the only information available is the beacon message. If this data does not contain an encoded position, the alert is unlocated. An unlocated alert shall be distributed using the country code in the beacon identification for routing to the appropriate MCC or Distress authority, as provided on the Cospas-Sarsat website "Contact List" for "406 MHz Beacon Registers (available 24/7 for SAR services)".

Unlocated alerts shall be validated at LUT and MCC level in accordance with the applicable procedure.

MCCs shall exchange unlocated alert messages using the formats specified in the document C/S A.002 and according to the alert distribution procedures described in section 4.1 and section 3.1.2 of this DDP.

Prior to position confirmation, an MCC shall transmit an unlocated alert message only if no position information has been received previously for the same beacon identification. To increase the probability of Image Position Determination (as defined in document C/S A.002), multiple LEOLUT/GEOLUT unlocated alert messages may be transmitted for a beacon other than an ELT(DT), provided that:

a) only one unlocated alert message is sent per GEOSAR satellite; and

b) only one unlocated alert message is sent per LEOSAR satellite beacon event.

After position confirmation, an MCC shall transmit an unlocated alert for an RLS-capable beacon as specified in section 4.2.10.

3.2.9 Combined LEOSAR/GEOSAR/MEOSAR Processing

For the purposes of alert data distribution procedures, solutions derived from combined LEOSAR/GEOSAR processing shall be treated as LEOSAR alerts. Solutions derived from MEOSAR processing that contain LEOSAR and/or GEOSAR data shall be treated as MEOSAR alerts.

3.2.10 Filtering Old Alert Data

Alert data with a detect time older than 24 hours shall be filtered.

3.2.11 Cancellation Messages

Cancellation messages are transmitted by SGBs and ELT(DT)s to indicate that the distress condition associated with a beacon activation has ceased. Cancellation messages shall be verified with a high degree of certainty before they are distributed to Distress authorities. The detailed procedure for cancellation messages is described in section 4.2.11.

3.2.12 Processing Alert Information Based on TAC

MCCs shall provide information to relevant destinations (i.e., Distress authorities and FGB-only-capable MCCs) based on the TAC number encoded in the beacon message (e.g., for SGB homing characteristics) in SIT 985 messages, in accordance with document C/S A.002. An MCC shall:

a) transmit a SIT 985 message to each relevant destination immediately after sending the first alert message to that destination for an alert site (i.e., on beacon activation); and

b) only transmit a single SIT 985 message to each relevant destination for an alert site (i.e., it shall not transmit a SIT 985 message for any subsequent alert sent to a relevant destination for an alert site).

Information associated with the TAC number shall be maintained at the MCC based on relevant information provided at the Cospas-Sarsat website and provided in SIT 927 messages.

3.3 Notification of Country of Beacon Registration (NOCR) Service

The NOCR service provides notification to the SPOC of a country when an alert is located outside of that country's SRR for a beacon registered to the country. The NOCR service ensures that a country is notified whenever one of its beacons is activated. The NOCR service is especially beneficial when a distress alert is located in an area of the world where suitable search and rescue resources are not available to perform the SAR mission. This service provides the parties responsible for the vessel, aircraft, or persons in distress an opportunity to assist the SAR services in their response to the emergency situation.

An NOCR message should not be interpreted as a request for information. If necessary, requests for information regarding the vehicle carrying a particular beacon should be made to the beacon registry.

The detailed procedure for the NOCR service is described in section 4.2.7.

3.4 Exchange of Beacon Registration Information

It is essential that every country using beacons maintain a register where Distress authorities can obtain vital information at any time. The maintenance of such a register is a national responsibility and the release of information is subject to national regulations.

Each country using beacons should make appropriate arrangements to ensure 24-hour access to their national register(s) by SAR services and inform Cospas-Sarsat of their point of contact. Cospas-Sarsat Participants should also make appropriate arrangements with the associated MCC listed on the Cospas-Sarsat website, to ensure fast and easy access to its national register via the associated MCC.

IMO Assembly Resolution A.887(21) concerning registration databases of satellite EPIRBs requires the EPIRB identification code to be included in the database amongst other SAR related information. It is possible that the only means to query a database would be through the beacon ID and thus it is imperative that the correct beacon ID usage be applied. The beacon ID, as described in the Cospas-Sarsat Glossary (document C/S G.004) should be used whenever requests for beacon registration information are made or provided.

3.5 System Information

System information messages include ephemeris or orbit vector messages, time and frequency calibration messages, spacecraft telemetry and commands, Ground Segment elements and spacecraft operational status, and narrative messages. Table 4-1 shows the network structure for System information distribution and indicates the senders and receivers of each type of System information. Orbitography beacons also provide System information. MCCs shall send

orbitography and reference beacon data to the associated nodal MCC to satisfy the Cospas-Sarsat Quality Management System (QMS) continuous monitoring and objective assessment process described in document C/S A.003. Information on orbitography beacons can be found on the Cospas-Sarsat website at www.cospas-sarsat.int.

The CMC and the USMCC distribute orbit ephemeris data for the Cospas and Sarsat spacecraft daily. They automatically receive, process, confirm by their own calculations and transmit the ephemeris data to the other MCCs and their own LUTs.

Search and Rescue Repeater (SARR) frequency calibration offset data for a given LEOSAR satellite is used by those LEOLUTs which perform combined LEO/GEO processing to adjust the SARR frequency measurements obtained from that LEOSAR satellite. SARR frequency calibration offset information is computed at the CMCC using a reference beacon. The CMCC automatically sends SARR frequency calibration offset messages to other MCCs once per week, as needed. SARR frequency calibration offset will be computed and distributed by the CMCC for all LEOSAR satellites which have an operational SARR channel.

Time calibration data is used to convert the Sarsat Search and Rescue Processor (SARP) time code to co-ordinated universal time (UTC). Time information provided for each 406 MHz data point must be corrected for computing the beacon location. Time and frequency calibration information for the Sarsat SARP is computed at the FMCC using signals from a time calibration platform relayed through Sarsat spacecraft. The FMCC automatically sends SARP time calibration messages to other MCCs once per week. Time calibration is not required for processing SAR incident data from Cospas spacecraft.

Sarsat payload commands requested by the CMCC (for the SARR), the FMCC (for the SARP), or the USMCC are co-ordinated, validated and then automatically forwarded by the USMCC to the NOAA Satellite Operations Control Center (SOCC) for transmission to the NOAA spacecraft. Verification of command execution is sent from the NOAA SOCC to the USMCC for transmission to the FMCC or CMCC. The Cospas payload commands are generated by the CMC.

Narrative and coordination messages are exchanged between the MCCs. Requests for retransmissions of messages will be addressed to the appropriate MCC. System information will be archived until it is updated and retrieved and transmitted when requested.

Changes in orbitography beacon information may be updated by System status messages sent to other MCCs.

3.6 System Status Changes

System status changes are the result of System element and System function failures, scheduled maintenance, integration or testing of new System elements, and the commissioning of new equipment or new capabilities of existing equipment. These changes will impact the operation of the Cospas-Sarsat System and should be notified to appropriate MCCs.

Space Segment Providers shall initiate System status messages to all MCCs whenever Space Segment out-of-limit conditions or changes occur, and when changes in the satellite SAR equipment are scheduled. The FMCC shall initiate notification of changes for Galileo satellites

and EUMETSAT Meteosat Second Generation (MSG) satellites on behalf of the associated Space Segment Providers. Ground Segment Operators shall initiate System status messages for changes of Ground Segment status. All changes of System status shall be notified by MCCs in accordance with this section and section 4.1.

3.6.1 Space Segment Status

Space Segment Providers shall provide notice to all Ground Segment Operators on the operational status of the spacecraft payloads in accordance with documents C/S T.004, C/S T.013 and C/S T.017. Payload status shall be declared with a System status message as described in section 5.2. Distribution of satellite ephemeris and SARP time calibration data, which may precede declaration of Initial Operational Capability (IOC) status, shall not itself be understood as a declaration of IOC status.

A satellite that is in IOC status shall be treated as though it were operational except that Ground Segment Operators may at their option elect to not acquire data from it via their LUTs. All Ground Segment Operators shall process alerts generated by other MCCs from this satellite data in their MCCs. It is recommended that satellites in IOC status be given lower priority in LUT scheduling.

3.6.2 Changes of Operational Capabilities

Changes of operational capabilities resulting from new equipment or new processing which impact the operation of the Cospas-Sarsat System, should be notified by the responsible MCC in accordance with Table 3-2 and Table 4-1.

Changes of System status resulting from the decommissioning of System equipment should be notified by the responsible MCC to all MCCs in accordance with Table 4-1.

Table 3-2: Notification Level for Failure or Outage

Failure or Outage	Notification Level
Space Segment	All MCCs should be notified
MCC	All MCCs and the reporting MCC's SPOCs should be notified
LUT	All MCCs should be notified
Communication Networks	Only affected MCCs should be notified
Orbitography beacons	All MCCs should be notified

3.6.3 System Failures

System status changes resulting from either a failure or outage of a System element or a System function should be reported to the appropriate MCC in accordance with Table 3-2 and the System Information Flow Diagram of Table 4-1. Nodal MCCs shall update System element status in the appropriate section of the Cospas-Sarsat website in accordance with the Cospas-Sarsat Quality

Management System (QMS) continuous monitoring and assessment process, as described in document C/S A.003.

3.6.4 Scheduled Outages

System status changes for any System element or function which result from scheduled outages for maintenance, integration or testing, should be notified by the responsible MCC to all MCC(s) and SPOCs in accordance with Table 3-2 and Table 4-1. The responsible MCC should provide advance notification as early as possible before interrupting operations, including a description of the planned backup arrangements (see sections 3.7 and 5.3). Additionally, the responsible MCC should repeat the notification 24 hours prior to the scheduled activity.

The MCC that performs a backup shall inform by a narrative message SIT 915, the non-operational MCC's SPOCs of the failure of their associated MCC and that the originating MCC is performing backup service according to section 3.7.

3.6.5 Scheduled Satellite Manoeuvres

Some LEOSAR satellites are subject to scheduled manoeuvres periodically, in order to maintain their sun synchronous orbit and thus to increase their useful life.

A satellite may be manoeuvred in two ways, in-plane or out-of-plane. An in-plane manoeuvre is issued to counteract the effect of drag on the semi-major axis. An in-plane manoeuvre changes satellite position by an amount that increases with each subsequent orbit. An out-of-plane manoeuvre is issued to counteract the effects of Luni-solar pull on inclination. An out-of-plane manoeuvre changes satellite position by an amount that does not increase with subsequent orbits.

A satellite manoeuvre may induce significant Doppler location errors, due to the possible application of incorrect orbit vectors by LEOLUTs. In order to mitigate the impact of planned satellite manoeuvres on Doppler location accuracy, MCCs shall implement the following procedures.

For each satellite that is subject to scheduled manoeuvres, one MCC shall be responsible for notification about its manoeuvres and is designated the responsible MCC. The USMCC is the responsible MCC for the manoeuvres of all LEOSAR satellites with Sarsat payloads.

The responsible MCC shall provide notification to all MCCs of the scheduled satellite manoeuvre. The responsible MCC shall provide notification five (5) to seven (7) days in advance of a scheduled satellite manoeuvre, to allow Ground Segment Providers adequate preparation time. The responsible MCC shall repeat the notification 24 hours prior to the scheduled manoeuvre. The responsible MCC shall provide notification of the execution of the satellite manoeuvre as soon as possible after the manoeuvre is complete. If the maximum expected change in satellite position is more than two (2) kilometers in the 24 hours following completion of the manoeuvre, then the responsible MCC shall provide new orbit vectors for the satellite as soon as possible after the manoeuvre is complete. Orbit vectors associated with a satellite manoeuvre shall be provided in a SIT 216 message.

Notification of a satellite manoeuvre shall be provided in a System status message as described in Figure 5-2 and in accordance with Table 4-1. The responsible MCC shall provide information on

the magnitude and duration of the expected change in satellite position. The magnitude should be provided for the 24-hour period after the manoeuvre, when possible, since the impact of the change should be negligible after 24 hours.

Based on notification of a satellite manoeuvre, MCCs shall:

a) treat orbit ephemeris data received in a SIT 216 message within 24 hours after the end of the manoeuvre as valid, if they are within the maximum tolerance specified for the satellite in the associated System status message;

b) use the validated SIT 216 orbit ephemeris data to immediately initialise orbit vectors at the MCC and its associated LUTs; and

c) notify its RCCs and SPOCs in alert messages sent for manoeuvred satellite as specified in document C/S A.002, if the maximum expected error in Doppler location exceeds 10 kilometres within 24 hours of the manoeuvre.

MCC responsibilities for scheduled satellite manoeuvres are outlined in Figure 3-3.

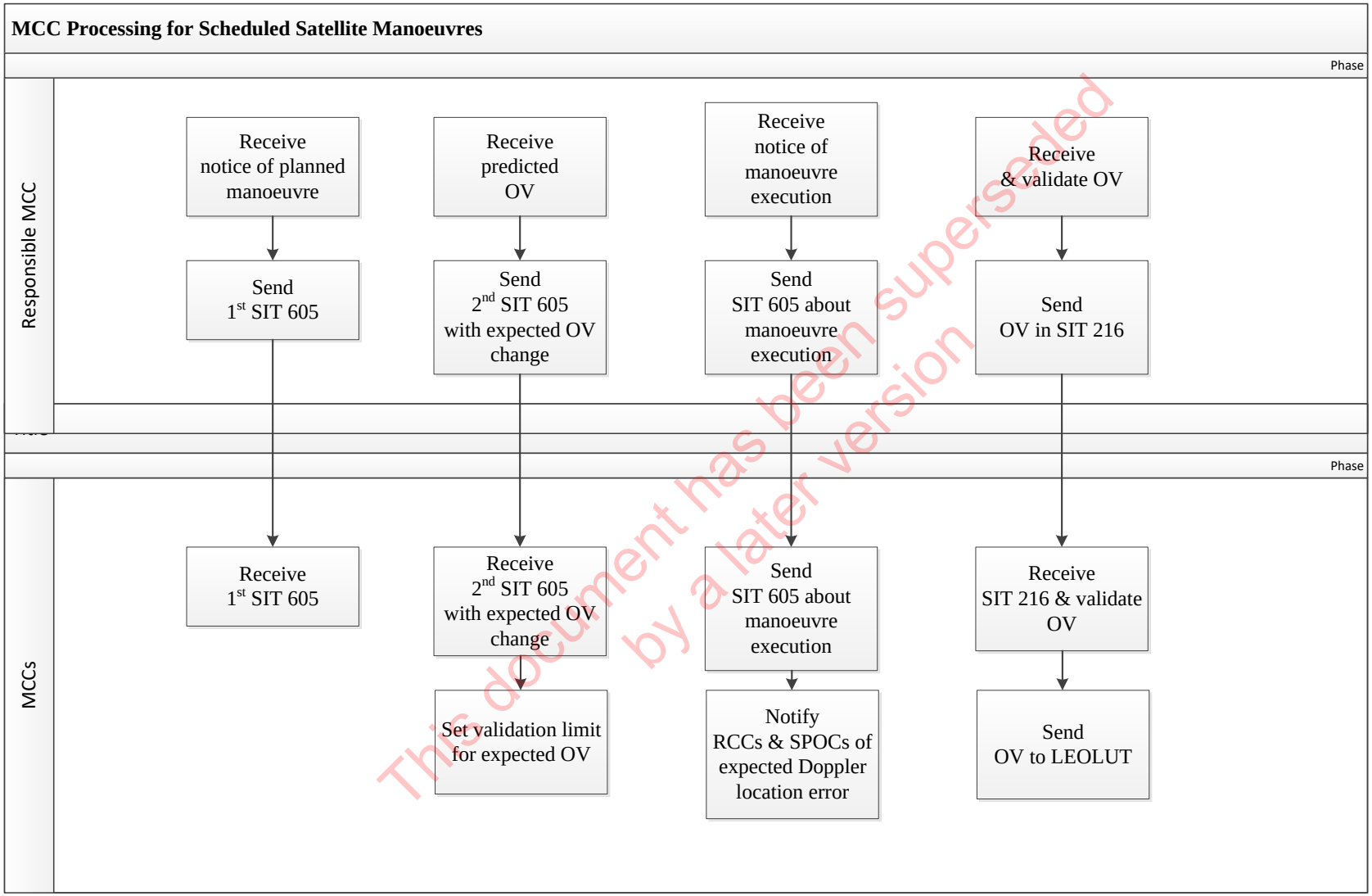


Figure 3-3: MCC Processing for Scheduled Satellite Manoeuvres

3.6.6 Reactivation of the SARP Instrument

On occasion, the SARP instrument on a satellite with a Sarsat payload is deactivated, due to an unexpected or a scheduled outage. Since accurate SARP time calibration (TCAL) data is required to compute accurate Doppler locations from SARP data, it is necessary that LEOLUTs be updated with new SARP TCAL data after the SARP instrument is reactivated, prior to computing Doppler solutions from SARP data. In order to mitigate the impact of SARP reactivation on Doppler location accuracy, MCCs shall implement the following procedures.

As the MCC responsible for the SARP instrument on satellites with a Sarsat payload, the FMCC provides notification about the reactivation of the SARP instrument. The FMCC shall provide notification that new SARP TCAL data will be distributed, as far in advance as possible, in order to allow adequate preparation time for each Ground Segment Provider. The notification shall be provided in a System status message as described in Figure 5-3, and should include the time it is expected that new SARP TCAL data will be sent to other MCCs, as available.

The FMCC shall provide new SARP TCAL data (in a SIT 415 or 417 message) as soon as reliable SARP TCAL data is available.

When notification about new SARP TCAL data is received by the MCC, each Ground Segment Provider shall:

a) ensure that the calibration time (per document C/S A.002, Message Field #37) in the new SARP TCAL data is treated as valid in its MCC, without regard to previous SARP TCAL data. The Ultra-Stable Oscillator (USO) frequency (C/S A.002, Message Field #38) shall be validated per normal procedures;

b) ensure that the new SARP TCAL data (validated as noted above) is used to initialise the SARP TCAL data in its LEOLUTs, without regard to previous SARP TCAL data; and

c) ensure that all Doppler solutions generated by its LEOLUT(s) that contain SARP data for the associated satellite are filtered, until new SARP TCAL data is loaded into the associated LEOLUT.

Once new SARP TCAL data is processed by MCCs and LUTs, each Ground Segment Provider shall resume normal validation of SARP TCAL data for the satellite, unless contrary notification is received from the FMCC.

3.6.7 Space Segment Anomaly Reporting Procedures

Any Ground Segment Provider which detects anomalies of the Space Segment during routine system monitoring, shall inform the relevant Space Segment Provider so that special tests can be conducted, and appropriate notification can be provided. Analysis of Space Segment anomalies shall be coordinated among the relevant Space Segment Providers and possible corrective action (e.g., switch to backup payload) will be taken, as appropriate.

Information on any anomalies which could significantly degrade system performance shall be provided by the MCC associated with the relevant Space Segment Provider:

a) in a System status message as described in Figure 5-4; and

b) to the Secretariat.

The MCC associated with the relevant Space Segment Provider shall provide status updates on spacecraft anomalies at least once per week until the anomaly ends, or its effects are mitigated. Further information on Space Segment Status Reporting Procedures is provided in documents C/S T.004, C/S T.013 and C/S T.017.

3.7 Contingency Procedures

3.7.1 Operational Backup

In general, each LUT and MCC tests itself and notifies the operator of an improper condition. Should the equipment become non-operational, the responsible MCC will notify other MCCs as described in section 3.6 by the best means available. Alternative MCCs and communication links could be designated for routing message traffic and assuming some of the functions of the non-operational MCC, in accordance with predetermined backup procedures described in section 5.3 or following direct coordination with other relevant MCCs.

The MCC serving as the backup MCC may support the RCCs/SPOCs of the non-operational MCC directly, or by routing message traffic to a SAR authority nominated by the non-operational MCC. Non-operational MCCs should recognize the additional workload placed on the backup MCC and provide all possible support when operating in the contingency scenario.

When an MCC assumes backup for another MCC, it shall send notification to each destination (i.e., MCC, RCC/SPOC and SAR authority) for which it will deliver alert data directly on behalf of the MCC being backed up. To ensure that the communication link to the destination is working successfully, this notification shall:

a) be sent by the communication link that will be used to deliver alert data; and

b) include a request for acknowledgement, if the communication link to the destination has been not been successfully used in the last six (6) hours.

Backup procedures for the distribution of System information and alert data should be described for each MCC in the relevant part of section 5.3. Any MCC may also communicate directly with any other MCC and an MCC shall respond to direct requests for information.

During back-up conditions MCCs may redirect message traffic to the backup MCC without effecting any change to the SIT destination, i.e., Message Field #5 per document C/S A.002. Each MCC is to specify their redirection capability in its backup procedures. MCCs shall not transmit QMS data to the backup nodal MCC.

An MCC that has assumed backup responsibilities for another MCC shall initiate and distribute all alert messages to the appropriate destinations on behalf of the MCC being backed up, including ship security alerts, NOCRs, alerts for RLS capable beacons and alerts for ELT(DT)s.

When an MCC that originates System data (e.g., the USMCC originates orbit data) is not operational, the MCC that backs up the non-operational MCC is not expected to originate the system data, unless this capability is identified in the published backup procedure. In addition, requests for beacon registration data should be made directly of the non-operational MCC and not the backup MCC.

3.7.2 Backup Test

Annually, each MCC should arrange to test its backup procedures. This test should include the exercise of each specific action listed in the backup procedures and agreements section described in section 5.3 to this DDP. Each MCC should review the results of the testing, and document problems for corrective action. To ensure that the backup testing does not impact operational activity within a DDR, each nodal MCC should co-ordinate backup testing within its DDR. Each MCC should also report the backup test results to the Cospas-Sarsat Secretariat as part of their annual report on System Status and Operations (as described in document C/S A.003). In addition, each MCC should perform a quarterly test of all backup communication methods. Each MCC should review the results of the tests and document problems for corrective action.

The annual backup test will not be required if the backup procedure has been successfully exercised for a period of time not less than six (6) hours during the year prior to the planned annual test, taking care to ensure that no more than one year passes between the tests. The backup test will take place for at least six (6) hours to ensure the Cospas-Sarsat Quality Management System objectives of providing timely and accurate alert data are met. Longer backup periods may be agreed bilaterally and described in the backup procedures and agreements part of section 5.3 to this DDP. A specific mention of this operational backup shall be noted in the annual status report.

The backup test between nodal MCCs should be conducted on a "no notice" basis, that is to say, no notification will be sent to non-nodal MCCs prior to the commencement of the test, in order to check the real-time reconfiguration ability and replicate as much as possible a real-world scenario. The affected MCCs shall send a confirmation narrative message to the backup nodal MCC after reconfiguration. Administrators for affected MCCs may be notified prior to the commencement of the test, on a bilateral basis, in order to ensure that the test has maximum effectiveness.

The quarterly communication test shall also be considered to be accomplished when the backup procedure has been exercised during the quarter for a time period which meets the needs of the specific MCC operator.

3.7.3 Backup Timing

When an MCC is found to be unable to operate within the specifications of this document and of the MCC Specification and Design Guidelines (document C/S A.005), arrangements shall be made to switch the services from the failed MCC to a backup system, according to the backup procedures for the failed MCC, as described in the relevant part of section 5.3. The timing of the switch to the backup system should be planned to ensure that the system will meet the requirement of the Cospas-Sarsat Programme Management Policy (document C/S P.011) that "the capability of an MCC to continuously deliver alert messages shall not be interrupted for longer than one hour".

To meet this goal, the MCC operators shall, during the initial MCC testing or during subsequent tests of backup procedures, make note of the time required for the backup to take effect. The backup procedures shall then be established to ensure that, when an actual failure occurs, the backup arrangements shall be initiated early enough that the backup facility is expected to take over the service from the failed MCC within one hour of the original failure.

When an MCC is to be shut down for scheduled maintenance that is expected to last for more than one hour, the backup arrangements should be initiated before the MCC is shut down.

3.7.4 Long-term Backup and Restoration of Operations

3.7.4.1 Long-term Backup and Restoration of MCC Operations

This section summarizes the sequence of actions to handle a long-term MCC outage and to restore MCC operations.

When an MCC has been non-operational for an extended period of time as described in document C/S A.003 ("Procedure for Determining the Status of Operational Ground Segment Equipment") the MCC status is considered to be "commissioned, not operational" (CNO).

When an MCC is set to CNO status, the associated nodal MCC shall prepare a plan for the re-assignment of MCC responsibilities. If the MCC has remained non-operational for another 45 days, the associated nodal MCC shall coordinate the distribution of alert data to the SPOCs that were served by the CNO MCC. If the associated nodal MCC is notified that an outage is expected to exceed 90 days, the associated nodal MCC shall coordinate the distribution of alert data to the SPOCs that were served by the CNO MCC as soon as possible. The sequence of events will be:

Day 0	Failure of the MCC is detected
Day 0-1	Routine backup arrangements are put in place
Day 2-45	The associated nodal MCC is notified that this is a long-term issue
Day 45*	The associated nodal MCC notifies all MCCs and the Secretariat of the CNO status, and that it is preparing a plan for the re-assignment of responsibilities
Day 90*	The nodal MCC coordinates the implementation of the alternate data distribution plan

* These relative days indicate a maximum period; the events may occur earlier, based on the notification of a long-term outage.

For the purposes of this re-distribution of responsibilities, the country that operates the non-operational MCC shall be considered as a SPOC until it has been restored to full operation. The procedure to restore an MCC to operational status is described in the section titled "Recover Operational Status of a CNO GSE" in document C/S A.003.

When an MCC regains FOC status, data distribution procedures affected by the loss of FOC status shall be restored.

3.7.5 Distribution of MEOSAR Alerts to MCCs that are Only LEOSAR/GEOSAR-Capable

Until all LEOSAR/GEOSAR capable MCCs are commissioned as LEOSAR/GEOSAR/MEOSAR -capable, LEOSAR/GEOSAR/MEOSAR-capable MCCs shall transmit MEOSAR alert data to other MCCs in:

a) a SIT 915 message with Message Field #5 set to the identification code of the final destination MCC, that contains alert data in SPOC format (i.e., SIT 185), if the immediate destination MCC is LEOSAR/GEOSAR only capable; or

b) MCC format (i.e., SITs 138 - 147), if the immediate destination MCC is LEOSAR/GEOSAR/MEOSAR capable.

The format for transmitting MEOSAR alert data (SIT 915/SPOC or MCC) shall be configurable by destination MCC. The implementation status of MEOSAR SIT messages by MCC is provided in section 5.1.

3.7.6 Distribution of Second-Generation-Beacon (SGB) Alerts to MCCs that are Only First-Generation-Beacon (FGB)-Capable

Until all MCCs are SGB-capable, SGB-capable MCCs shall transmit SGB alert data to other MCCs in:

a) a SIT 915 message with Message Field #5 set to the identification code of the final destination MCC, that contains alert data in SPOC format (i.e., SIT 185), if the immediate destination MCC is FGB-only capable; or

b) MCC format (i.e., SIT 3xx series), if the destination MCC is SGB-capable.

Until all MCCs are SGB-capable, SGB-capable MCCs shall transmit a SIT 915 message (that contains data in SIT 985 format) with Message Field #5 set to the identification code of the final destination MCC, if the immediate destination MCC is FGB-only-capable, as specified in section 3.2.12.

3.7.7 Distribution of Alerts for RLS-Capable FGBs to MCCs that are Not FGB-RLS-Capable

Until all MCCs are FGB-RLS-capable, FGB-RLS-capable MCCs shall transmit alert data for RLS-capable FGBs to MCCs in:

a) a SIT 915 message with Message Field #5 set to the identification code of the final destination MCC, that contains alert data in SPOC format (i.e., SIT 185), if the destination MCC is not FGB-RLS-capable; or

b) MCC format (i.e., SIT 134, SIT 135, SIT 138 or SIT 139), if the destination MCC is FGB-RLS-capable.

3.7.8 Distribution of FGB-ELT(DT) Alerts to MCCs that are Not FGB-ELT(DT)-Capable

Until all MCCs are FGB-ELT(DT)-capable, FGB-ELT(DT)-capable MCCs shall transmit FGB-ELT(DT) alert data to MCCs in:

a) a SIT 915 message with Message Field #5 set to the identification code of the final destination MCC, that contains alert data in SPOC format (i.e., SIT 185), if the destination MCC is not FGB-ELT(DT)-capable; or

b) MCC format (i.e., SIT 1xx series), if the destination MCC is FGB-ELT(DT)-capable.

3.7.9 Distribution of Notifications for RLS-Capable FGB Alerts to the RLSP on Behalf of MCCs that are Not FGB-RLS-Capable

Until all MCCs are FGB-RLS-capable, FGB-RLS-capable nodal MCCs shall transmit notifications (i.e., SIT 134, SIT 135, SIT 138 or SIT 139) to the RLSP for an RLS-capable FGB alert with a confirmed position regardless of whether the confirmed position is in the nodal MCC's service area. In addition to this modification, all other procedures in section 4.2.10 shall be applied as defined.

3.7.10 Operational Distribution of Alert Data for SGBs and FGB ELT(DT)s

Until the Cospas-Sarsat Council declares that SGBs may be used operationally, SGB-capable MCCs shall:

a) be capable of being configured to filter alert data for SGBs; and

b) be configured to filter alert data for SGBs from operational distribution.

Until the Cospas-Sarsat Council declares that FGB ELT(DT)s may be used operationally, FGB-ELT(DT)-capable MCCs shall:

a) be capable of being configured to filter alert data for FGB ELT(DT)s; and

b) be configured to filter alert data for FGB ELT(DT)s from operational distribution.

3.8 Exchange of Test and Exercise Data

3.8.1 Coordination of Beacon Tests

Beacons coded with operational protocols shall not be used for tests, except on rare occasions when required by and under control of a national administration, or for international exercises coordinated by the Cospas-Sarsat Joint Committee. All MCCs shall be notified of tests using beacons coded with operational protocols, in accordance with the procedure of section 4.3 of the DDP. Tests using beacons coded with a Test User Protocol, may be performed by anyone having coordinated the test with, and received approval from the responsible MCC, when conducted in accordance with the procedure of section 4.3 of the DDP. Coordination with affected MCCs should be performed by the responsible MCC in accordance with the procedure of section 4.3 of the DDP.

3.8.2 Exchange of Test Messages

Test data obtained for beacons coded with operational protocols or test protocols shall be exchanged between MCCs only upon request. Such requests shall contain the 15 hexadecimal characters of the Beacon Identification, as specified in section 3.1.4.

3.9 Archived Information

Each LEOLUT, GEOLUT, MEOLUT and MCC shall archive alert data and other messages transmitted, as specified in documents C/S T.002, C/S T.009, C/S T.019 and C/S A.005, respectively. This information will be provided upon request to another MCC, SPOC or RCC, for a specific period of time and for activities in their area of responsibility. It may be also provided to the Cospas-Sarsat Secretariat for the analysis of particular beacon events when such analysis has been requested in accordance with the procedure approved by the Cospas-Sarsat Council.

3.10 Communication Networks

Each MCC transfers alert data to other MCCs and SPOCs within its service area as described in section 5.3.

3.11 Return Link Service (RLS)

The Return Link Service (RLS) provides notification to a 406 MHz beacon that an alert transmitted by the beacon has been detected by a LUT and distributed via the Cospas-Sarsat MCC network to the MCC whose service area covers the beacon confirmed position. This service is intended to provide acknowledgement of the reception of the alert message to persons in distress and is only available for 406 MHz beacons coded to provide a return link.

Once notified that an RLS-capable beacon has been located, the RLSP interfaces to the ground segment for transmitting return link messages to appropriate satellites, which, in turn, transmit return link messages to the transmitting beacon. After receipt of the return link message by the beacon, subsequent beacon transmissions include the return link message receipt status, and an alert that includes the receipt status is distributed via the Cospas-Sarsat MCC network to the designated RLSP. Once notified that the beacon has received the return link message, the RLSP interfaces to the relevant ground segment which will cease transmitting return link messages to satellites. Further information on the Return Link Service is provided in document C/S R.012.

The detailed procedure for the RLS is described in section 4.2.10.

3.12 Autonomous Distress Tracking Data Repository for ELT(DT) alert data

To provide alert data to the Autonomous Distress Tracking Data Repository (ADR), each MCC shall send alerts for an ELT(DT) received from its associated LUTs to its associated nodal MCC as follows:

a) The reference time (i.e., detect time) of the new alert differs by at least three (3) seconds from the reference time of all previous alerts received from its associated LUTs; or

b) Position data (including latitude, longitude and altitude) in the new alert has not been previously sent to the associated nodal MCC in an alert received from its associated LUTs with a reference time within three (3) seconds of the reference time of the new alert.

The destination nodal MCC (where distribution is based on position data in the current alert or the country coded in the beacon message) shall provide alerts for an ELT(DT) to the ADR as follows:

a) the reference time of the new alert differs by at least three (3) seconds from the reference time of all previous alerts sent to the ADR by the nodal MCC; or

b) position data in the new alert has not been previously sent to the ADR by the nodal MCC with a reference time within three (3) seconds of the reference time of the new alert.

MCCs shall provide ELT(DT) alert data to other MCCs for the ADR in SIT messages 122 to 147 and SIT messages 322 to 347, as described in document C/S A.002. MCCs shall provide alert data to the ADR in [SIT message [TBD]] as described in document C/S A.002.

- END OF SECTION 3 –

4. OPERATIONAL PROCEDURES FOR COSPAS-SARSAT MCCs

4.1 Data Distribution Regions and Inter-MCC Data Exchange

4.1.1 Introduction

This section describes the inter-DDR arrangements for data exchange and includes the particular regional arrangements or agreements that affect MCCs within a DDR. It may be amended by the MCCs involved. However, other MCCs should be notified of any changes in the event that the changes impact MCCs outside the region. If so, agreement of the Joint Committee is needed prior to implementation.

These procedures and arrangements become effective for MCCs under development only after confirmation by the appropriate host MCC, that the MCC under development has achieved Initial Operational Capability (IOC).

4.1.2 Definition of DDR

A data distribution region (DDR) is a region comprising two or more MCC service areas. Cospas-Sarsat alert data and System information are exchanged between DDRs through an MCC in each DDR which is the single point of contact for that DDR. This MCC is identified as the nodal MCC of the DDR.

4.1.3 Data Exchange Between DDRs

The inter-nodal network diagram is provided as Figure 4-1.

The nodes of the MCC communication network and the associated DDRs are identified as follows:

Australia:	AUMCC – South West Pacific DDR	AU
France:	FMCC - Central DDR	FR
Japan:	JAMCC – North West Pacific DDR	JA
Russia:	CMC - Eastern DDR	RU
Spain:	SPMCC - South Central DDR	SP
USA:	USMCC - Western DDR	US

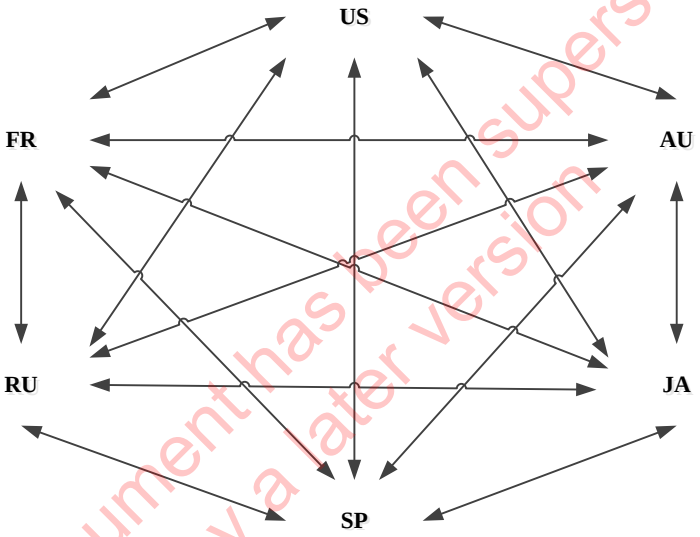


Figure 4-1: Inter-Nodal Network Diagram

4.1.4 Data Exchange Within DDRs

4.1.4.1 Western DDR

The USMCC, as a nodal MCC, has accepted responsibility for passing alert information in this region and for the filtering of global mode alert or NOCR messages. Specific SRRs are outlined in section 5.3.

Data flow in Western DDR (ARMCC, BRMCC, CHMCC, CMCC, PEMCC, and USMCC is described in Figure 4-2.

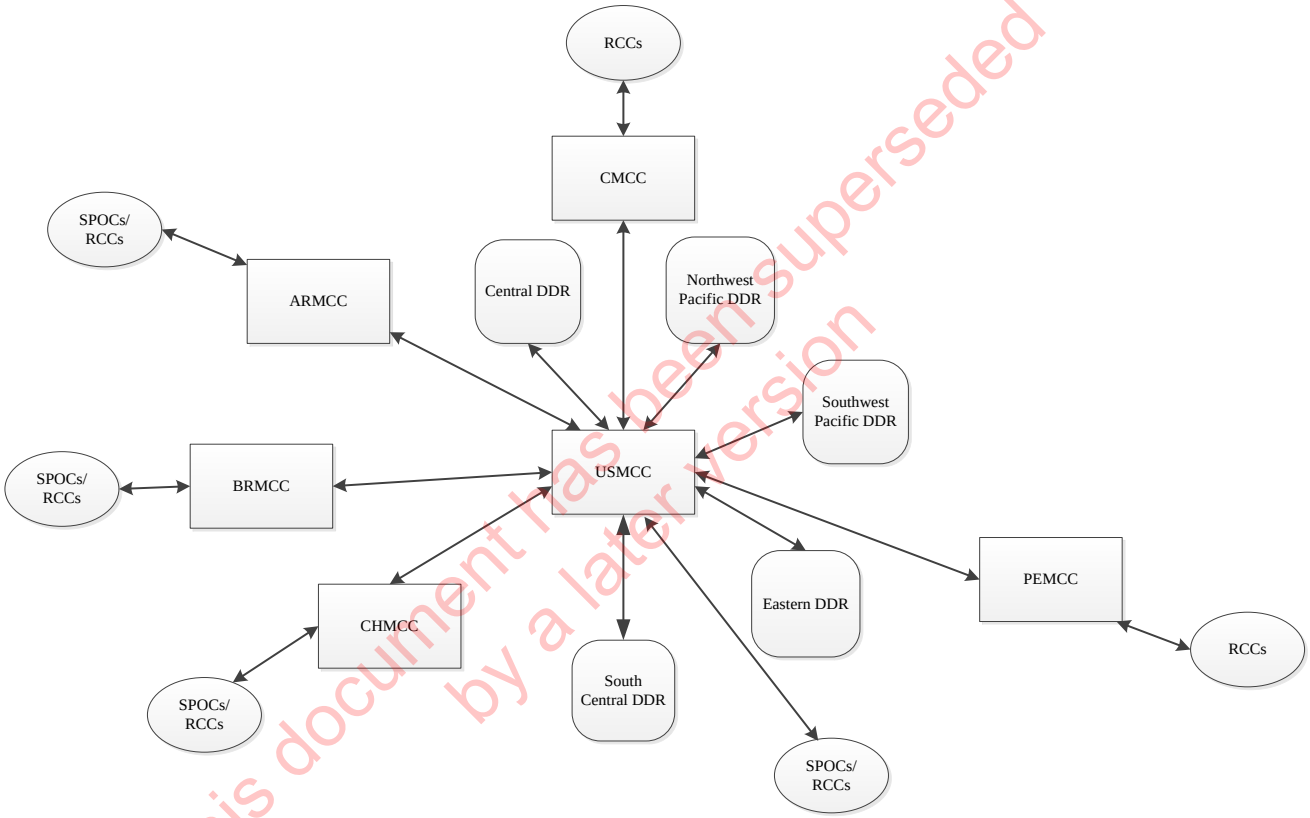


Figure 4-2: Western DDR Network Diagram

4.1.4.2 Central DDR

Data flow in Central DDR (CYMCC*, FMCC, GRMCC, ITMCC, NMCC, TRMCC and UKMCC) is described in Figure 4-3. Central DDR MCCs validate locations before forwarding them to the SAR organisations.

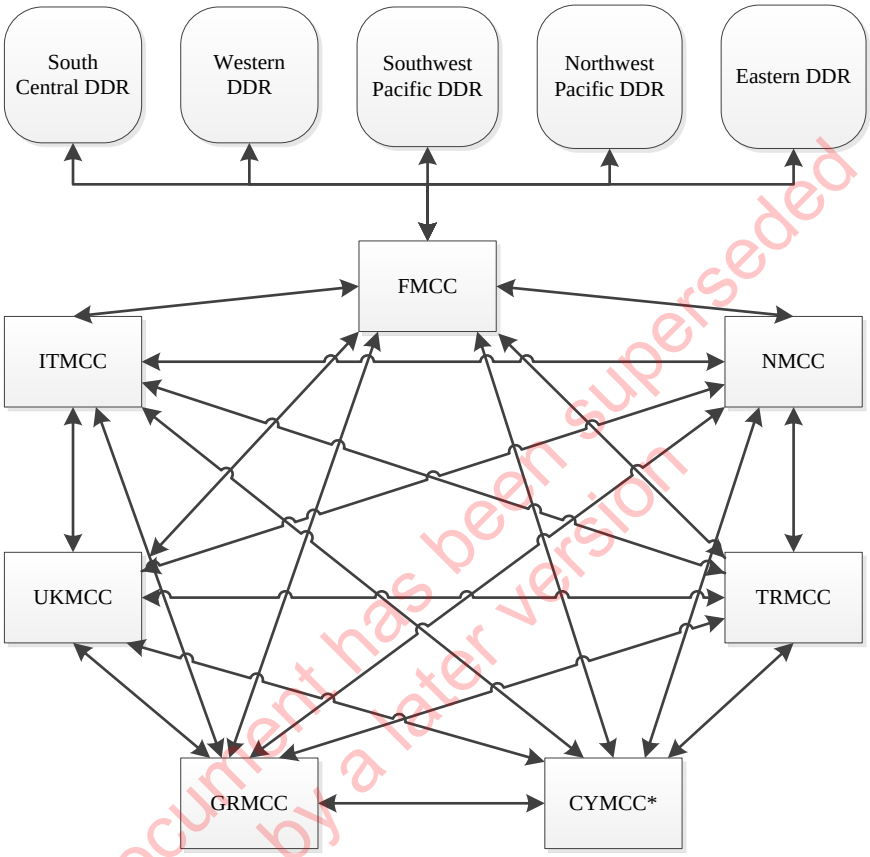


Figure 4-3: Central DDR Network Diagram

Note: * Under development.

4.1.4.3 Eastern DDR

The CMC has no formal regional agreements.

Data flow in Eastern DDR (CMC, INMCC and PAMCC) is described in Figure 4-4.

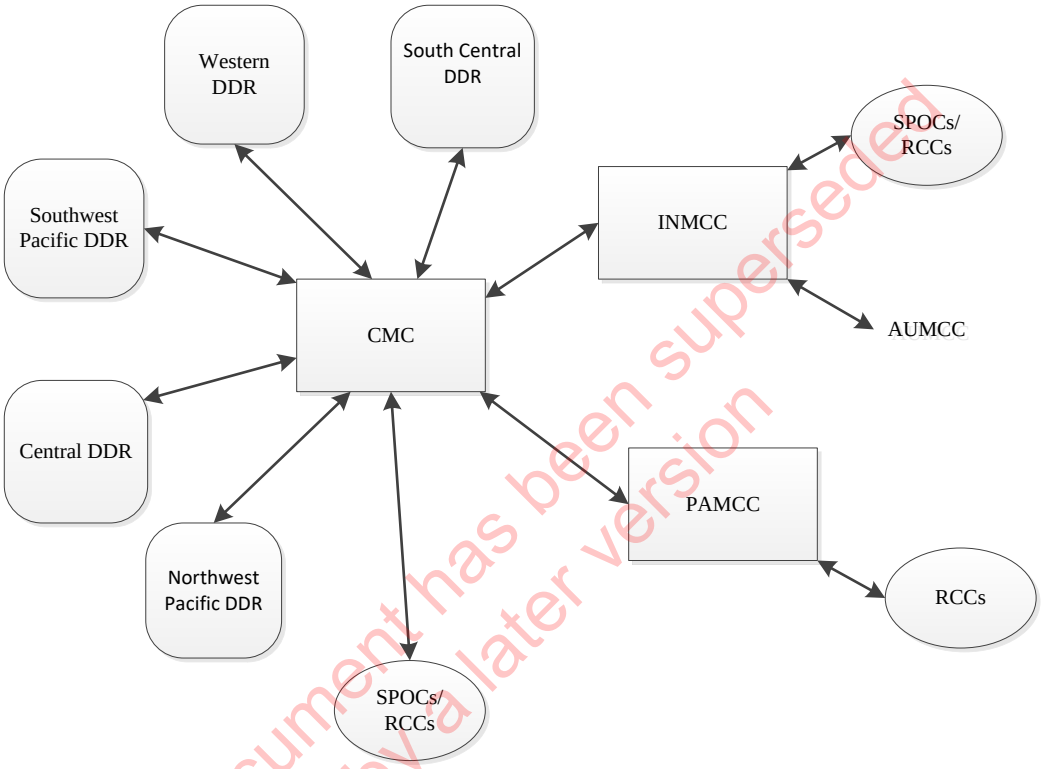


Figure 4-4: Eastern DDR Network Diagram

4.1.4.4 South West Pacific DDR

Data flow in South West Pacific DDR (ASMCC, AUMCC, IDMCC, SIMCC and THMCC) is described in Figure 4-5.

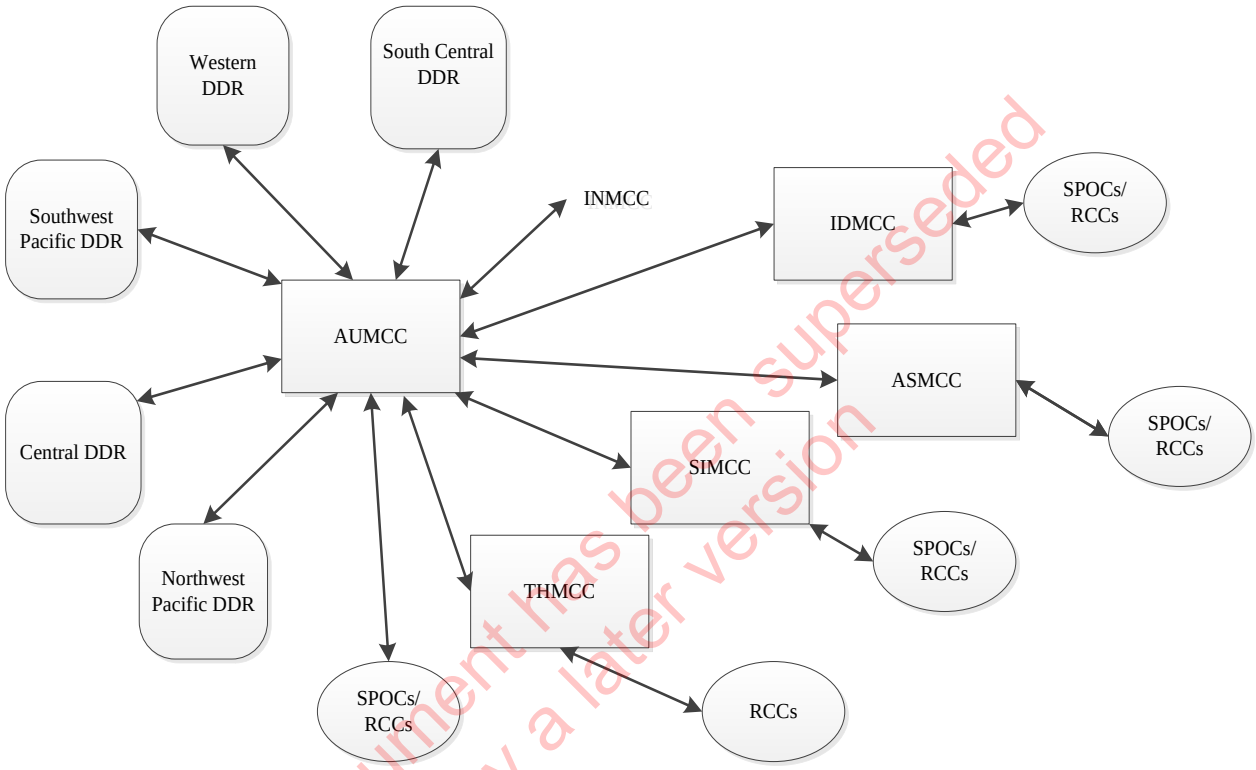


Figure 4-5: South West Pacific DDR Network Diagram

4.1.4.5 North West Pacific DDR

Data flow in North West Pacific DDR (CNMCC, HKMCC, JAMCC, KOMCC, TAMCC and VNMCC) is described in Figure 4-6.

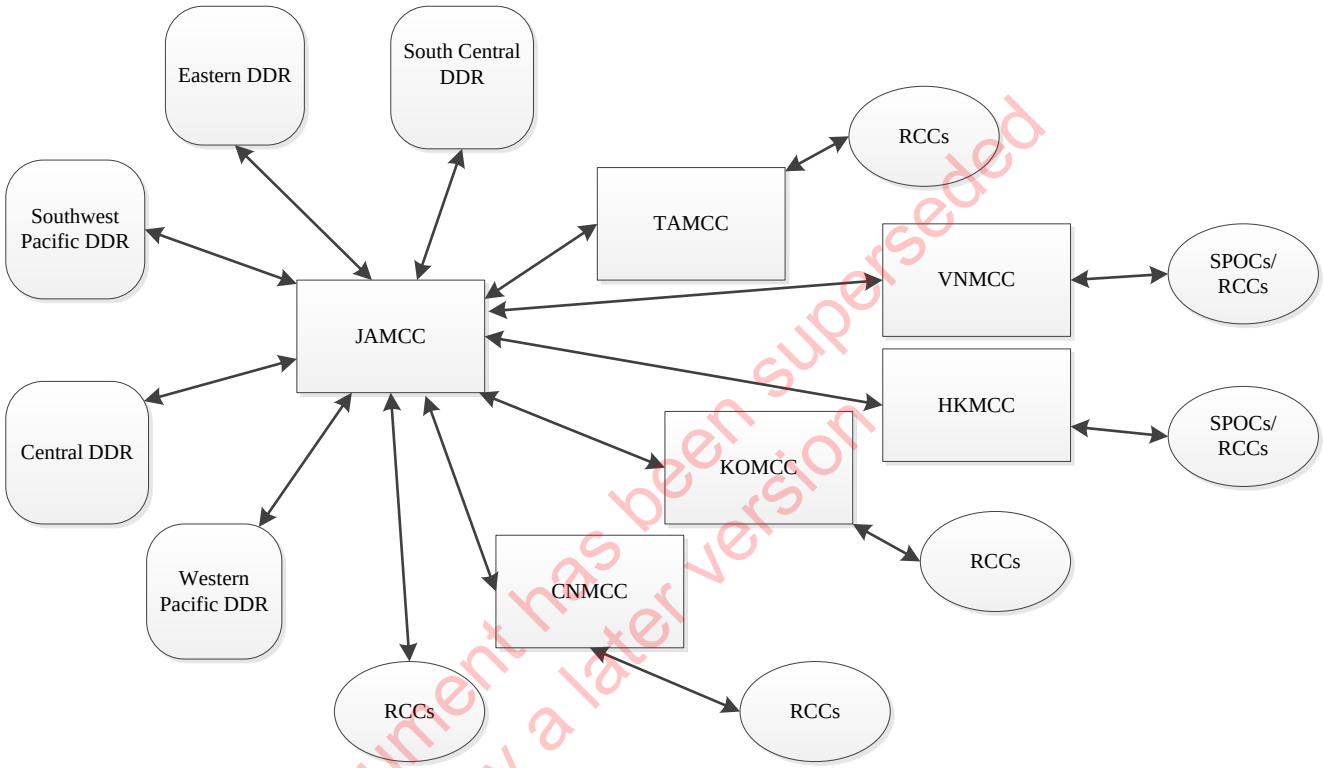
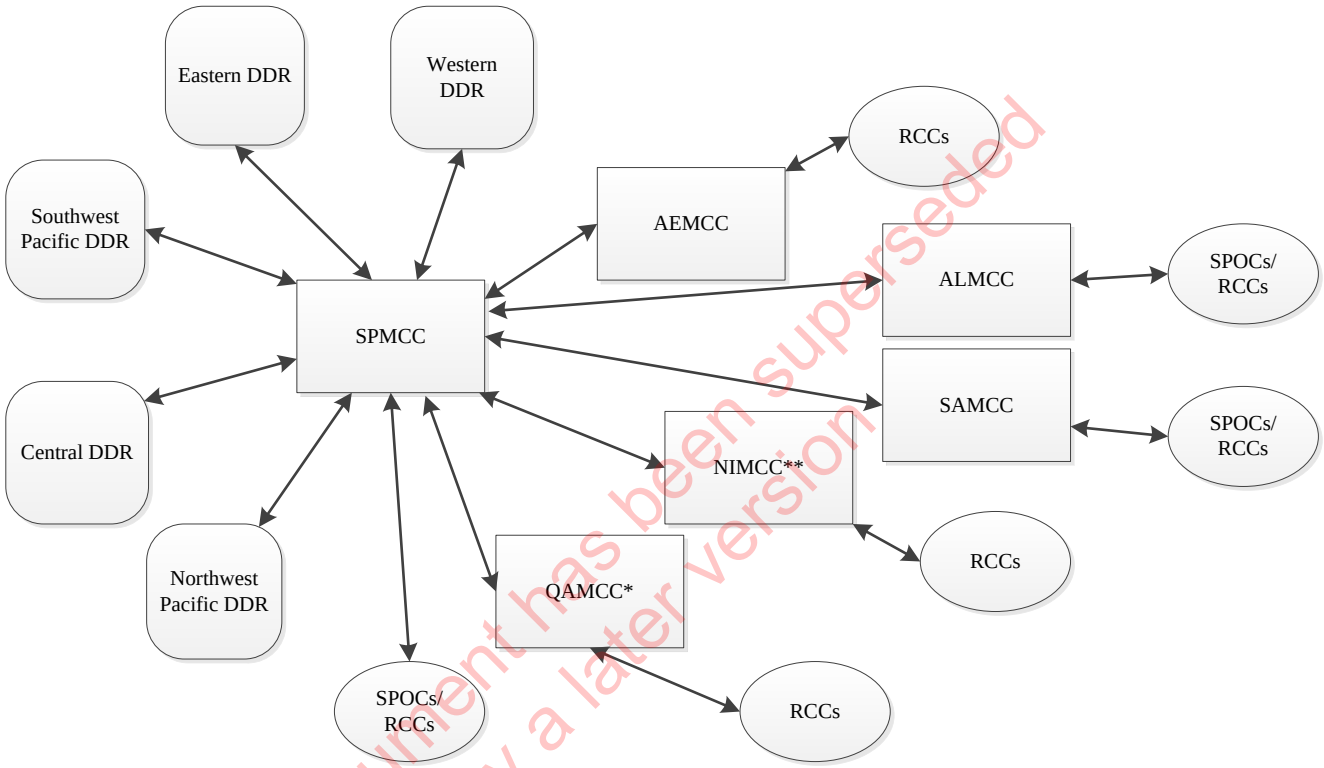


Figure 4-6: North West Pacific DDR Network Diagram

4.1.4.6 South Central DDR

Data flow in South Central DDR (AEMCC, ALMCC, NIMCC**, QAMCC*, SAMCC) and SPMCC) is described in Figure 4-7.



Note: * Under development.
** Commissioned not operational.

Figure 4-7: South Central DDR Network Diagram

4.1.5 Inter-MCC Routing of Alert Data

The receiving MCC shall route alert data to the MCC in which service area the alert is located (i.e., the destination MCC) as described in Table 4-1.

4.1.6 Inter-MCC Routing of System Information

The routing of System information between MCCs is described in Table 4-2 “System Information Distribution”. MCCs shall route System information as described in Table 4-1.

Receiving MCC: / Destination MCC:	AEMCC	ALMCC	ARMCC	ASMCC	AUMCC	BRMCC	CHMCC	CMC	CMCC	CNMCC	CYMCC*	FMCC	GRMCC	HKMCC	IDMCC	INMCC
AEMCC	Nat. Pr.	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
ALMCC	SPMCC	Nat. Pr.	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
ARMCC	SPMCC	SPMCC	Nat. Pr.	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
ASMCC	SPMCC	SPMCC	USMCC	Nat. Pr.	ASMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	AUMCC	CMC
AUMCC	SPMCC	SPMCC	USMCC	AUMCC	Nat. Pr.	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	AUMCC	AUMCC
BRMCC	SPMCC	SPMCC	USMCC	AUMCC	USMCC	Nat. Pr.	USMCC	USMCC	USMCC	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
CHMCC	SPMCC	SPMCC	USMCC	AUMCC	USMCC	USMCC	Nat. Pr.	USMCC	USMCC	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
CMC	SPMCC	SPMCC	USMCC	AUMCC	CMC	USMCC	USMCC	Nat. Pr.	USMCC	JAMCC	FMCC	CMC	FMCC	JAMCC	AUMCC	CMC
CMCC	SPMCC	SPMCC	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	Nat. Pr.	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
CNMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	Nat. Pr.	FMCC	JAMCC	FMCC	JAMCC	AUMCC	CMC
CYMCC*	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	Nat. Pr.	CYMCC	CYMCC	JAMCC	AUMCC	CMC
FMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	FMCC	Nat. Pr.	FMCC	JAMCC	AUMCC	CMC
GRMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	GRMCC	GRMCC	Nat. Pr.	JAMCC	AUMCC	CMC
HKMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	FMCC	JAMCC	FMCC	Nat. Pr.	AUMCC	CMC
IDMCC	SPMCC	SPMCC	USMCC	AUMCC	IDMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	Nat. Pr.	CMC
INMCC	SPMCC	SPMCC	USMCC	AUMCC	INMCC	USMCC	USMCC	INMCC	USMCC	JAMCC	FMCC	CMC	FMCC	JAMCC	AUMCC	Nat. Pr.
ITMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	ITMCC	ITMCC	ITMCC	JAMCC	AUMCC	CMC
JAMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	FMCC	JAMCC	FMCC	JAMCC	AUMCC	CMC
KOMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	FMCC	JAMCC	FMCC	JAMCC	AUMCC	CMC
NIMCC**	SPMCC	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
NMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	NMCC	NMCC	NMCC	JAMCC	AUMCC	CMC
PAMCC	SPMCC	SPMCC	USMCC	AUMCC	CMC	USMCC	USMCC	PAMCC	USMCC	JAMCC	FMCC	CMC	FMCC	JAMCC	AUMCC	CMC
PEMCC	SPMCC	SPMCC	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
QAMCC*	SPMCC	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
SAMCC	SPMCC	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
SIMCC	SPMCC	SPMCC	USMCC	AUMCC	SIMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	AUMCC	CMC
SPMCC	SPMCC	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	FMCC	SPMCC	FMCC	JAMCC	AUMCC	CMC
TAMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	FMCC	JAMCC	FMCC	JAMCC	AUMCC	CMC
THMCC	SPMCC	SPMCC	USMCC	AUMCC	THMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	AUMCC	CMC
TRMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	TRMCC	TRMCC	TRMCC	JAMCC	AUMCC	CMC
UKMCC	SPMCC	SPMCC	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	UKMCC	UKMCC	UKMCC	JAMCC	AUMCC	CMC
USMCC	SPMCC	SPMCC	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	FMCC	USMCC	FMCC	JAMCC	AUMCC	CMC
VNMCC	SPMCC	SPMCC	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	FMCC	JAMCC	FMCC	JAMCC	AUMCC	CMC

Table 4-1: MCC Data Routing Matrix
(1/2)

Notes: Nat. Pr. National Procedures.
* Under development.
** Commissioned not operational

Receiving MCC: / Destination MCC:	ITMCC	JAMCC	KOMCC	NIMCC**	NMCC	PAMCC	PEMCC	QAMCC*	SAMCC	SIMCC	SPMCC	TAMCC	THMCC	TRMCC	UKMCC	USMCC	VNMCC
AEMCC	FMCC	SPMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	AEMCC	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
ALMCC	FMCC	SPMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	ALMCC	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
ARMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC	FMCC	ARMCC	JAMCC
ASMCC	FMCC	AUMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	AUMCC	JAMCC	AUMCC	FMCC	FMCC	AUMCC	JAMCC
AUMCC	FMCC	AUMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	AUMCC	JAMCC	AUMCC	FMCC	FMCC	AUMCC	JAMCC
BRMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC.	FMCC	BRMCC	JAMCC
CHMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC	FMCC	CHMCC	JAMCC
CMC	FMCC	CMC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	CMC	JAMCC	AUMCC	FMCC	FMCC	CMC	JAMCC
CMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC	FMCC	CMCC	JAMCC
CNMCC	FMCC	CNMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	JAMCC	AUMCC	FMCC	FMCC	JAMCC	JAMCC
CYMCC*	ITMCC	FMCC	JAMCC	SPMCC	CYMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	CYMCC	CYMCC	FMCC	JAMCC
FMCC	FMCC	FMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	FMCC	FMCC	FMCC	JAMCC
GRMCC	GRMCC	FMCC	JAMCC	SPMCC	GRMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	GRMCC	GRMCC	FMCC	JAMCC
HKMCC	FMCC	HKMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	JAMCC	AUMCC	FMCC	FMCC	JAMCC	JAMCC
IDMCC	FMCC	AUMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	AUMCC	JAMCC	AUMCC	FMCC	FMCC	AUMCC	JAMCC
INMCC	FMCC	CMC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	CMC	JAMCC	AUMCC	FMCC	FMCC	CMC	JAMCC
ITMCC	Nat. Pr.	FMCC	JAMCC	SPMCC	ITMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	ITMCC	ITMCC	FMCC	JAMCC
JAMCC	FMCC	Nat. Pr.	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	JAMCC	AUMCC	FMCC	FMCC	JAMCC	JAMCC
KOMCC	FMCC	KOMCC	Nat. Pr.	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	JAMCC	AUMCC	FMCC	FMCC	JAMCC	JAMCC
NIMCC**	FMCC	SPMCC	JAMCC	Nat. Pr.	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	NIMCC**	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
NMCC	NMCC	FMCC	JAMCC	SPMCC	Nat. Pr.	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	NMCC	NMCC	FMCC	JAMCC
PAMCC	FMCC	CMC	JAMCC	SPMCC	FMCC	Nat. Pr.	USMCC	SPMCC	SPMCC	AUMCC	CMC	JAMCC	AUMCC	FMCC	FMCC	CMC	JAMCC
PEMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	Nat. Pr.	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC	FMCC	PEMCC	JAMCC
QAMCC*	FMCC	SPMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	Nat. Pr.	SPMCC	AUMCC	NIMCC**	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
SAMCC	FMCC	SPMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	Nat. Pr.	AUMCC	SAMCC	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
SIMCC	FMCC	AUMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	Nat. Pr.	AUMCC	JAMCC	AUMCC	FMCC	FMCC	AUMCC	JAMCC
SPMCC	FMCC	SPMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	Nat. Pr.	JAMCC	AUMCC	FMCC	FMCC	SPMCC	JAMCC
TAMCC	FMCC	TAMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	Nat. Pr.	AUMCC	FMCC	FMCC	JAMCC	JAMCC
THMCC	FMCC	AUMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	AUMCC	JAMCC	Nat. Pr.	FMCC	FMCC	AUMCC	JAMCC
TRMCC	TRMCC	FMCC	JAMCC	SPMCC	TRMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	Nat. Pr.	TRMCC	FMCC	JAMCC
UKMCC	UKMCC	FMCC	JAMCC	SPMCC	UKMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	FMCC	JAMCC	AUMCC	UKMCC	Nat. Pr.	FMCC	JAMCC
USMCC	FMCC	USMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	USMCC	JAMCC	AUMCC	FMCC	FMCC	Nat. Pr.	JAMCC
VNMCC	FMCC	VNMCC	JAMCC	SPMCC	FMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	JAMCC	AUMCC	FMCC	FMCC	JAMCC	Nat. Pr.

Table 4-1: MCC Data Routing Matrix
(2/2)

Notes: Nat. Pr. National Procedures.
* Under development.
** Commissioned not operational

Transmitting MCC / System Information	AEMCC	ALMCC	ARMCC	ASMCC	AUMCC	BRMCC	CHMCC	CMC	CMCC	CNMCC	CYMCC*	FMCC	GRMCC	HKMCC	IDMCC	INMCC
Sarsat, GPS/DASS Spacecraft & Ephemeris Data* **	LUTs	LUTs	LUTs	LUTs	ASMCC	LUTs	LUTs	INMCC	LUTs	LUTs	LUTs	CYMCC*	LUTs	LUTs	LUTs	LUTs
					IDMCC			PAMCC				ITMCC				
					SIMCC			LUTs				GRMCC				
					THMCC							NMCC				
					LUTs							TRMCC				
												UKMCC				
												LUTs				
Cospas, Glonass Spacecraft & Ephemeris Data* **	LUTs	LUTs	LUTs	LUTs	ASMCC	LUTs	LUTs	AUMCC	LUTs	LUTs	LUTs	CYMCC*	LUTs	LUTs	LUTs	LUTs
					IDMCC			FMCC				ITMCC				
					SIMCC			INMCC				GRMCC				
					THMCC			JAMCC				NMCC				
					LUTs			PAMCC				TRMCC				
								SPMCC				UKMCC				
								USMCC				LUTs				
								LUTs								
Sarsat SARP Time Calibration*, Galileo Spacecraft & Ephemeris Data**	LUTs	LUTs	LUTs	LUTs	ASMCC	LUTs	LUTs	INMCC	LUTs	LUTs	LUTs	AUMCC	LUTs	LUTs	LUTs	LUTs
					IDMCC			PAMCC				CMC				
					SIMCC			LUTs				CYMCC*				
					THMCC							GRMCC				
					LUTs							ITMCC				
												JAMCC				
												NMCC				
												SPMCC				
												TRMCC				
												UKMCC				
												USMCC				
												LUTs				
SARR Commands												USMCC				
SARP Cmd Response & Housekeeping																
SARR Commands									USMCC							
SARR Cmd Response & Housekeeping																
System Status	SPMCC	SPMCC	USMCC	AUMCC	ASMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	FMCC	AUMCC	FMCC	JAMCC	AUMCC	CMC
					CMC			FMCC				CMC				
					FMCC			INMCC				CYMCC*				
					JAMCC			JAMCC				GRMCC				
					IDMCC			PAMCC				ITMCC				
					SIMCC			SPMCC				JAMCC				
					SPMCC			USMCC				NMCC				
					THMCC							SPMCC				
					USMCC							TRMCC				
												UKMCC				
												USMCC				
406 MHz SARR Frequency Calibration									USMCC							

Table 4-2: System Information Distribution (1/2)

Transmitting MCC / System Information	ITMCC	JAMCC	KOMCC	NIMCC**	NMCC	PAMCC	PEMCC	SAMCC	QAMCC*	SIMCC	SPMCC	TAMCC	THMCC	TRMCC	UKMCC	USMCC	VNMCC
Sarsat, GPS/DASS Spacecraft & Ephemeris Data* **	LUTs	CNMCC	LUTs	LUTs	LUTs	LUTs	LUTs	INMCC	LUTs	LUTs	AEMCC	LUTs	LUTs	LUTs	LUTs	ARMCC	LUTs
		HKMCC									ALMCC					AUMCC	
		KOMCC									NIMCC**					BRMCC	
		TAMCC									QAMCC*					CHMCC	
		VNMCC									SAMCC					CMC	
		LUTs									LUTs					CMCC	
																FMCC	
																JAMCC	
																SPMCC	
																PEMCC	
																LUTs	
Cospas, Glonass Spacecraft & Ephemeris Data* **	LUTs	CNMCC	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	AEMCC	LUTs	LUTs	LUTs	LUTs	ARMCC	LUTs
		HKMCC									ALMCC					AUMCC	
		KOMCC									NIMCC**					BRMCC	
		TAMCC									QAMCC*					CHMCC	
		VNMCC									SAMCC					CMCC	
		LUTs									LUTs					PEMCC	
																LUTs	
Sarsat SARP Time Calibration*, Galileo Spacecraft & Ephemeris Data**	LUTs	CNMCC	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	LUTs	AEMCC	LUTs	LUTs	LUTs	LUTs	ARMCC	
		HKMCC									ALMCC					BRMCC	
		KOMCC									NIMCC**					CHMCC	
		TAMCC									QAMCC*					CMCC	
		VNMCC									SAMCC					PEMCC	
		LUTs									LUTs					LUTs	
SARR Commands																NOAA	
SARP Cmd Response & Housekeeping																FMCC	
SARR Commands									USMCC							NOAA	
SARR Cmd Response & Housekeeping																CMCC	
System Status	FMCC	AUMCC	JAMCC	SPMCC	CMC	USMCC	SPMCC	SPMCC	AUMCC	JAMCC	AEMCC	JAMCC	AUMCC	FMCC	FMCC	ARMCC	JAMCC
		CNMCC									ALMCC					AUMCC	
		CMC									AUMCC					BRMCC	
		FMCC									CMC					CHMCC	
		HKMCC									FMCC					CMC	
		KOMCC									JAMCC					CMCC	
		TAMCC									NIMCC**					FMCC	
		USMCC									QAMCC*					JAMCC	
		VNMCC									SAMCC					PEMCC	
		SPMCC									USMCC					SPMCC	
406 MHz SARR Frequency Calibration																	

Table 4-2: System Information Distribution (2/2)

Notes: * Under development. ** Commissioned not operational *** Sarsat and Cospas ephemeris data and Sarsat SARP Time Calibration are distributed to LEOLUTs.

4.2 Detailed Implementation of Data Distribution Procedures

The following sections provide detailed implementation information on selected data distribution procedures and requirements. These procedures are agreed by the Joint Committee and apply to all MCCs unless otherwise stated.

4.2.1 Alert Message Validation (Filtering Anomalous Data)

Alert message validation should be performed at each MCC to prevent incorrect data from being transmitted to other MCCs and Distress authorities. The flowchart (Figure 4-8) is provided to illustrate data validation procedures for ease of comprehension, given the complexity of the validation process. The flowchart is intended to clarify data validation procedures and incorporates all the validation requirements of section 4.2. It is not intended to replace the detailed requirements provided in the remainder of section 4.2. The associated alert message validation table (Table 4-3) follows the logic of the flowchart and includes the same decision diamonds.

4.2.1.1 Validation of Alert Message Format and Content

Each MCC should validate all incoming beacon alert messages based on the format and content of the SIT message.

4.2.1.1.1 Validation of SIT Message Format

The format of a SIT message should be deemed corrupt if:

a) any message field is missing; or

b) the size of any message field is incorrect; or

c) a numeric message field contains non-numeric character(s); or

d) a space or decimal point is incorrectly placed.

The resultant MCC action is defined by Table 4-3.

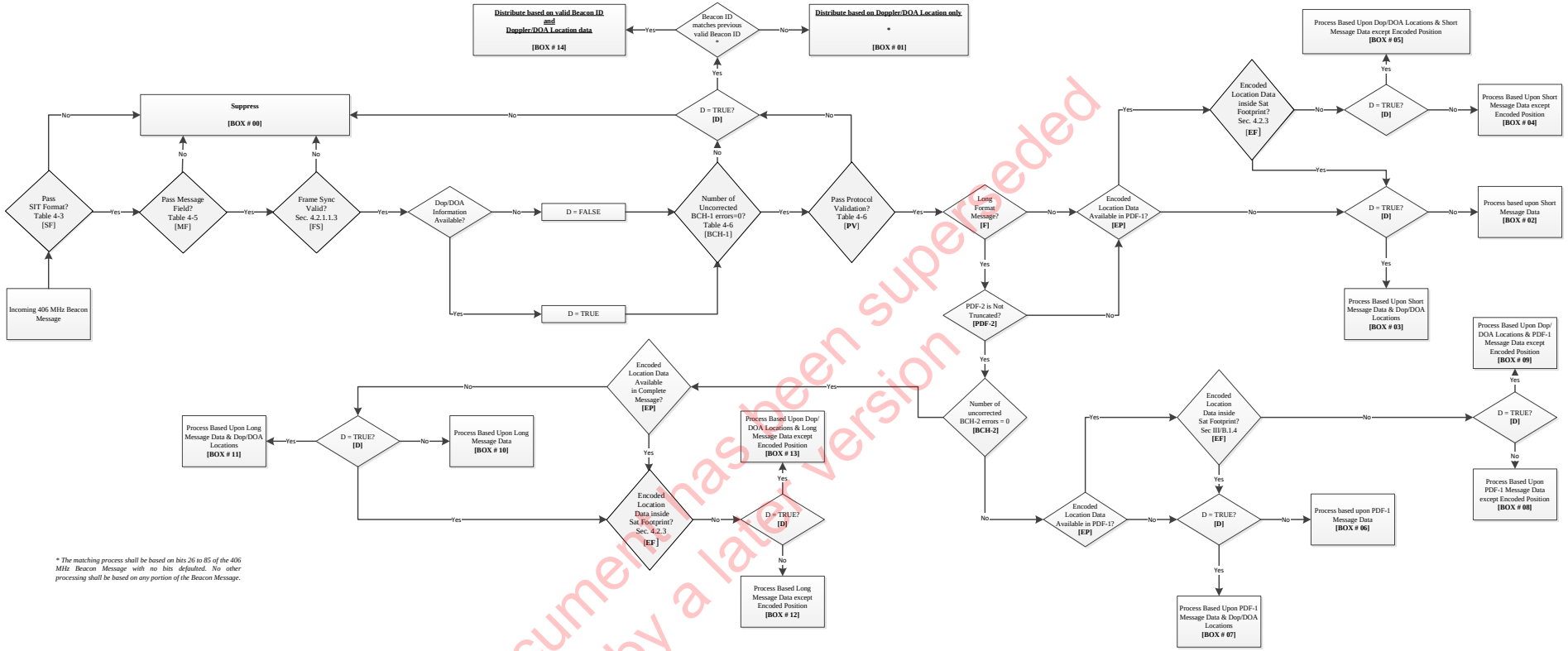


Figure 4-8: 406 MHz Alert Message Validation Flowchart

Note: « Dop/DOA» denotes Doppler/DOA. MEOSAR uncorroborated alerts are processed per section 4.2.1.4

Table 4-3: MCC Action Based on SIT Format

SIT Format	Action
Corrupt	Suppress
Not Corrupt	See Table 4-4

Table 4-4: 406 MHz Alert Message Validation

	1	2	3	4	5	6	7	8	9	10	11	12	
	SF	**MF**	**FS**	**BCH-1**	**PV**	**PrVal**	**F**	**PDF-2**	**BCH-2**	**EP**	**EF**	**D**	**BOX**
1	0												**0**
2	1	0											**0**
3	1	1	0										**0**
4	1	1	1	0								0	**0**
5	1	1	1	0		0						1	**1**
6	1	1	1	0		1						1	**14**
7	1	1	1	1	0							0	**0**
8	1	1	1	1	0	0						1	**1**
9	1	1	1	1	0	1						1	**14**
10	1	1	1	1	1		0			0		0	**2**
11	1	1	1	1	1		0			0		1	**3**
12	1	1	1	1	1		0			1	0	0	**4**
13	1	1	1	1	1		0			1	0	1	**5**
14	1	1	1	1	1		0			1	1	0	**2**
15	1	1	1	1	1		0			1	1	1	**3**
16	1	1	1	1	1		1	0		0		0	**2**
17	1	1	1	1	1		1	0		0		1	**3**
18	1	1	1	1	1		1	0		1	0	0	**4**
19	1	1	1	1	1		1	0		1	0	1	**5**
20	1	1	1	1	1		1	0		1	1	0	**2**
21	1	1	1	1	1		1	0		1	1	1	**3**
22	1	1	1	1	1		1	1	0	0		0	**6**
23	1	1	1	1	1		1	1	0	0		1	**7**
24	1	1	1	1	1		1	1	0	1	0	0	**8**
25	1	1	1	1	1		1	1	0	1	0	1	**9**
26	1	1	1	1	1		1	1	0	1	1	0	**6**
27	1	1	1	1	1		1	1	0	1	1	1	**7**
28	1	1	1	1	1		1	1	1	0		0	**10**
29	1	1	1	1	1		1	1	1	0		1	**11**
30	1	1	1	1	1		1	1	1	1	0	0	**12**
31	1	1	1	1	1		1	1	1	1	0	1	**13**
32	1	1	1	1	1		1	1	1	1	1	0	**10**
33	1	1	1	1	1		1	1	1	1	1	1	**11**

Legend – Flowchart abbreviation equivalence follows. Text within <"..."> (e.g., <"Pass SIT Format? Table 4-3">) refers to the equivalent decision diamond in the flowchart.

SF: <"Pass SIT Format? Table 4-3">: (0= No / 1=Yes).

MF: <"Pass Message Field? Table 4-4">: (0=No / 1=Yes).

FS: <"Frame Sync valid? Section 4.2.1.1.3">: (0=No / 1=Yes). Set to 1 for SGB.

BCH-1: <"Number of Uncorrected BCH-1 errors=0? Table 4-5">: (0=No /1=Yes).

PV: <"Protocol Validation. Table 4-6">: (0=Fail / 1=Pass).

PrVal: <"Beacon ID matches previous valid beacon ID">: (0=No / 1=Yes).

F: <"Long Format?">: (0=Short / 1=Long). Set to 0 for SGB.

PDF-2: <"PDF-2 is Not Truncated?">: (0=No / 1=Yes). Set to 0 for SGB.

BCH-2: <"Number of uncorrected BCH-2 errors=0?">: (0=No / 1=Yes). Not applicable for SGB.

EP: <"Encoded Position Available?">: (0=No / 1=Yes).

EF: <"Encoded Location in Footprint?">: (0=No / 1=Yes).

D: <"Doppler/DOA Locations Used?">, i.e., <"D=TRUE?">: (0 =No / 1=Yes). No, if Doppler for SGB; otherwise, Yes for Doppler/DOA location.

Note: If a test is irrelevant in a particular context (e.g., the BCH-2 test for Short Format Messages [F=0]) then the cell in the table is shaded.

4.2.1.1.2 Validation of SIT Message Field Content

Some message fields are essential to MCC alert processing. MCCs shall validate SIT message fields, against allowable values in document C/S A.002 Table "Message Fields Description", as specified in Table 4-5.

Table 4-5: MCC Action Based on Message Field Content

Message Field #	Data Contents (According to C/S A.002, Table B.1)	
	In Range	Out of Range
2, 4, 6, 8, 10, 11, 12, 13, 14, 14a, 14b, 21, 23, 25, 26, 27, 31, 77, 83, and 90	Process	Suppress
Other SIT Message Fields	Process	Process

Alert messages shall not be suppressed based on out-of-range values unless the message field is contained in the above list.

4.2.1.1.3 406 MHz Beacon Message Validation

Normal mode FGB messages have a perfect match of bits 16 to 24 with the 9-bit frame synchronization pattern described in document C/S T.001. If bits 16 to 24 of the FGB message (as contained in Message Field #77) do not perfectly match the 9-bit frame synchronization pattern (000101111), then the MCC shall suppress the associated MEOSAR alert. If a SGB alert is a self-test transmission (per Message Field #90), then the MCC shall suppress the associated alert.

In addition to the above validation, each MCC shall perform a BCH check of all incoming 406 MHz alert FGB messages from MCCs and LUTs to ensure that the 406 MHz beacon message (Message Field #23) is valid.

In addition, when the first protected field of the FGB or SGB message has no uncorrected BCH errors, each MCC shall validate the beacon message contents against specified values for FGBs per document C/S T.001 and SGBs per document C/S T.018, in accordance with Table 4-6.

A 406 MHz beacon alert message fails when one or more of the conditions in Table 4-6 below are met.

Table 4-6: Protocol Validation for 406 MHz Alert Messages

Beacon Type	Item to Check	Bits	Fail if:
FGB	Country Code Not Allocated	27 - 36	Decimal Value < 200 or > 780 or not allocated between 200 and 780
FGB	User Protocol	37 - 39	Bit 26 = 1, and Bits 37 - 39 = 101
FGB	Serial User Protocol	40 - 42	Bit 26 = 1, and Bits 40 - 42 = 101 or 111
FGB	Short Format Location Protocol	25 - 26	Bit 25 = 0 and Bit 26 = 0
FGB	Standard Location Ship Security Protocol	61 - 64	Bit 25 = 1 and Bit 26 = 0 and Bits 37 - 40 = 1100 and Bits 61 - 64 ≠ 0000
FGB	Return Link Service Location Protocol	43 - 52	Bit 25 = 1 and Bit 26 = 0 and Bits 37 - 40 = 1101 and decimal value < 1 or > 999
FGB	Maritime User or Radio Call Sign	82 - 83	Bit 26 = 1 and Bits 37 - 39 = 010 or 110 and Bits 82 - 83 are non-zero
FGB	Unallocated Location Protocols	37 - 40	Bit 26 = 0, and Bits 37 - 40 = 0000 or 0001
FGB	Supplementary Data (Standard Location Protocols)	107 - 110	Bit 26 = 0 and Bits 37 - 40 = 0010, 0011, 0100, 0101, 0110, 0111 1110, and Bits 107 - 110 ≠ 1101
FGB	Supplementary Data (Standard Location Ship Security Protocol)	107 - 110	Bit 25 = 1 and Bit 26 = 0 and Bits 37 - 40 = 1100, and Bits 107 - 110 ≠ 1101
FGB	Supplementary Data (National Location Protocol, Long)	107 - 109	Bit 25 = 1 and Bit 26 = 0, and Bits 37 - 40 = 1000, 1010, 1011 or 1111, and Bits 107 - 109 ≠ 110
FGB, SGB	Modified Baudot Code	Varies	Unassigned Baudot Character
FGB, SGB	Binary Coded Decimal	Varies	Decimal Value for Four Bit Group > 10
FGB, SGB	Encoded Latitude and Longitude	Varies	Encoded Latitude > 90 or Encoded Longitude > 180 (for FGB, the check is performed after any usable encoded position data in the second protected field (bits 107 – 144) is included in the encoded position.
SGB	Country Code Not Allocated	31 - 40*	Decimal Value < 200 or > 780 or not allocated between 200 and 780
SGB	Aircraft / Vessel ID Type	91 - 93*	Bits 91 - 93 = 110
SGB	Aircraft / Vessel ID Type	91 – 93*	Bit 43 = 0 and Bits 91 – 93 = 111
SGB	Aircraft / Vessel ID	94 – 137*	Bits 91 – 93 = 010 and bits 136 – 137 ≠ 00, Bits 91 – 93 = 011 and bits 136 – 137 ≠ 00, Bits 91 – 93 = 100 and bits 118 – 137 are non-zero, or Bits 91 – 93 = 101 and bits 124 – 137 are non-one

Beacon Type	Item to Check	Bits	Fail if:
SGB	Beacon Type	138 – 140*	Bits 138 – 140 = 100, 101, 110, 111
SGB	Spare Bits and Rotating Field Fixed Bits	141 – 200*	Bits 155 – 158 = 1111 and either: bits 141 – 154 are non-zero, or bits 159 – 200 are non-one

* Based on the 154-bit main data field, and 48-bit rotating field, per C/S T.018 section 3.

4.2.1.1.4 406 MHz FGB Message Validation

If the first protected field of the FGB message (bits 25 - 106) contains any uncorrected BCH errors, or the FGB beacon fails any condition in Table 4-6, then the MCC shall:

a) match for the "same beacon ID" based on bits 26 - 85 of the 406 MHz Beacon Message with no bits defaulted;

b) in case of successful match with a previous alert having a valid 406 MHz Beacon Message, distribute to Distress authorities using the valid 406 MHz Beacon Message (per items (d), (e) and (f) below);

c) perform no other processing based on any portion of the 406 MHz Beacon Message;

d) distribute the alert based on Doppler/DOA position only;

e) not distribute the data if there is no Doppler/DOA position; and

f) only provide information in alert messages to Distress authorities based on the "same Beacon Id" per item (a) above.

If the second protected field (bits 107 - 144) has uncorrected BCH errors, then no processing shall be based on any portion of this field, except for the Supplementary Data Bits as defined in Table 4-6.

If the second protected field has no uncorrected BCH errors and a component value of the encoded position (i.e., degrees, minutes or seconds) in the second protected field contains an out of range value (per document C/S T.001), then the encoded position information in the second protected field shall not be processed.

4.2.1.1.5 406 MHz SGB Message Validation

If the SGB message contains uncorrectable BCH errors (per MF #91) or the SGB message fails any condition in Table 4-9, then the MCC shall:

a) match for the same beacon ID based on the 15 HEX ID per the section 3.1.4;

b) in case of successful match with a previous alert having a valid 406 MHz Beacon Message, distribute to Distress authorities using the valid 406 MHz Beacon Message (per items (d), (e), and (f) below);

c) perform no other processing based on any portion of the 406 MHz Beacon Message (including rotating fields);

d) distribute the alert based on DOA position only;

e) not distribute the data if there is no DOA position; and

f) only provide information in alert messages to Distress authorities based on the "same Beacon Id" per item (a) above.

Rotating fields are considered supplemental data. If the SGB message contains no uncorrectable BCH errors and does not fail any condition in Table 4-6, then each associated rotating field shall be validated against specified values in Table 4-7. If any rotating field fails to meet any condition in Table 4-8, then the MCC shall not use any of the component fields in the associated rotating field.

Table 4-7: Rotating Field Validation for SGB*

Rotating Field Id	1 – 4	Bits 1 – 4 ≠ 0000, 0001, 0010, 0011, or 1111
G.008 Objective Requirements Rotating Field	40 - 48	Bits 1- 4 = 0000 and (Bits 40 – 41 = 11 or bits 42 – 44 = 110 or bits 45 – 46 = 00 or bits 47 – 48 ≠ 00)
ELT(DT) In-flight Emergency Rotating Field	5 - 48	Bits 1- 4 = 0001 and (Bits 5 - 21 are non-one and encoded value > 86399, or Bits 32 – 35 ≠ 0001, 0100, or 1000, or Bits 36 – 37 = 00, or Bits 40 – 48 are not all-zero)
RLS Rotating Field	38 – 48	Bits 1 – 4 = 0010 and Bits 38 – 48 are not all-zero
Cancellation Rotating Field	5 – 48	Bits 1 – 4 = 1111 and (Bits 5 – 46 are not all-one or bits 47-48 = 00 or 11)

* Bits 1 – 48 within a rotating field, which follow the 154-bit main data field, per document C/S T.018 section "Digital Message Content".

4.2.1.1.6 Additional Validation

MCCs may perform additional validation to meet national requirements; however, additional validation shall not affect the distribution of data to other MCCs.

4.2.1.2 Doppler/DOA Position Footprint Validation

Each MCC shall implement the "Algorithm to Determine if Computed Position is Inside Satellite Footprint", as specified in document C/S A.002 to determine if:

a) the Doppler positions are inside the satellite footprint at the time of detection; and

b) the DOA position is inside the satellite footprints at the time of detection (either first or last detect time).

If one of the LEOSAR Doppler positions or the DOA position is conclusively outside the footprint then this failure shall be flagged in alert messages sent by the MCC, as specified in document C/S A.002.

4.2.1.3 Encoded Position Footprint Validation

Each MCC shall implement the "Algorithm to Determine if Computed Position is Inside Satellite Footprint" as specified in document C/S A.002 to determine if the encoded position is inside the satellite footprint(s) at the time of detection (MF #14, MF #14a, or MF #14b per document C/S A.002). If the encoded position is conclusively outside the footprint then no processing shall be based on the encoded position.

4.2.1.4 Uncorroborated MEOSAR Alerts*

If a MEOSAR alert is derived from only a single beacon burst (i.e., the associated detect times per Message Fields #14a and #14b in document C/S A.002 are within 2.5 seconds) and from a single satellite (per Message Field #83) and no previous alert was generated for the alert site (beacon activation) that contains data from a different beacon burst or satellite, then the MEOSAR alert is deemed uncorroborated.

The MCC shall not distribute an uncorroborated MEOSAR alert to LEOSAR/GEOSAR only capable MCCs unless the beacon is an ELT(DT).

The MCC shall not distribute an uncorroborated MEOSAR alert to SPOCs unless:

a) the beacon is an ELT(DT); or

b) the reporting MEOLUT meets the requirement for processing anomalies (per section "Processing Anomalies Rate" of document C/S T.019; or

c) it is determined that the beacon ID associated with the MEOSAR alert is registered.

Uncorroborated MEOSAR alerts shall be included in an alert site regardless of whether they are distributed, so that they are used in subsequent processing for the beacon activation.

If a new alert site only contains uncorroborated MEOSAR alert data, then:

a) the status word is treated as Sw_0 in subsequent processing; and

b) if a new MEOSAR alert contains data from a different beacon burst or satellite than the previous uncorroborated MEOSAR alert data, then the new alert is distributed to all relevant destination (i.e., without filtering alerts to SPOCs and LEOSAR/GEOSAR-only-capable MCCs).

4.2.2 Position Matching

Position matching is the comparison of the computed distance between two beacon positions and a set distance criterion. It is used to decide if two positions should be considered operationally as a unique beacon position or as separate beacon positions. The matching process can include other

* The filtering of uncorroborated MEOSAR alerts is a temporary mitigation measure to address the high number of these alerts being delivered by MEOLUTs. It is expected that MEOLUT manufacturers will resolve this issue before the end of the MEOSAR EOC phase.

technical parameters. For ELT(DT)s, position matching is limited to comparing the encoded and DOA position in the same alert so that a position conflict will be identified if the position difference exceeds the relevant distance match criterion (per item e below).

Matching criteria are necessary to determine if two sets of independent position data should be regarded as corresponding to the same beacon position. Such matching criteria are used in the ambiguity resolution process to determine whether two Doppler positions from two independent beacon events, or an encoded position and a Doppler position, are sufficiently close to determine which Doppler position is the "true" position and which is the image or incorrect position(s). Matching criteria are also used to decide if a separate alert message should be transmitted for a beacon when a new position is at a distance from any previously received position greater than the distance separation defined by the matching criteria.

The points listed below concerning the matching of positions apply to the matching criteria distance to be used by MCCs:

a) the Doppler to Doppler distance match criterion shall be 20 kilometres for position confirmation and position conflict;

b) the Doppler to encoded distance match criterion shall be 20 kilometres for position confirmation and position conflict;

c) the encoded to encoded distance match criterion shall be three (3) kilometres for position conflict;

d) the DOA to DOA distance match criterion shall be 20 kilometres for position confirmation and position conflict;

e) the DOA to encoded distance match criterion shall be 20 kilometres for position confirmation and position conflict;

f) the DOA to Doppler distance match criterion shall be 20 kilometres for position confirmation and position conflict;

g) each of the above distance match criteria shall be independently configurable;

h) in the match process, the "best" match shall be used to confirm position when multiple candidate positions meet the match criterion; however,

i) if both pairs of Doppler positions meet the match criterion prior to position confirmation for different satellite passes, this is deemed an Unresolved Doppler Position Match (see Figure 4-9) and:

   i. position shall not be confirmed from either pair of Doppler positions, and

   ii. other pairs of positions shall remain eligible to resolve ambiguity, even if the "best" distance match was between ineligible Doppler positions; and

j) the distance between positions shall be computed independent of altitude (which may be provided for DOA positions and SGB encoded positions).

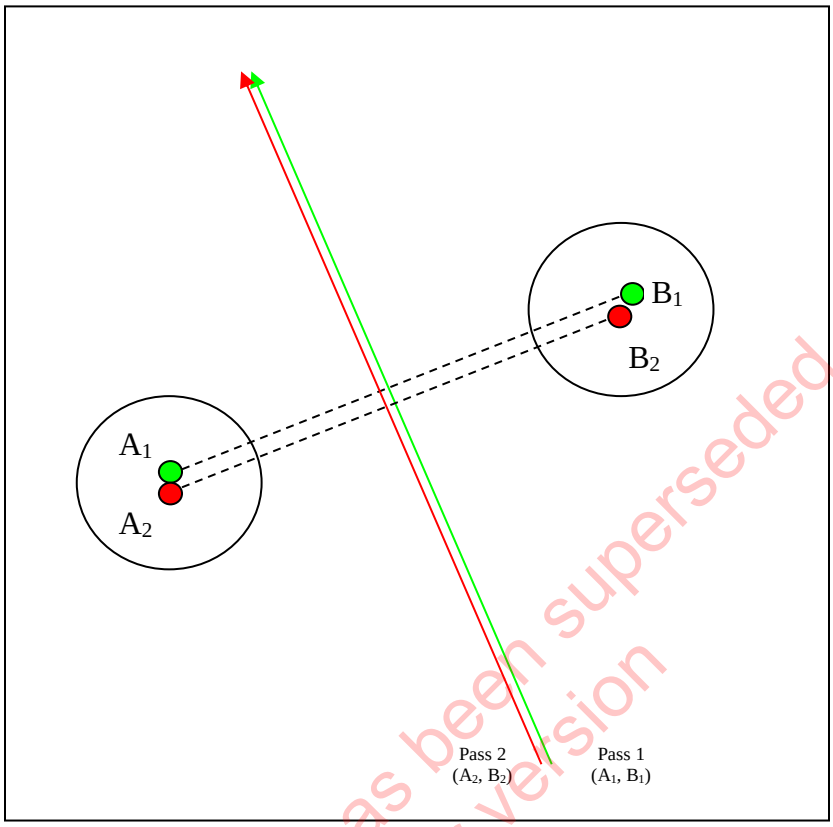


Figure 4-9: Unresolved Doppler Match Scenario (20 km circles)

4.2.3 Position Confirmation

Position Confirmation is the determination of the confirmed beacon position (the resolved position), as described in section 3.2.4. Details on position matching are provided in section 4.2.2.

4.2.4 Procedures to Determine Better Quality LEOSAR Alert Data for Same Beacon Event Position Conflicts

4.2.4.1 Introduction

A position conflict exists when an alert is received at an MCC and the position data fails to match (see section 4.2.2 above) any previously received position data for the same beacon. MCCs shall use the filtering procedure detailed below for filtering Doppler position conflict alerts for the same beacon event prior to and after position confirmation. This procedure is not used for ELT(DT)s.

The purpose of the filtering procedure is to minimise the distribution of alert messages containing "poor" quality Doppler position data. If a new alert with Doppler position conflict is for the same beacon event as previously received data, additional checks can be performed to determine if the new Doppler position data is of better quality than previously received Doppler position data and should be transmitted or is of poorer quality and can be deemed redundant. If the relative quality of the Doppler positions cannot be determined, then the new data should be transmitted. The procedure below ensures that "good" data will not be suppressed while limiting the amount of erroneous data distributed to Distress authorities.

4.2.4.2 Doppler Position Conflict Procedure

An MCC should identify a reference alert with Doppler position data for each beacon event. By default, the first alert for each pass becomes the reference until another alert of better quality is received. If an alert with new Doppler position data for the same beacon event is received which is determined to be of better quality, and the new Doppler position fails to match any previously received position data for the same beacon, the new alert becomes the reference and a position conflict alert is transmitted.

An MCC determines if a new alert contains Doppler position data of better quality by performing the following checks in sequence. The appropriate action is then taken as indicated (see Table 4-12).

Step 1:

If both alerts have a bias standard deviation less than 20 Hz, then proceed to Step 2. If both alerts have a bias standard deviation equal to or greater than 20 Hz, or if either bias standard deviation is not available, then quality differentiation cannot be made, and the new alert is transmitted.

If the reference alert has a bias standard deviation equal to or greater than 20 Hz, and the new alert has a bias standard deviation less than 20 Hz, then the new alert is deemed to be of better quality, a position conflict alert is transmitted, and the new alert becomes the reference alert. If the reverse is true, the new alert is deemed to be of poorer quality and the new alert is not transmitted.

Step 2:

In this step both alerts are assumed to have bias standard deviations less than 20 Hz. If both alerts have WF values < 2, then go to Step 3. If the new alert contains a WF ≥ 2, and the reference alert contains a WF < 2 then the new alert is not transmitted. If the WF of the reference alert contains a value ≥ 2 and the new alert contains a WF < 2, then the new alert is transmitted and becomes the reference alert. If both alerts have WF values ≥ 2, then quality differentiation cannot be made, and the new alert is transmitted.

Step 3:

This step applies when both bias standard deviations are < 20 Hz and both Window Factors are < 2. In this case, the dimensions of the minor axis of the error ellipse for the “A” solution are compared.

If the error ellipse minor axis (MIN) of the new alert is ≥ 99.9 and the MIN of the reference alert < 99.9, then the new alert is not transmitted. If the MIN for the new alert is < 99.9 and the MIN for the reference alert is ≥ 99.9, then the new alert is transmitted and becomes the reference alert. Finally, if either of the above conditions are not met, then quality differentiation cannot be made, and the new alert is transmitted.

If for any reason the relative quality cannot be determined in the comparison of the Doppler positions from alerts for the same beacon event, the new position data should be transmitted.

Table 4-8: Procedures to Determine Better Quality Alert Data for Same Beacon Event Doppler Position Conflicts

	Parameters						
	Bias Std Dev (Hz) MF #13		**Window Factor (0 - 9) MF #15**		**Min. Axis Error Ellipse (km) MF #27**		
Steps	Reference Alert	New Alert	Reference Alert	New Alert	Reference Alert	New Alert	Action[3]
Step 1	< 20 Hz	< 20 Hz					Go to Step 2
	default [1]	default [1]					New alert transmitted
	≥ 20 Hz	< 20 Hz					New alert transmitted [2]
	< 20 Hz	≥ 20 Hz					New alert NOT transmitted
	≥ 20 Hz	≥ 20 Hz					New alert transmitted
Step 2	< 20 Hz	< 20 Hz	< 2	< 2			Go to Step 3
	< 20 Hz	< 20 Hz	< 2	≥ 2			New alert NOT transmitted
	< 20 Hz	< 20 Hz	≥ 2	< 2			New alert transmitted [2]
	< 20 Hz	< 20 Hz	≥ 2	≥ 2			New alert transmitted
Step 3	< 20 Hz	< 20 Hz	< 2	< 2	< 99.9	≥ 99.9	New alert NOT transmitted
	< 20 Hz	< 20 Hz	< 2	< 2	≥ 99.9	< 99.9	New alert transmitted [2]
	< 20 Hz	< 20 Hz	< 2	< 2	< 99.9	< 99.9	New alert transmitted
	< 20 Hz	< 20 Hz	< 2	< 2	≥ 99.9	≥ 99.9	New alert transmitted

1 indicates that at least one bias standard deviation is not available.
2 indicates that the new alert becomes the reference alert.
3 if the new alert is transmitted, then the Poor-Quality Flag (PQF) is set to 0; otherwise, PQF is set to 1.

4.2.5 Detailed Procedures for Alert Data Distribution

4.2.5.1 Analysis and General Representation of Alert Data Processing

Alert data received by a Cospas-Sarsat MCC, either from its associated LUTs or from another MCC, shall be forwarded to a MCC, or a Distress authority if it contains 'new' information useful to Distress authorities. The MCC shall not send an alert message received from another MCC to the other MCC if the new alert message would contain identical alert information and be sent with the same SIT number.

The alert data distribution process consists of a set of rules commonly used by Cospas-Sarsat MCCs for deciding whether new input data concerning a particular 406 MHz beacon ID contains 'new' information. It is based on a number of parameters defined in the Cospas-Sarsat Glossary (document C/S G.004) and matching rules (defined in this document), which include:

- the definitions of 'beacon events', 'position confirmation' and 'position conflict', and
- the definition of distance criteria for matching Doppler and encoded position data.

However, these basic rules and the variety of position data available in 406 MHz alert messages create a large number of possible combinations which need to be thoroughly analysed to ensure the consistency of the alert data distribution process throughout the Cospas-Sarsat MCC network.

The procedures in section 4.2.5 do not apply to ELT(DT)s, unless stated otherwise. Procedures for ELT(DT)s are provided in section 3.2.3.2.2.

In order to implement this data distribution process, the 'position information content' of each valid incoming alert message (referred to as 'Input' or 'I' in this section) must be compared with the information already transmitted concerning the same beacon ID. Therefore, the history of all data already transmitted must be preserved. For each beacon ID, that history can be summarised in a 'Status word' (Sw). Input and Status words are both characterised by the type of position information (received in the input or transmitted in previous messages). Similarly, the 'action(s)' resulting from the process (i.e., the message to be transmitted, its format and recipients) can be summarised in an 'Action word' (Aw) and characterised by the type of position information to be forwarded, taking also into account position data already distributed. The functional relations between 'Input', 'Status word' and 'Action word' in the process are summarised in Figure 4-10. For ELT(DT)s, the new Status word is Sw1 even when position data was previously received and resulted in an Action word > Aw1, because previous position data is not used to process a new ELT(DT) alert.

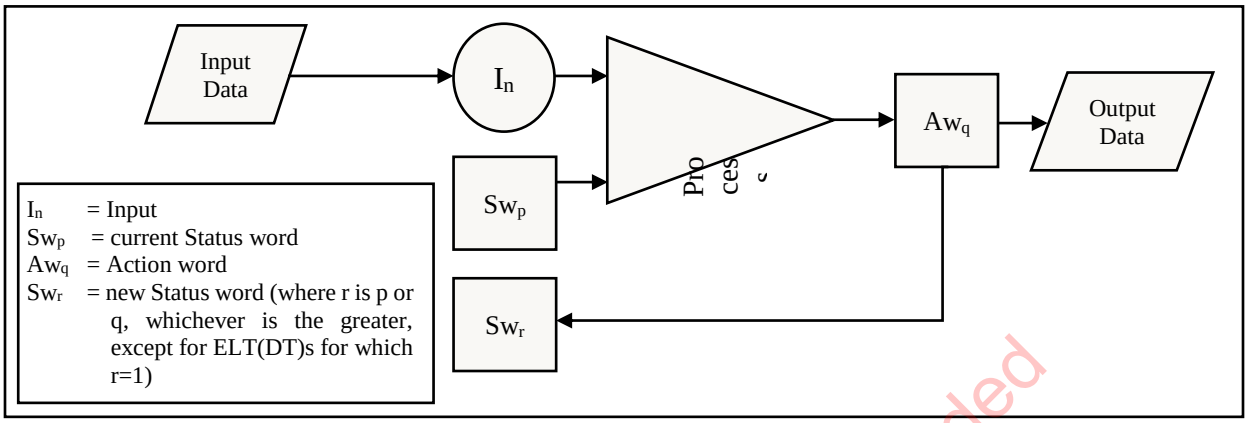


Figure 4-10: Alert Data Processing Concept

4.2.5.2 Definition of Input, Status and Action Words

The possible combinations of position data which characterise an input (I), the current status (Sw) or the resulting action (Aw) of the process concerning a given beacon ID are identified by the subscript index, described in Table 4-9. No other combinations of the type of position data are allowed and the possible position information contents of I, Sw and Aw are summarised in the last column. Table 4-9 only describes the definition of 'Input', 'Status word' and 'Action word'; the functional relations between 'Input', 'Status word' and 'Action word' are described in Figure 4-10.

Table 4-9: Definition of the Input, Status and Action Words for 406 MHz Alerts

Input	Type of position data					Status word	Action word	Comments
	No Position Data	DOA Doppler Positions	Encoded Position Data	Dop/DOA Pos. Confirmed	Dop/DOA & E Positions Matched			Position Information Content
-	0	0	0	0	0	Sw_0	Aw_0	No message received or sent
I_1	1	0	0	0	0	Sw_1	Aw_1	Unlocated alert
I_2	0	1	0	0	0	Sw_2	Aw_2	Doppler/DOA positions only
I_3	0	0	1	0	0	Sw_3	Aw_3	Encoded position only
I_4	0	1	1	0	0	Sw_4	Aw_4	Doppler/ DOA & E positions all unmatched
I_5	0	1	0	1	0	Sw_5	Aw_5	Doppler/DOA pos. only, position confirmed
I_6	0	1	1	1	0	Sw_6	Aw_6	Doppler/DOA pos. (pos. confirmed) + E pos. unmatched
I_7	0	1	1	1	1	Sw_7	Aw_7	Resolved positions (Doppler/DOA & E matched)

Notes:

- The Input word (I) is specific to each individual input and independent of the origin of the data (e.g. another MCC or the LUTs associated with the receiving MCC).
- The Status word (Sw) summarises all previous inputs and actions in respect of a particular beacon ID. Sw_5, Sw_6 and Sw_7 each mean that position has been confirmed. However, the distinction between the various position information contents after position confirmation is relevant for the Input and Action words.
- The Actions to be carried out as a result of the process depend on the Input / Status combination, but also on the results of comparisons (matching tests) between 'old' and 'new' position data received by the MCC, as shown in the matrix (Figure 4-10). The selected Action word is also used to define the message format to be sent and, before position confirmation, characterises the new status associated with that beacon ID after completion of the selected Action (i.e., Aw_i -› Sw_i).
- For ELT(DT)s, the Action Word is Aw_2 if only DOA position is present, Aw_2 if positions in the new alert (i.e., encoded and DOA position) match each other, Aw_3 if only encoded position is present, Aw_4 if positions in the new alert do not match each other.
- For uncorroborated MEOSAR alerts, the Status Word is set to "Sw_0", as specified in the section entitled "Uncorroborated MEOSAR Alerts".

4.2.5.3 Process Matrix for Alerts

The process is summarised in Table 4-10 and Table 4-11 for input LEOSAR/GEOSAR alerts and input MEOSAR alerts, respectively. These tables define, for each Input / Status combination the possible output (Action words), the corresponding SIT message numbers (to be used if the new data in the Input has to be forwarded to another MCC, outside the processing MCC service area) and the appropriate recipient(s) of this information, as determined by the geographic sorting of position data. A single Action Word applies to a specific beacon activation regardless of whether the data source is the LEOSAR, GEOSAR or MEOSAR system.

4.2.5.3.1 Processing Before Position Confirmation (Sw_0, Sw_1, Sw_2, Sw_3, Sw_4 Status)

The process is quite simple when no data was previously received for the beacon ID in a new Input (Status Sw_0), or when the previously received alert(s) for that ID did not include any position information (Status Sw_1).

However, as shown in Table 4-10 and Table 4-11, a number of Input / Status combinations may result in several possible Actions. This occurs when a number of alert messages have been received prior to the new input, but the available position data did not satisfy the matching criteria for position confirmation. The new position data in the input message must then be compared with all positions previously received for the same beacon ID, and these matching tests can lead to different Actions. The position information content of each possible Action is used to select the appropriate Action word as illustrated in the special algorithm described in section 4.2.5.4 (Table 4-12, Table 4-13, Table 4-14 and Table 4-15).

4.2.5.3.2 Processing After Position Confirmation (Sw_5, Sw_6, Sw_7 Status)

After position confirmation, the distribution of input alert data is normally continued, and a different processing logic must be implemented since the initial objective of increasing the position information content to obtain a confirmed position has already been achieved. To reflect this different approach, the new 'Actions' are identified in the matrices as Ct_i (see Table 4-10, Table 4-11 and Table 4-15).

Except for additional encoded position, all input position data is compared to the last resolved position transmitted by the MCC, in accordance with the usual processing criteria. If the process results in an Action different from Ct_0 (redundant data not to be distributed), the input position data is sent to the destination(s) for which continued transmission is enabled.

Notes:

- The suffix of Inputs (I words), Actions (Ct) and Status (Sw) remain consistent with the definitions of Figure 4-10, although there is no practical differences between the three Status words (Sw_5, Sw_6, and Sw_7) in terms of processing after position confirmation in the proposed procedure.
- Table 4-10 and Table 4-11 indicates several possible outcomes for all Inputs but one after position confirmation. However, only one comparison is performed between the new position data in the Input and the known resolved position, except for additional encoded position. Therefore, the outcome is always unambiguous and no 'priority rule' is required.

Table 4-10: Processing Matrix, Message Formats and Distribution of new 406 MHz LEOSAR/GEOSAR Alerts

	I_1 (no position data)			I_2 (A / B Doppler positions)			I_3 (Encoded only)			I_4 (A / B / E unmatched)			I_5 (Confirmed Doppler)			I_6 (Conf. Doppler + E unmatched)			I_7 (Confirmed Doppler and E)		
	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest
Sw_0	Aw_1	n22	C	Aw_2	125	AB	Aw_3	n22	E	Aw_4	126	ABE	Aw_5	127	R	Aw_6	127	R	Aw_7	127	R
Sw_1	Aw_0 Aw_1	- n22	- C	Aw_2	125	ABP	Aw_3	n22	EP	Aw_4	126	ABEP	Aw_5	127	RP	Aw_6	127	RP	Aw_7	127	RP
Sw_2	Aw_0	-	-	Aw_5 Aw_0 Aw_2 Aw_2	127 - 126 125	RIP - ABP ABP	Aw_7 Aw_4	n24 n23	RIP EP	Aw_7 Aw_6 Aw_4	127 127 126	RIP RIP ABEP	Aw_5	127	RIP	Aw_6	127	RIP	Aw_7	127	RIP
Sw_3	Aw_0	-	-	Aw_7 Aw_4	127 126	RIP ABP	Aw_0 Aw_3	- n23	- EP	Aw_7 Aw_4	127 126	RIP ABEP	Aw_7 Aw_6	127 127	RIP RIP	Aw_7 Aw_6	127 127	RIP RIP	Aw_7	127	RIP
Sw_4	Aw_0	-	-	Aw_7 Aw_6 Aw_0 Aw_4 Aw_4	127 127 - 126 125	RIP RIP - ABP ABP	Aw_7 Aw_0 Aw_4	n24 - n23	RIP - EP	Aw_7 Aw_6 Aw_0 Aw_4 Aw_4	127 127 - 126 125	RIP RIP - ABEP ABEP	Aw_7 Aw_6	127 127	RIP RIP	Aw_7 Aw_6	127 127	RIP RIP	Aw_7	127	RIP
Sw_5 Sw_6 Sw_7	Ct_0	-	-	Ct_0 Ct_2 Ct_5	- 126 127	- RD RD	Ct_0 Ct_3 Ct_7	- n23 n24	- RD RD	Ct_0 Ct_4 Ct_7	- 126 127	- RD RD	Ct_0 Ct_5	- 127	- RD	Ct_0 Ct_6	- 127	- RD	Ct_0 Ct_7	- 127	- RD

Notes: For Ship Security alerts, the destination is "C" for all transmitted messages. "n" is "1" for FGB (e.g., SIT 122), "3" for SGB (e.g., SIT 322). A SGB example is provided in section 4.2.12.

Ii = Input
Swi = Status word
Awi = Action word
Cti = Continue transmission

A = A Doppler position
B = B Doppler position
E = Encoded position
O = DOA position

R = Confirmed position
I = Incorrect previous position(s)
C = Country code destination
RD = Post Confirmation destination

Dest = Destination of SIT message
SIT = Subject Indicator Type / (standard message format)
P = Previous recipient(s)

Table 4-11: Processing Matrix, Message Formats and Distribution of new 406 MHz MEOSAR Alerts

	I_1 (no position data)			I_2 (DOA position)			I_3 (Encoded only)			I_4 (DOA / E unmatched)			I_5 (Confirmed DOA)			I_6 (Conf. DOA + E unmatched)			I_7 (Confirmed DOA and E)		
	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest	Aw	SIT	Dest
Sw_0	Aw_1	n42	C	Aw_2	n45	O	Aw_3	n42	E	Aw_4	n46	OE	Aw_5	n47	R	Aw_6	n47	R	Aw_7	n47	R
Sw_1	Aw_0 Aw_1	- n42	- C	Aw_2	n45	OP	Aw_3	n42	EP	Aw_4	n46	OEP	Aw_5	n47	RP	Aw_6	n47	RP	Aw_7	n47	RP
Sw_2	Aw_0	-	-	Aw_5 Aw_0 Aw_2 Aw_2	n47 - n46 n45	RIP - OP OP	Aw_7 Aw_4	n44 n43	RIP EP	Aw_7 Aw_6 Aw_4	n47 n47 n46	RIP RIP OEP	Aw_5	n47	RIP	Aw_6	n47	RIP	Aw_7	n47	RIP
Sw_3	Aw_0	-	-	Aw_7 Aw_4	n47 n46	RIP OP	Aw_0 Aw_3	- n43	- EP	Aw_7 Aw_4	n47 n46	RIP OEP	Aw_7 Aw_6	n47 n47	RIP RIP	Aw_7 Aw_6	n47 n47	RIP RIP	Aw_7	n47	RIP
Sw_4	Aw_0	-	-	Aw_7 Aw_6 Aw_0 Aw_4 Aw_4	n47 n47 - n46 n45	RIP RIP - OP OP	Aw_7 Aw_0 Aw_4	n44 - n43	RIP - EP	Aw_7 Aw_6 Aw_0 Aw_4 Aw_4	n47 n47 - n46 n45	RIP RIP - OEP OEP	Aw_7 Aw_6	n47 n47	RIP RIP	Aw_7 Aw_6	n47 n47	RIP RIP	Aw_7	n47	RIP
Sw_5 Sw_6 Sw_7	Ct_0	-	-	Ct_0 Ct_2 Ct_5	- n46 n47	- RD RD	Ct_0 Ct_3 Ct_7	- n43 n44	- RD RD	Ct_0 Ct_4 Ct_7	- n46 n47	- RD RD	Ct_0 Ct_5	- n47	- RD	Ct_0 Ct_6	- n47	- RD	Ct_0 Ct_7	- n47	- RD

Note: See Table 4-10

4.2.5.4 Special Processing Procedures

4.2.5.4.1 Tests and Flag Setting for Special Processing Procedures

Multiple flags may be positioned to determine the output of an I_n / Sw_p combination which requires special procedures:

DEM = Doppler / DOA to Encoded Positions Matching flag: set to "1" if a D (Doppler or DOA) position and an Encoded position match the distance separation criterion (and other criteria as may be required) and set to "0" otherwise. However, in some Input / Status combinations this flag has no relevance, for example, if the Input is the I_2 type, containing only Doppler or DOA position data. In such cases the DEM flag is assumed to be set to default value "0". The DEM test is not applicable after position confirmation.

In the DEM test, the E position of the Input is compared to all previously received Doppler and DOA positions, if the position is not confirmed. After position confirmation, the E position is compared to previously received non-redundant E positions if there is previous encoded position, or to the confirmed position if there is no previous encoded position.

Alternatively, the A / B Doppler positions or DOA position of the Input are compared with any E position previously received at the MCC, if the position is not confirmed. A correct match with one Doppler or DOA position is sufficient to achieve position confirmation. After position confirmation, the confirmed position is compared to the input Doppler positions or DOA position. If neither of the input Doppler positions matches the confirmed position, then the input Doppler positions are compared to previous Doppler positions for the SBE to determine redundancy.

SBE = the 'Same Beacon Event' flag is to be set for each matching test as follows:

SBE set to "1" if, for the same Beacon ID, previous A / B Doppler positions to be compared with Input are from same satellite and same TCA +/- 20 minutes.

Otherwise, SBE set to "0".

The SBE flag is used only in relation with the Doppler to Doppler position matching tests. It has no relevance for Doppler to DOA, DOA to DOA, DEM or EEM tests and is set to the default value "0" in such cases.

DBE = the 'Dependent Beacon Event' flag is to be set for each matching test as follows:

DBE set to "1" if, for the same Beacon ID:

a) prior to position confirmation:

   i. the unique set of satellites used to compute the new DOA position is not contained in (or does not contain) the unique set of satellites used to compute a previously sent DOA position and every portion of the time period associated with the new DOA position (i.e., the time from the first to last burst used to compute the new DOA position) is within two (2) seconds of some portion of the time period associated with the same previously sent DOA position, or

   ii. the unique set of satellites used to compute the new DOA position is contained in (or contains) the unique set of satellites used to compute a previously sent DOA position and the time of the latest beacon burst used to compute the new DOA

position is within 30 minutes of the time of the latest beacon burst used to compute the same previously sent DOA position; or

b) after position confirmation:

i. the new DOA position matches the confirmed position, and the time of the latest beacon burst used to compute the new DOA position is within 15 minutes of the time of the latest beacon burst used to compute a previously sent DOA position that matched the confirmed position, and

ii. the new DOA position does not match the confirmed position, and the time of the latest beacon burst used to compute the new DOA position is within 10 minutes of the time of the latest beacon burst used to compute a previously sent DOA position that did not match the confirmed position.

Otherwise DBE = 0, including DOA to Doppler, Doppler to Doppler, DEM and EEM position matching tests.

DDM = LUT computed (i.e., Doppler/DOA) position Matching flag: set to "1" if two Doppler positions, a Doppler position and a DOA position, or two DOA positions match the distance separation criterion (and other criteria as may be required) and set to "0" otherwise. For an Unresolved Doppler Position Match (as specified in section 4.2.2) set to "0". However, in some Input/ Status combinations this flag has no relevance, for example, if the current status is Sw_3 (previous alert data received at the MCC contain only encoded position data). In such cases the DDM flag is set to default value "0".

After position confirmation, input Doppler or DOA position is first compared for redundancy test only with the confirmed position previously processed by the MCC. In addition, if neither new Doppler position matches the confirmed position, then the new Doppler position data is compared to previous Doppler position data for the Same Beacon Event. In this context, the DDM test is reinterpreted as a DRM test (Doppler or DOA to Confirmed Position Matching).

EEM = Encoded position / Encoded position Matching flag: set to "1" if two encoded positions match the distance separation criterion (and other criteria as may be required) and set to "0" otherwise. However, the EEM test is relevant only in a limited number of cases (e.g., for the processing of I_3 type Inputs (E position only) in a Sw_3 context (only E positions were previously received)). In all other situations, the EEM flag should be set to its default value "0".

After position confirmation, the E position is compared to previously received non-redundant E positions if there is previous encoded position, or to the confirmed position if there is no previous encoded position.

PQF = Poor Quality Flag: The Poor Quality Flag is used in conjunction with the DDM test only, when a position conflict exists between Doppler positions for the same beacon event (SBE = 1 and DDM = 0). In such cases, parameters characterising the quality of the position data are tested to determine whether the new data provide a better-quality position.

PQF is set to "1" if the new position data is of inferior quality than the data previously processed by the MCC for the same beacon event. The new data should then be considered as redundant.

PQF is set to "0":

i. if the new position data is of better quality than the data previously processed for the same beacon event, or

ii. if the relative quality of the new versus the old position data cannot be determined for the same beacon event, or

iii. if SBE = 0.

PQF is set to "0" for Doppler to DOA position matches.

For DOA to DOA matches, PQF is set to "1":

i. if DDM = 0 and position has been confirmed, or

ii. if DDM = 0, position has not been confirmed, and at least four (4) position conflict alerts have been sent that contain DOA position;

otherwise PQF is set to "0" for DOA to DOA matches.

SRF = Send Redundant Flag: SRF is used to determine if an alert that is otherwise redundant should be transmitted. SRF is set to "1":

a) prior to position confirmation, if the time of the latest beacon burst used to compute the new DOA position is more than five (5) minutes after the time of the latest beacon burst used to compute all previously sent DOA positions; or

b) has better quality DOA position, per the procedure "Distribution of Alerts with Better Quality DOA Position" in section 3.2.3.3; or

c) new or updated information is provided in a Rotating Data Field, as specified in section 3.2.3.2; or

d) prior to position confirmation, if the new Doppler alert provides Image Position Determination.

Otherwise SRF is set to "0".

4.2.5.4.2 Selection of the Relevant Action in Input / Status Combinations with Multiple Outputs

When the I / Sw combination leads to several possible actions, it is essential to clarify which Action in the sequence supersedes others and should be completed. The logic to be followed in this selection is always that:

Actions enhancing the 'position information content' of the alert to be forwarded by the MCC should have overall precedence ($Aw_7 > Aw_6 > Aw_5$ > etc.) provided the 'position information content' (or suffix) of the Action word is superior to the suffix of the current Status word; and

Action Aw_0 (which means that the same data as in the Input has already been processed) has precedence over an Action which has same 'position information content' as the current Status (in Sw_4 status, $Aw_0 > Aw_4$), except when SRF = 1. This rule reflects the fact that the Input is redundant, i.e., the Input matches all the characteristics of at least one set of data previously received, and all other matching tests have failed to enhance the 'position information content' of the possible output.

4.2.5.4.3 Definition of Special Processing Matrices

Special processing matrices are defined for each Status of the process to clarify the implementation of the test sequence to be performed for each possible input data. The Input / Status combinations which have a unique output Action (see Table 4-10 and Table 4-11) are not repeated in the special processing matrices shown in the following sections.

Notes:

Shaded cells in the 'Input' columns correspond to flag combinations which are not applicable for the particular Input / Status combination.

The default value for all flags is "0". If a test is irrelevant in a particular context (e.g. in the Sw_2 status, DEM = 1 and DDM = 1 means the PQF test is irrelevant) then the corresponding flag is set to "0" and the cell in the matrix is shaded. The flag column is entirely shaded if the corresponding test is inapplicable for all inputs in the Sw context (e.g. the EEM column in the Sw_2 status).

An "X" indicated in the flag column means that both flag values are possible, but the actual flag value does not affect the output Action (therefore the test can be ignored in this context).

4.2.5.4.3.1 Sw_2 Special Processing Matrix

Doppler and/or DOA positions for the same beacon ID have already been processed by the MCC which receives the new input Ij.

Since no encoded position has previously been received, the EEM test is irrelevant (see shaded column). Similarly, the PQF test is irrelevant when a DEM test or a DDM test show a successful match (DEM = 1 and / or DDM =1).

Table 4-12: Special Processing for Sw_2 Status

DEM	SBE/ DBE[1]	DDM	PQF[2]	EEM	SRF	I_2 [A / B] or [O]	I_3 [E]	I_4 [A / B /E) or [O / E]
1	X	1	0	0	0			Aw_7
1	X	0	0	0	0		Aw_7	Aw_7
0	1	1	0	0	0	Aw_0		Aw_4
0	1	1	0	0	1	Aw_2		Aw_4
0	1	0	1	0	0	Aw_0		Aw_4
0	1	0	1	0	1	Aw_2		Aw_4
0	1	0	0	0	0	Aw_2	Aw_4	Aw_4
0	0	1	0	0	0	Aw_5		Aw_6
0	0	0	0	0	0	Aw_2	Aw_4	Aw_4
Aw priority if multiple matching tests are required						Aw_5 > Aw_0 > Aw_2	Aw_7 > Aw_4	Aw_7 > Aw_6 > Aw_4

Notes:
1 DBE is used for MEOSAR input. SBE is used for LEOSAR input.
2 PQF is always 0 on DOA to Doppler matches.

4.2.5.4.3.2 Sw_3 Special Processing Matrix

An 'E' (encoded) position for the same beacon ID has already been processed by the MCC which receives the new input Ij, but no Doppler or DOA position data were received.

Therefore, the Doppler / Doppler, Doppler / DOA and DOA / DOA matching tests, and the associated SBE, DDM, SRF and PQF tests, are irrelevant in this Status (columns SBE, DDM and PQF are shaded).

Table 4-13: Special Processing for Sw_3 Status

DEM	SBE/ DBE[1]	DDM	PQF	EEM	I_2 [A / B] or [O]	I_3 [E]	I_4 [A / B / E] or [O / E]	I_5 [A / B] or [O]	I_6 [A / B+(E)] or [O / E]
1	0	0	0	1			Aw_7		Aw_7
1	0	0	0	0	Aw_7		Aw7	Aw_7	Aw_7
0	0	0	0	1		Aw_0	Aw_4		Aw_6
0	0	0	0	0	Aw_4	Aw_3	Aw_4	Aw_6	Aw_6
Aw priority if multiple matching tests are required					Aw_7 > Aw_4	Aw_0 > Aw_3	Aw_7 > Aw_4	Aw_7 > Aw_6	Aw_7 > Aw_6

Note: 1 DBE is used for MEOSAR input. SBE is used for LEOSAR input.

4.2.5.4.3.3 Sw_4 Special Processing Matrix

D (Doppler or DOA) positions data and encoded position data for the same beacon ID have already been processed by the MCC which receives the new input, but no position matching tests have confirmed position.

Table 4-14: Special Processing for Sw_4 Status

DEM	SBE/ DBE[1]	DDM	PQF	EEM	SRF	I_2 [A/B] or [O]	I_3 [E]	I_4 [A/B/E] or [O/E]	I_5 [A/B] or [O]	I_6 [A/B+(E)] or [O/E]
1	X	1	0	0	0	Aw_7		Aw_7	Aw_7	Aw_7
1	X	0	0	0	0	Aw_7	Aw_7	Aw_7	Aw_7	Aw_7
0	1	1	0	1	1			Aw_4		Aw_6
0	1	1	0	1	0			Aw_0		Aw_6
0	1	1	0	0	1	Aw_2		Aw_4	Aw_6	Aw_6
0	1	1	0	0	0	Aw_0		Aw_4	Aw_6	Aw_6
0	1	0	1	1	1			Aw_4		Aw_6
0	1	0	1	1	0			Aw_0		Aw_6
0	1	0	1	0	1	Aw_2		Aw_4	Aw_6	Aw_6
0	1	0	1	0	0	Aw_0		Aw_4	Aw_6	Aw_6
0	X	0	0	1	0		Aw_0	Aw_4		Aw_6
0	X	0	0	0	0	Aw_4	Aw_4	Aw_4	Aw_6	Aw_6
0	0	1	0	1	0			Aw_6		Aw_6

DEM	SBE/ DBE[1]	DDM	PQF	EEM	SRF	I_2 [A/B] or [O]	I_3 [E]	I_4 [A/B/E] or [O/E]	I_5 [A/B] or [O]	I_6 [A/B+(E)] or [O/E]
0	0	1	0	0	0	Aw_6		Aw_6	Aw_6	Aw_6
Aw priority if multiple matching tests are required						Aw_7 > Aw_6 > Aw_0 > Aw_4 > Aw_2	Aw_7 > Aw_0 > Aw_4	Aw_7 > Aw_6 > Aw_0 > Aw_4	Aw_7 > Aw_6	Aw_7 > Aw_6

Note: 1 DBE is used for MEOSAR input. SBE is used for LEOSAR input.

4.2.5.4.3.4 Special Filtering Matrix After Position Confirmation

It is assumed that continued transmission is enabled, otherwise no action should be taken when receiving new alerts for the particular beacon ID under consideration.

The filtering procedure after position confirmation is as follows:

a) the Doppler position data received in the new input is compared first to the resolved position (R) used for reference (i.e., the DRM test replaces the DDM test);

b) if neither new Doppler position matches the resolved position, then the new Doppler position data is compared to previous Doppler position data for the Same Beacon Event;

c) the DOA position data received in the new input is compared only to the resolved position (R) used for reference (i.e. the DRM test replaces the DDM test);

d) the encoded position data received in the new input is compared to previous encoded position, unless there is no previous encoded position, in which case it is compared to the resolved position (R) used for reference;

e) all new beacon events are transmitted, based on the setting of the Same/Dependent Beacon Event flag; and

f) position data for Same/Dependent beacon events is forwarded if any one of the possible tests fails.

Table 4-15: Special Processing for Sw_5, Sw_6 and Sw_7 Status

SBE/DBE[1]	DRM	PQF	EEM*	SRF	I_2 [A/B] or [O]	I_3 [E]	I_4 [A/B/E] or [O/E]	I_5 [A/B] or [O]	I_6 [A/B+(E)] or [O/E]	I_7 [Conf. D+E]
1	1	0	1	1			Ct_7		Ct_6	Ct_7
1	1	0	1	0			Ct_0		Ct_0	Ct_0
1	1	0	0	1	Ct_7			Ct_5	Ct_6	Ct_7
1	1	0	0	0	Ct_0		Ct_4	Ct_0	Ct_6	Ct_7
1	0	1	1	0			Ct_0		Ct_0	Ct_0
1	0	1	0	1	Ct_2		Ct_4	Ct_5	Ct_6	Ct_7
1	0	1	0	0	Ct_0		Ct_4	Ct_0	Ct_6	Ct_7
1	0	0	1	0		Ct_0	Ct_4		Ct_6	Ct_7
1	0	0	0	0	Ct_2	Ct_3	Ct_4	Ct_5	Ct_6	Ct_7
0	1	0	1	0			Ct_7		Ct_6	Ct_7

SBE/DBE[1]	DRM	PQF	EEM*	SRF	**I_2** [A/B] or [O]	**I_3** [E]	**I_4** [A/B/E] or [O/E]	**I_5** [A/B] or [O]	**I_6** [A/B+(E)] or [O/E]	**I_7** [Conf. D+E]
0	1	0	0	0	Ct_5		Ct_4	Ct_5	Ct_6	Ct_7
0	0	0	1	0		Ct_7	Ct_4		Ct_6	Ct_7
0	0	0	0	0	Ct_2	Ct_3	Ct_4	Ct_5	Ct_6	Ct_7

Note: 1 DBE is used for MEOSAR input. SBE is used for LEOSAR input.
* The encoded position data received in the new input is compared to the resolved position (R) used for reference if there is no previous encoded position.

4.2.6 Distribution of Beacon Registration Information

The identification data in the beacon message includes a code which identifies the country where the beacon is registered. When an MCC acquires distress alert or NOCR data (based on the alert's country code), the MCC can determine if it has access to the registry data. If so, the beacon registration could be transmitted to the MCC in whose service area, the Doppler, DOA or encoded position is located, using the SIT 925 or SIT 926 message format. Registration data shall be routed in accordance with Table 4-1. The registration data would only be sent upon the first reception of an alert or NOCR message.

The beacon ID contained in the SIT 925 or SIT 926 message can be used by the receiving MCC to correlate it to a previously received alert message and forward the registry data to the appropriate Distress authority.

An MCC is not required to automatically transmit registration data from its registry to other MCCs. However, the reception of this data is required by all MCCs.

An MCC receiving an NOCR alert may respond with registration data without being specifically requested.

4.2.7 NOCR Procedures

4.2.7.1 Procedure

An MCC shall initiate an NOCR message when a 406 MHz alert for a beacon ID is first located, except when specified otherwise. The location can be provided by Doppler location processing, DOA location processing or the encoded position contained in beacons coded using a location protocol.

An MCC that initiates an NOCR message shall transmit the message to the associated MCC (i.e., the destination MCC) based on the distribution matrix provided in Table 4-1. The appropriate associated MCC for NOCR message distribution is determined by the country code contained in the beacon ID of the message, so that the NOCR is distributed to the country that maintains the beacon registry for that country code, as provided on the Cospas-Sarsat website "Contact List" for "406 MHz Beacon Registers (available 24/7 for SAR Services)".

In addition to distributing the NOCR message to the appropriate SPOC or MCC, the associated MCC shall process the NOCR message as an alert message, in accordance with Table 4-10 and Table 4-11.

An NOCR message is not sent for unlocated alerts because, by definition, an NOCR message includes position information. An MCC is not required to send an NOCR message to a destination (SPOC or MCC) if the sending MCC transmits the alert to that destination as an alert message, unless the sending MCC and the destination are nodal MCCs.

The receiving MCC shall filter redundant NOCRs for the same beacon ID.

4.2.7.2 NOCR Example (FGB)

Scenario

Country code in Beacon ID: Sweden (265)

"A" Position Service Area: AUMCC (Australian MCC)

"B" Position Service Area: CHMCC (Chilean MCC)

Doppler alerts received by the AUMCC and the CHMCC from an associated LEOLUT with the "A" location in the AUMCC SRR and the "B" location in the CHMCC SRR. The USMCC received the alert message from the CHMCC prior to receiving the alert message from the AUMCC.

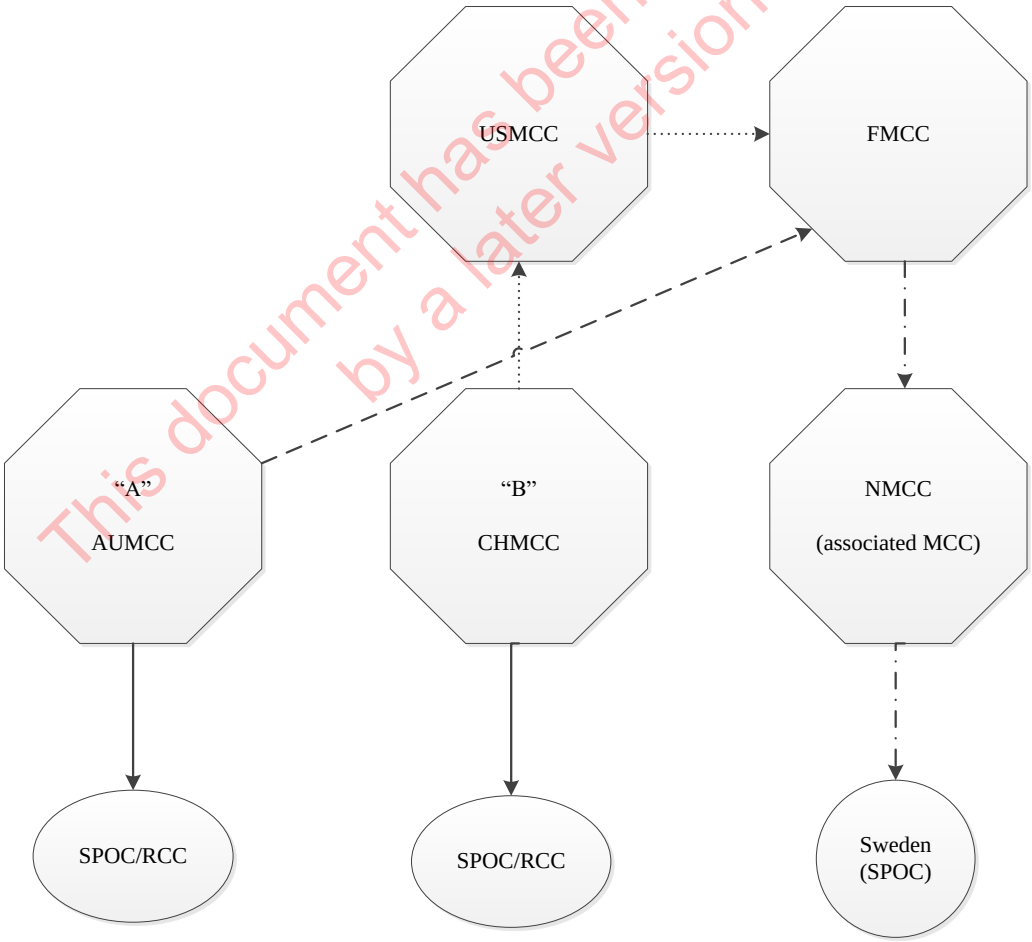


Figure 4-11: NOCR Example (FGB)

4.2.8 Distribution of 406 MHz Ship Security Alerts

The identification data in the beacon message includes a protocol code which can identify the 406 MHz transmission as a ship security alert. In addition, the beacon message also contains a country code which can be associated with the "flag state" of the vessel. When an MCC receives a ship security alert, the alert shall be processed according to the same procedures that apply for distress alerts except that the resulting ship security alert message will be forwarded based only on the country code included in the beacon message.

All States wishing to use the Cospas-Sarsat System to relay ship security alerts should make the necessary arrangements with their associated MCC. Arrangements should include the identification of the competent authority responsible for receiving the ship security alert and the communication link to the competent authority

4.2.8.1 Procedure

An MCC shall process ship security alerts (FGB message bits 37-40 = 1100) according to the logic provided in Table 4-10 and Table 4-11. Routing of ship security alerts shall be based on the country code contained in the beacon message, that is, the message will be transmitted to the MCC associated with the country code, and not transmitted to other MCCs, RCCs, or SPOCs based on the Doppler locations, DOA position or encoded position contained in the beacon message. Message routing for ship security alerts shall follow the data distribution matrix as provided at Table 4-1. Ship security alerts shall be exchanged between MCCs using the formats and data content for alert messages as contained in document C/S A.002.

When a ship security alert is received by the Associated MCC, MCC shall notify the relevant competent security authority as provided by IMO or another appropriate point of contact as previously arranged.

The Associated MCC shall continue to provide information to the competent authority after position confirmation, as described in section 3.2.5.

4.2.8.2 Ship Security Alert Example

Scenario 1 (FGB)

Country code in Beacon ID: Sweden (265)
Initial Alert with Doppler Location
“A” Position Service Area: AUMCC (Australian MCC)
“B” Position Service Area: CHMCC (Chilean MCC)
Receiving MCC: CHMCC

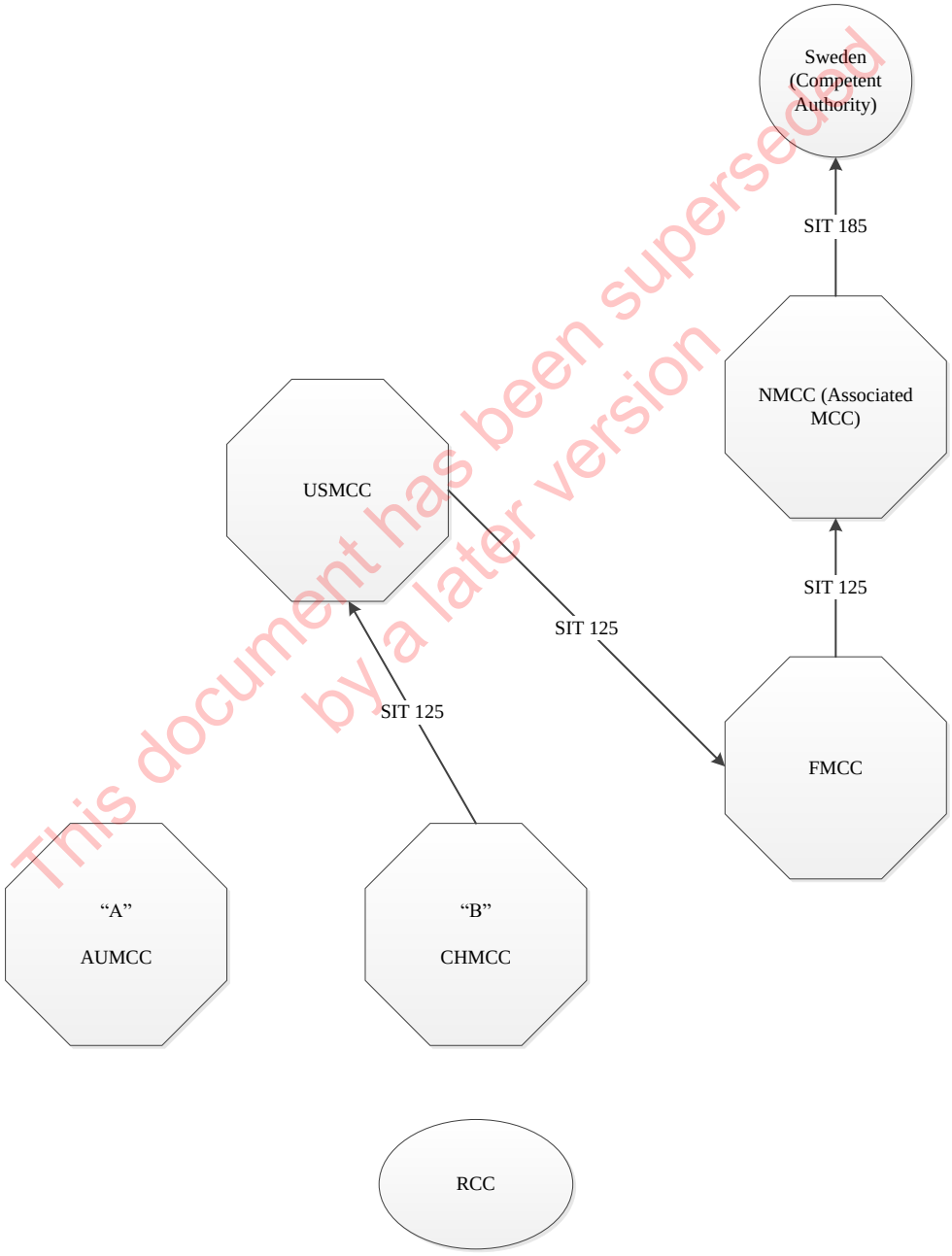


Figure 4-12: Ship Security Alerts Examples (Scenario 1)

Scenario 2 (SGB)

Country code in Beacon ID: Panama
Initial Alert with DOA Position
DOA Position Service Area: SPMCC (Spanish MCC)
Receiving MCC: SPMCC

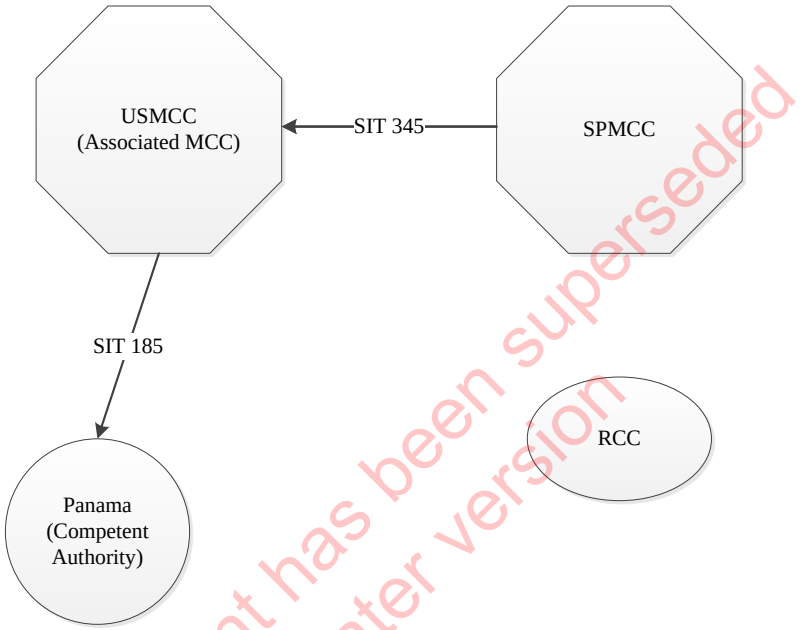


Figure 4-13: Ship Security Alert Example (Scenario 2)

4.2.9 Processing and Distribution of 406 MHz Interference Data

4.2.9.1 406 MHz Interference Data Processing

When processing 406 MHz interference data, the matching of interferer solutions is based strictly on location, with a 100-km criterion. In addition, the thresholds for closing interferer sites (i.e., for resetting the interferer activation status to zero) 72 hours without new data or 20 missed LEO satellite passes, takes into account the fact that interferers often do not transmit continually.

4.2.9.2 406 MHz Interference Data Distribution

MCCs exchange 406 MHz interference data from LEOLUTs and MEOLUTs in the SIT 121 and SIT 141 message formats, respectively. MCCs shall automatically distribute 406 MHz interference data to other MCCs only when the position is confirmed, based on the location of the interferer. MCCs shall send at least two messages to other MCCs for each interferer site.

Interference data received from MEO satellites shall be processed and distributed independently from interference data received from LEO satellites.

4.2.10 Return Link Service (RLS) Procedures

4.2.10.1 Procedure

An MCC shall initiate a Return Link Service (RLS) message to the MCC associated with the Return Link Service Provider (RLSP) as specified in Table 4-16 when the position of a 406 MHz beacon with Acknowledgement Type-1 Return Link capability is confirmed to be in the MCC's service area. An RLS message is only sent for beacons with Acknowledgement Type-1 Return Link capability, based on the Location Protocol encoded in beacon message bits 37 – 40 for FGBs and beacon message bit 42 for SGBs. Beacon position is confirmed, as specified in section 3.2.4. The MCC associated with the RLS provider shall distribute RLS messages to the designated RLSP, as specified in Table 4-16. If the designated RLSP is not known (i.e., PDF-2 of the FGB beacon message is not usable, an SGB message with a usable RLS Rotating Field is not available, or the associated MCC is not specified in Table 4-16 for an RLS Provider ID), then a position confirmation alert shall be sent to each MCC associated with a designated RLS provider.

Table 4-16 : Associated MCCs for Return Link Service Providers

Satellite Constellation RLSP	Associated MCC
SAR/Galileo	FMCC
Glonass*	CMC

* Glonass is not currently a designated RLS provider but may provide this capability in the future.

RLS messages shall be transmitted to the MCC(s) associated with the RLS provider(s) based on the distribution matrix provided in Table 4-1. In addition to distributing the RLS message to the appropriate MCC or the RLSP, MCCs shall also process the RLS message as an alert message, in accordance with Table 4-10 and Table 4-11.

After position confirmation, if the status of the Acknowledgement Type-1received by the beacon (based on FGB message bit 111, or SGB message bit 161 when the RLS Rotating Field is present) changes, then the new alert shall be sent to the MCC(s) associated with RLS provider(s) previously notified with a position confirmation alert. A new alert shall only be sent to the MCC(s) associated with RLS provider(s) after position confirmation if:

a) PDF-2 of the FGB message or the RLS Rotating Field of the SGB message is usable; and

b) The time of the latest burst in the new alert is later than the time of the latest burst in the previous alert sent for the beacon to the associated MCC(s) for the RLS provider(s). If the time of the latest burst is not known for an alert with Doppler position, then the TCA is used as the time of the latest burst.

MCCs shall distribute alerts for test coded RLS beacons (when beacon message bits 41-42 = 11 for RLS-capable FGBs, or when beacon message bit 43 = 1 for RLS-capable SGBs) to other MCCs, including the MCC(s) associated with the RLS provider(s), in the same manner that operationally coded RLS beacons are distributed. MCCs shall not distribute alerts for test coded RLS beacons to RCCs and SPOCs.

Further information on the Acknowledgement Type-1 Return Link Service is provided in document C/S R.012 “Cospas-Sarsat 406 MHz MEOSAR Implementation Plan”.

4.2.10.2 RLS Example (FGB)

Scenario

Country code in Beacon ID: Australia (503)
Confirmed (DOA) Position Service Area: CMCC (Canadian MCC)
Beacon coded for the Sar/Galileo Return Link Service

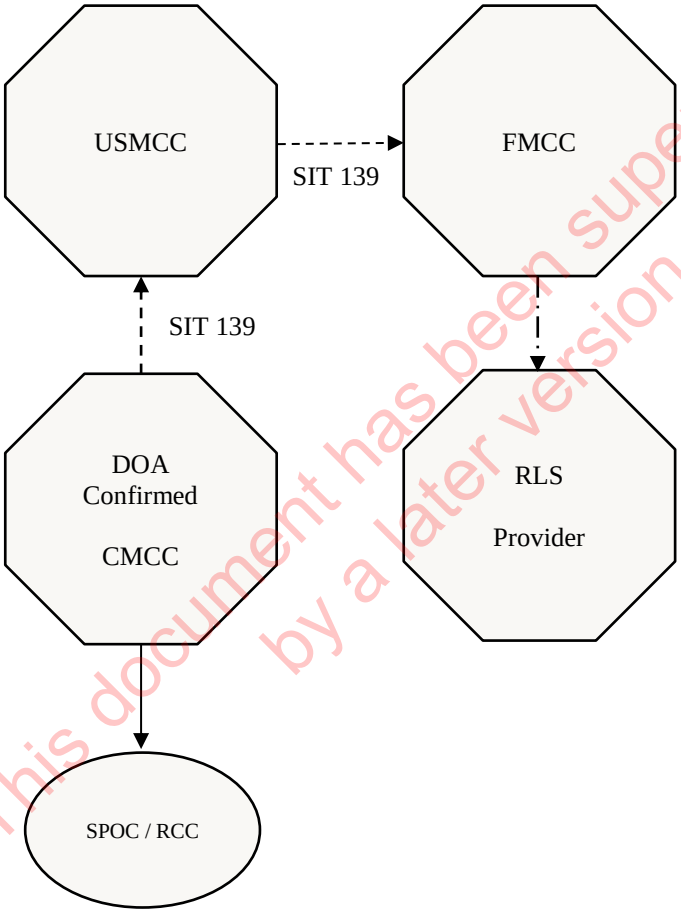


Figure 4-14: RLS Example (FGB)

4.2.11 Cancellation Message Procedures

Cancellation messages are transmitted to indicate that the distress condition associated with a beacon activation has ceased. A cancellation message is deemed complete if all bits that comprise the cancellation message exactly match the specified pattern, and:

a) both Protected Data Field 1 (PDF-1) and PDF-2 are valid for an FGB; or

b) there are no uncorrected bit errors in the beacon message and the Rotating Data field is valid for a SGB (per Table 4-7).

A cancellation message is considered to be confirmed if three (3) complete cancellation messages) are received from different beacon bursts (i.e., with detect times separated by at least 2.5 seconds) and with associated detect times all within a single 110 second period, and either:

- no non-cancellation alert message with a valid PDF-1 is received with a burst time between the burst times of the first and last cancellation message for an FGB, or
- no valid non-cancellation alert message is received with a burst time between the burst times of the first and last cancellation message for an SGB.

MCCs shall process cancellation messages as follows:

a) if an unconfirmed, complete cancellation message is received, then the associated alert message shall be distributed to all current MCC destinations;

b) all cancellation messages received until cancellation is confirmed (including the confirming cancellation message, valid incomplete FGB messages, and unconfirmed complete messages) shall be processed as alerts without regard to their cancellation status;

c) if a confirming cancellation message is received, then the associated alert message shall be distributed to all current MCC and Distress authority destinations, formatted in accordance with document C/S A.002, and the beacon activation status is deemed "confirmed cancellation"; and

d) any cancellation message received while the beacon activation status is "confirmed cancellation" shall be filtered.

All non-cancellation alert messages that do not have an associated detect time after the earliest detect time used to confirm the most recent cancellation shall be filtered.

If any associated detect time of a new non-cancellation alert message is after the earliest detect time used to confirm the most recent cancellation, and the beacon activation status is "confirmed cancellation", then the new alert shall be treated as a new beacon activation (i.e., the beacon activation status word (Sw) is reset to zero, per section 4.2.5) and the beacon activation status is no longer "confirmed cancellation".

4.2.12 SGB example

Scenario

Country code in Beacon ID: Brazil (710)
(Matching DOA, Encoded) Position Service Area: CHMCC (Chilean MCC)

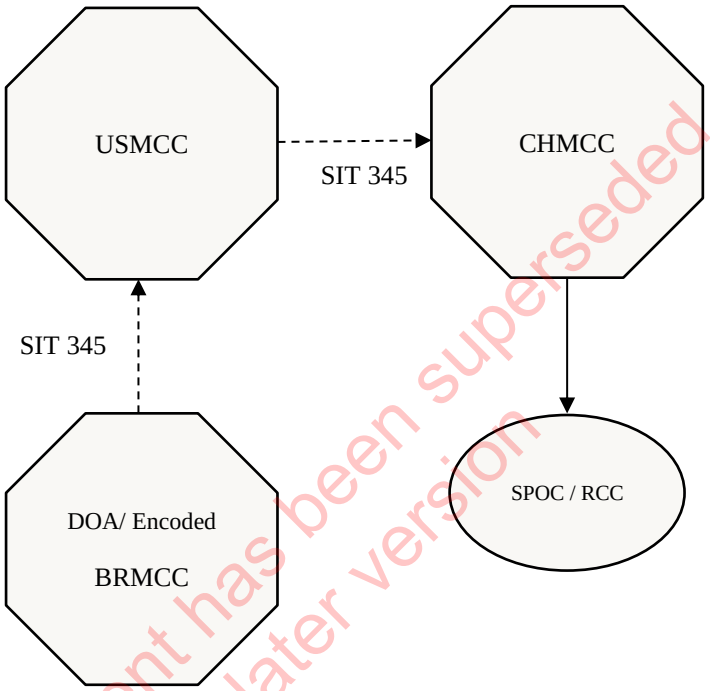


Figure 4-15: SGB Example

4.3 Procedures for the Co-Ordination of Beacon Tests

Section 3.8 of C/S A.001 defines the principles governing the implementation of tests using beacons coded with operational or test protocols. The following procedures should be implemented by the MCC responsible for the test for co ordinating the requirements of the test with all affected MCCs. This procedure does not apply to international exercises co-ordinated through the Cospas-Sarsat Joint Committee.

The co-ordination shall consist of an advance submission of a text (SIT 605) message shown in Figure 4-16. The message shall include the 15 hexadecimal ID (per section 3.1.4) and indicate if the beacon will transmit in self-test mode, since this information cannot be derived from the hexadecimal ID. The extent of required co-ordination will depend on beacon protocol (operational or test) and the number of beacons used, as shown in Table 4-17.

The Beacon ID must conform to the definition given in the Cospas-Sarsat Glossary (document C/S G.004).

SIT 605 < MESSAGE>

DATE: DD MM YY
FM: MCC SUPPORTING THE 406 MHz TEST
TO: ALL MCCs
SUBJ: BEACON TEST

A. TEST OBJECTIVE:

B. TEST DESCRIPTION:

C. LOCATION OF TEST:

D. DATE, TIME AND DURATION OF TEST:

E. BEACON IDS AND TRANSMISSION TYPE:
15 HEXADECIMAL CHARACTERS TRANSMISSION TYPE IS SELF-TEST, AS APPLICABLE.

F. SPECIAL DATA COLLECTION AND PROCESSING REQUIREMENTS:

G. POINT OF CONTACT
NAME:
LOCATION:
TELEPHONE NO:
AFTN NO:
TELEX NO:
FACSIMILE NO:

Figure 4-16: Beacon Test Co-ordination Message

Table 4-17: Notification Time Requirement for Submission of Co-ordination Information Indicated in Figure 4-16

Beacon Type	Number of Beacons Used	Messages Required	Beacon Protocol	
			Operational	Test
FGB, SGB	1 - 3	Initial Notification	As soon as practical	Not required
		Second Notification	24 hours prior to the activation of the first beacon *	Not required
		End-of-Test Notification	Upon deactivation of the last beacon as required	Not required
FGB	4 – 6 **	Initial Notification	7 days prior to the date of the test	7 days prior to the date of the test
		Second Notification	24 hours prior to the activation of the first beacon *	24 hours prior to the activation of the first beacon *
		End-of-Test Notification	Upon deactivation of the last beacon as required	Upon deactivation of the last beacon as required
SGB	4 – 12 **	Initial Notification	7 days prior to the date of the test	7 days prior to the date of the test
		Second Notification	24 hours prior to the activation of the first beacon *	24 hours prior to the activation of the first beacon *
		End-of-Test Notification	Upon deactivation of the last beacon as required	Upon deactivation of the last beacon as required

Note: * This set of information will be an update, if necessary, of the original set.
** Tests involving more than six (6) FGBs or 12 SGBs are not authorized.

4.4 LEOLUT Orbit Vector Update Method

There are three methods for LEOLUT orbit vector updates for each Cospas-Sarsat satellite: use of the downlink signal, use of orbitography beacon information and use of orbit vector data supplied by an MCC. Which method offers the more accurate orbit vector determination for a given satellite pass depends on the satellite's SAR instrument status and how often orbit vectors are available at the LUT from the MCC.

If the SAR instrument status of a satellite is such that any of the three update methods can be used, the preferred update method is through orbitography beacons. Table 4-18 provides guidelines for each satellite with the update methods listed such that the preferred method is number 1.

Table 4-18: Orbit Vector Update Method

Satellite	Orbit Vector Update Method
Sarsat-7, Sarsat-10, Sarsat-11, Sarsat-12 and Sarsat-13	1. Orbitography 2. MCC Provided Orbit Vectors 3. Downlink

- END OF THIS SECTION -

5. COSPAS-SARSAT SPACE AND GROUND SEGMENT DESCRIPTION

5.1 SID Implementation Status

Document C/S A.002, "Cospas-Sarsat Mission Control Centres Standard Interface Description", contains standardised message formats, identified by "Subject Identifier Type" (SIT) codes, which may be used by MCCs.

The tables shown below indicate which SITs for System information messages and alert and narrative messages have been implemented by the various MCCs.

They also indicate whether the capability is "receive", "originate", "both receive and originate", or "not implemented".

5.1.1 System Information Messages

MCC Name	SIT NUMBER														
	215	216	217	415	416	417	425	435	445	510	515	525	535	545	605
AEMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
ALMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
ARMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
ASMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
AUMCC	B	B	-	B	-	B	-	-	-	B	-	-	-	-	B
BRMCC	R		-	R	-	R	-	-	-	R	-	-	-	-	B
CHMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
CMC	B	R	-	R	-	R	-	-	-	-	-	-	-	-	B
CMCC	R	R	-	R	-	R	-	-	-	B	R	R	O	R	B
CNMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
CYMCC*	[R]		-	[R]	-	[R]	-	-	-	-	-	-	-	-	[B]
FMCC	B	B	B	B	B	B	R	O	R	-	-	-	-	-	B
GRMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
HKMCC	R		-	R	-	R	-	-	-	-	-	-	-	-	B
IDMCC	R		-	R	-	R	-	-	-	-	-	-	-	-	B
INMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
ITMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
JAMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
KOMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
MYMCC*	[R]		-	[R]	-	[R]	-	-	-	-	-	-	-	-	[B]
NIMCC**	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
NMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
PAMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
PEMCC	R		-	R	-	R	-	-	-	-	-	-	-	-	B
QAMCC*	[R]		-	[R]	-	[R]	-	-	-	-	-	-	-	-	[B]
SAMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
SIMCC	R		-	R	-	R	-	-	-	-	-	-	-	-	R
SPMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B
TAMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
THMCC	R		-	R	-	TBD	-	-	-	-	-	-	-	-	B
TRMCC	R	R	-	R	-	R	-	-	-	R	-	-	-	-	B
UKMCC	R		-	R	-	TBD	-	-	-	R	-	-	-	-	B
USMCC	B	O	B	B	O	B	O	R	O	B	O	O	R	O	B
VNMCC	R	R	-	R	-	R	-	-	-	-	-	-	-	-	B

Legend:

O	originate	R	receive	**	Commissioned not operational
B	both originate and receive	-	not implemented		
TBD	to be determined	*	under development		

5.1.2 Alert and Narrative Messages

SIT messages 121 to 135 contain LEOSAR/GEOSAR data for FGBs. SIT messages 136 to 147 contain MEOSAR data for FGBs. SIT messages 322 to 347 contain alert data for SGBs. See section "Subject Indicator Types for Alert Messages" in document A.002.

MCC Name	SIT Number												
	121	122 - 127	132 - 133	134 - 139	141	142 - 147	185	322 - 347	915	925	926	927	985
AEMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
ALMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
ARMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
ASMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
AUMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
BRMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
CHMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
CMC	B	B	B	-	-	-	B	-	B	B	-	-	-
CMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
CNMCC	B	B	B	-	-	-	B	-	B	R	-	-	-
CYMCC*	[B]	[B]	[B]	-	-	-	[B]	-	[B]	[B]	-	-	-
FMCC	-	B	B	B	B	B	B	-	B	B	-	-	-
GRMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
HKMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
IDMCC	B	B	B	-	-	-	O	-	B	B*	-	-	-
INMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
ITMCC	B	B	B	-	-	-	B	-	B	TBD	-	-	-
JAMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
KOMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
MYMCC*	[B]	[B]	[B]	-	-	-	[B]	-	[B]	[B]	-	-	-
NIMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
NMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
PAMCC	B	B	B	-	-	-	O	-	B	B	-	-	-
PEMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
QAMCC*	[B]	[B]	[B]	-	-	-	[B]	-	[B]	[B]	-	-	-
SAMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
SIMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
SPMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
TAMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
THMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
TRMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
UKMCC	B	B	B	-	-	-	B	-	B	B	-	-	-
USMCC	B	B	B	B	B	B	O	-	B	B			-
VNMCC	B	B	B	-	-	-	B	-	B	B			-

Legend: O Originate R Receive B Both originate and receive TBD To be determined - Not implemented * Under development

5.2 Status of Space Segment

The Cospas-Sarsat website provides the current status of Cospas-Sarsat Space Segment payloads.

Each satellite platform provider shall commission new satellite payloads according to the procedures documented in documents C/S T.004, C/S T.013 and C/S T.017. Additionally, after a payload is declared operational, and whenever there is a change in the configuration or status of a satellite payload, the Space Segment Providers shall notify all Ground Segment Operators and the Secretariat. The message format described in Figure 5-1 shall be used to provide this notification.

Figure 5-2 is a standard message for reporting satellite manoeuvres.

Figure 5-3 shows a standard message for reporting reactivation of the SARP instrument.

Figure 5-4 is a standard message for reporting a spacecraft anomaly.

```
/12345 00000/3660/97 123 1234
/605/5030
/TO: ALL MCCS
FROM: <MCC ASSOCIATED WITH SATELLITE OR PAYLOAD PROVIDER>
SUBJECT:   A) INITIAL OPERATIONAL CAPABILITY FOR <S/C> SAR PAYLOAD
           B) DECLARATION OF OPERATION FOR <S/C> SAR PAYLOAD
           C) CHANGE IN STATUS FOR <S/C> SAR PAYLOAD
           D) DECOMMISSIONING OF <S/C> SAR PAYLOAD

DATA CONSIDERED OPERATIONAL IN COSPAS-SARSAT (WWW.COSPAS-SARSAT.INT)
-----------------------------------------------------------------------

   (L/G/M)406 SARR: A) OPERATIONAL, B) NOT OPERATIONAL OR C) NOT APPLICABLE
   (L) 406 SARP (LOCAL): A) OPERATIONAL OR B) NOT OPERATIONAL
   (L) 406 SARP (GLOBAL): A) OPERATIONAL OR B) NOT OPERATIONAL
   (L) PSEUDO MODE: A) OPERATIONAL, B) NOT OPERATIONAL OR C) NOT APPLICABLE

STATUS OF SAR PAYLOAD (WWW.COSPAS-SARSAT.INT)
-----------------------------------------------

   (L/M) L-BAND DOWNLINK: A) NORMAL, B) DEGRADED, C) UNUSABLE OR D) NOT
         APPLICABLE
   (Ms)   S-BAND DOWNLINK: A) NORMAL, B) DEGRADED OR C) UNUSABLE
   (L/G/M)406 SARR: A) NORMAL, B) DEGRADED, C) UNUSABLE OR D) NOT APPLICABLE
   (L/G/M)406 SARR GAIN CONTROL: A) AUTOMATIC, B) FIXED OR C) NOT APPLICABLE
   (L) 406 SARP (LOCAL): A) NORMAL, B) DEGRADED OR C) UNUSABLE
   (L) 406 SARP (GLOBAL): A) NORMAL, B) DEGRADED OR C) UNUSABLE
   (L) PSEUDO MODE: A) ENABLED, B) DISABLED OR C) NOT APPLICABLE
   (L/G/M) BANDWIDTH: A) 27 KHZ, B) 40 KHZ, C) 80 KHZ OR D) NOT APPLICABLE
   (G) POSITION:
   (G) DOWNLINK FREQUENCY/TYPE:

    (L) SAR INSTRUMENTS ACTIVE DURING SATELLITE MANOEUVRE: A) YES, B) NO OR C)
        NOT APPLICABLE


COMMENTS
 (G/M TEST RESULTS PER SPACECRAFT COMMISSIONING STANDARD)
--------
QQQQ
/LASSIT
/ENDMSG
```


Notes: (L) - Applies to LEOSAR only.
(G) - Applies to GEOSAR only.
(L/G) - Applies to both LEOSAR and GEOSAR.
(M) - Applies to MEOSAR only
(Ms) - Applies to MEOSAR S-band only
(G/M) - On declaration of Initial Operational Capability, GEOSAR and MEOSAR commissioning test results shall be reported per documents C/S T.013, Annex D and C/S T.017, section 5, respectively.
(L/G/M) - Applies to LEOSAR, GEOSAR and MEOSAR.

Figure 5-1: Standard Message for Reporting Satellite Payload Status

```
/12345 00000/3660/05 123 1412
/605/5030
/TO: ALL MCCS
FROM: <MCC RESPONSIBLE FOR THE SATELLITE MANOEUVRE >
SUBJECT: MANOEUVRE OF SATELLITE <XNN>

STATUS OF MANOEUVRE: <SCHEDULED, EXECUTED OR CANCELLED>
TYPE OF MANOEUVRE: <IN PLANE, OUT OF PLANE OR BOTH>
SAR INSTRUMENTS ACTIVE DURING MANOEUVRE: <YES OR NO>

MANOEUVRE START TIME: <DD MON YEAR HHMM> UTC
MANOEUVRE END TIME: <DD MON YEAR HHMM> UTC
[REPEAT INFORMATION ABOUT MANOEUVRE START AND END TIME AS NEEDED]

TIME NEW ORBIT VECTORS ARE EXPECTED: <DD MON YEAR HHMM> UTC

MAXIMUM EXPECTED CHANGE IN SATELLITE POSITION DUE TO THE SATELLITE
MANOEUVRE: <XX> KM AFTER <YY> HOURS
MAXIMUM EXPECTED ERROR IN DOPPLER LOCATION: <XX> KM AFTER <YY>
HOURS

THIS DOPPLER LOCATION ERROR INCLUDES A NOMINAL SYSTEM ERROR OF 5
KM.

COMMENTS - MCCS SHOULD <EXECUTE OR REFER TO> PROCEDURES ON
SATELLITE MANOEUVRES CONTAINED IN SECTION 3.6.5 OF C/S A.001.

QQQQ
/LASSIT
/ENDMSG
```

Figure 5-2: Standard Message for Reporting Satellite Manoeuvres

```
/12345 00000/2270/12 222 1412
/605/2730

TO: ALL MCCS
FROM: FMCC
SUBJECT: REACTIVATION OF THE SARP INSTRUMENT ON [SXX]

THE SARP INSTRUMENT WAS REACTIVATED AT [DD MON YEAR HH:MM]
THE SARP RESUMED NORMAL OPERATIONS AT [DD MON YEAR HH:MM]
NEW SARP TCAL DATA WILL BE SENT AT [DD MON YEAR HH:MM]

WHEN NEW SARP TCAL DATA IS RECEIVED BY THE MCC FOR THIS SATELLITE,
FOLLOW THE PROCEDURE ON SARP REACTIVATION DESCRIBED IN C/S A.001
SECTION 3.6.6. SPECIFICALLY, THE GROUND SEGMENT PROVIDER SHALL:

A) ENSURE THAT THE CALIBRATION TIME IN THE NEW SARP TCAL DATA IS
TREATED AS VALID IN ITS MCC, WITHOUT REGARD TO THE PREVIOUS SARP
TCAL DATA.

B) ENSURE THAT THE NEW SARP TCAL DATA IS USED TO INITIALIZE THE
SARP TCAL DATA IN ITS LEOLUTS, WITHOUT REGARD TO THE PREVIOUS SARP
TCAL DATA.

C) ENSURE THAT ALL DOPPLER SOLUTIONS GENERATED BY ITS LEOLUT(S)
THAT CONTAIN SARP DATA FOR THIS SATELLITE ARE FILTERED UNTIL NEW
SARP TCAL DATA IS LOADED INTO THE ASSOCIATED LEOLUT.

COMMENTS:

QQQQ
/LASSIT
/ENDMSG
[...]
```


Figure 5-3: Standard Message for Reporting Reactivation of the SARP Instrument

```
[…]

/12345 00000/AAA0/12 222 1412
/605/BBB0

TO: ALL MCCS
FROM: <MCC ASSOCIATED WITH THE RELEVANT SPACE SEGMENT PROVIDER >
SUBJECT: SPACECRAFT ANOMALY FOR [XXX]

AN ANOMALY HAS OCCURRED FOR SATELLITE [XXX] AS DESCRIBED BELOW.
[DETAILS OF PROBLEM, INCLUDING START TIME, IF KNOWN]

WHILE THE IMPACT AND MITIGATION OF THIS ANOMALY ARE BEING
EVALUATED,
GROUND SEGMENT PROVIDERS SHOULD:

[…]*

THE NEXT UPDATE ON THIS ANOMALY IS PLANNED FOR: [DD MON YEAR
HH:MM].

QQQQ
/LASSIT
/ENDMSG
```

Figure 5-4: Standard Message for Reporting a Spacecraft Anomaly

* Message content may vary. For example, the message may include one or more of the following statements:

a) EVALUATE THEIR GROUND SYSTEM IN RESPECT OF THIS ANOMALY AND CONSULT WITH THEIR LUT OR MCC VENDOR, AS APPROPRIATE.

b) NOTIFY THEIR ASSOCIATED RCCS AND SPOCS THAT [SARR/SARP/YYY] ALERT DATA FROM THE SATELLITE MAY BE UNRELIABLE.

c) FILTER [SARR/SARP/YYY] ALERT DATAFROM THE SATELLITE.

5.3 DESCRIPTION OF COSPAS-SARSAT MCCs

5.3.1 GENERAL

The purpose of this section is to describe the Cospas-Sarsat MCCs and their interfaces, types of messages originated, normal routing of these messages, and any backup arrangements with other MCCs and a list of supported SPOCs. Any general information, such as 406 MHz beacon register queries, may be included in this section.

Any changes which are unique to the MCC may be amended by that MCC. If bilateral changes are involved, both MCCs shall draft appropriate amendments to their sections once the new interface has been successfully tested.

NOTE

Section 5.3 will be updated by Ground Segment Providers with MEOLUT descriptions as associated MEOLUTs are commissioned for operational use.

Hyperlink to MCC Sections			
AEMCC	CMC	KOMCC	SPMCC
ALMCC	CYMCC	MYMCC	TAMCC
ARMCC	FMCC	NIMCC	THMCC
ASMCC	GRMCC	NMCC	TRMCC
AUMCC	HKMCC	PAMCC	UKMCC
BRMCC	IDMCC	PEMCC	USMCC
CMCC	INMCC	QAMCC	VNMCC
CHMCC	ITMCC	SAMCC	
CNMCC	JAMCC	SIMCC	

5.3.2 AEMCC - UNITED ARAB EMIRATES MISSION CONTROL CENTRE

Last updated: February 2019

5.3.2.1 AEMCC GENERAL

The UAE Mission Control Centre is manned and operates 24/7. AEMCC operates two Operational Control Consoles. The primary (AEMCC) is located in Abu Dhabi, the secondary (AEMCC2) is a backup to the primary and it is co-located with Abu Dhabi SAR Coordination Centre in Abu Dhabi.

AEMCC controls one LEOLUT and two GEOLUTs located in Albateen Airbase (Abu Dhabi, UAE) at the following locations:

	Latitude	Longitude	
LEOLUT (4701)	24°25.89' N	054° 26.87' E	
GEOLUT1 (4702)	24° 25.89' N	054° 26.87' E	
GEOLUT2 (4707)	24° 25.89' N	054° 26.87' E	(active-tracking antenna)

5.3.2.2 SPOCs SUPPORTED

United Arab Emirates.

5.3.2.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at AEMCC:

- Orbit vectors: receive from SPMCC,
- SARP calibration: receive from SPMCC,
- System status: originate to and receive from SPMCC,
- Narrative: received and originated as required.

5.3.2.4 BACKUP PROCEDURES AND AGREEMENTS

In the case of complete failure of the AEMCC, the SPMCC will assume the duties of the AEMCC. SPMCC will send validated Cospas-Sarsat alert data within the AEMCC service area to Abu Dhabi SAR Coordination Center.

Operators will forward a written notice to their backup MCC of intention to perform maintenance routines requiring a backup at least 24 hours in advance.

As described in SPMCC section, in the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. In that case, the AEMCC will change its configuration in order to consider the FMCC as its current nodal MCC until the backup situation is finished. When the backup is finished, the AEMCC will revert to its normal configuration in order to consider the SPMCC as its nodal MCC.

5.3.2.5 OTHER INFORMATION

Beacon Registration

Beacon registration is maintained by AEMCC.

5.3.3 ALMCC - ALGERIAN MISSION CONTROL CENTRE

Last updated: December 2015

5.3.3.1 ALMCC GENERAL

The Algerian Mission Control Centre is located at Algiers. The ALMCC controls two LEOLUTs at Algiers and Ouargla and one GEOLUT at Algiers at the following locations:

	Latitude	Longitude
Algiers LEOLUT	36° 45.20' N	003° 22.86' E
Ouargla LEOLUT	31° 52.80' N	005° 29.40' E
Algiers GEOLUT	36° 45.20' S	003° 26.87' E

The Ouargla and Algiers LEOLUTs coverage overlaps with French, Italian, Spanish and UK LEOLUTs on Western Africa and Europe and extends southward to the Guinea Gulf up to Gabon and Congo and eastward up to the Red Sea.

The two LEOLUTs can localise transmitters and distress beacons in local mode and global mode. Interferers in the 406.0 to 406.1 MHz band are localised in the local mode and this information is provided to the Algerian Telecommunication for action through the ITU.

The GEOLUT is co-located with the LEOLUT at Algiers and it operates with MSG-3 satellite.

The SAR Administration is the head agency in Algeria for the Cospas-Sarsat Programme.

5.3.3.2 SPOCs SUPPORTED

ALMCC provides alert data to SPOCs in the ALMCC service area including:

Algeria	Libya
Burkina Faso	Niger
Egypt	

It also routes alert messages to SPMCC and can receive these messages from this source.

Alert messages in other DDR service areas are routed to the SPMCC.

A communication summary for these interfaces is shown below:

Algerian RCC:	AFTN, Telex, Fax, Voice
SPMCC:	FTP-VPN, AFTN, Fax, Voice

5.3.3.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at ALMCC:

Orbit vectors:	received from SPMCC;
SARP calibration:	received from SPMCC;
System status:	received and originated as required;
Narrative:	received and originated as required.

5.3.3.4 BACKUP PROCEDURES AND AGREEMENTS

The Ouargla LEOLUT has overlapping local mode coverage areas to a greater or lesser extent with the following LEOLUTs: Abuja, Bari, Combe Martin, Maspalomas and Toulouse. It is therefore feasible for one to back up the other in the case of a failure or planned maintenance downtime.

Operators will forward a written notice to their backup MCC of intention to perform maintenance routines requiring a backup at least 24 hours in advance.

In the case of a complete failure of the ALMCC, the SPMCC will assume the duties of the ALMCC. SPMCC will send validated Cospas-Sarsat alert data within the ALMCC service area to designated SPOCs. In the Algerian SRR this will be Algiers RCC (this AFTN address is DAALZSZX).

As described in SPMCC section, in the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. In that case, the ALMCC will change its configuration in order to consider the FMCC as its current nodal MCC until the backup situation is finished. When the backup is finished, the ALMCC will revert to its normal configuration in order to consider the SPMCC as its nodal MCC.

5.3.3.5 OTHER INFORMATION

To be determined.

5.3.4 ARMCC - ARGENTINE MISSION CONTROL CENTRE

Last updated: October 2012

5.3.4.1 ARMCC GENERAL

The Argentine Mission Control Centre (ARMCC) is located in El Palomar, Buenos Aires. The ARMCC controls two LEOLUTs and one GEOLUT at the following locations:

	Latitude	Longitude
El Palomar GEOLUT	34° 36.00' S	058° 36.00' W
Rio Grande LEOLUT	53° 46.75' S	067° 42.32' W
El Palomar LEOLUT	34° 36.00' S	058° 36.00' W

The Argentine LEOLUTs provide full processing of 406 MHz frequency alert data, including G-SARP processing of the transponded SARR data and combined LEO/GEO processing, according to the relevant Cospas-Sarsat specifications. The local coverage area of the Argentine LEOLUTs includes Argentina, South of Brazil and Peru, Bolivia, Paraguay, Uruguay, Chile, part of Antarctica, the Southwestern Atlantic Ocean and Southeastern Pacific Ocean.

The Argentine GEOLUT receives data from the GOES-12 satellite and provides it to the ARMCC for distribution and to the LEOLUTs for combined LEO/GEO processing.

The communication interfaces available at the ARMCC are AFTN, FTP-PNV, Telephone and Fax. These communication means are used as follows:

ARMCC-USMCC:	FTP-VPN	AFTN
ARMCC-RCCs:	AFTN	
ARMCC-Falkland Islands (Malvinas)*:	Telephone	Facsimile
ARMCC-CHMCC:	AFTN	

The entire ground segment is maintained and operated twenty-four hours a day, seven days a week by SASS (Servicio de Alerta y Socorro Satelital), a joint Argentine Navy / Air Force office.

5.3.4.2 SPOCs SUPPORTED

The ARMCC supports the RCCs in Argentina and Falkland Islands (Malvinas)* SRR.

Note: * A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

5.3.4.3 SYSTEM INFORMATION MESSAGES

The ARMCC receives and process the following System information messages:

Orbit vectors
SARP calibration data
SARR calibration data
System status
Narrative

The ARMCC is capable of originating the following System information messages:

System status
Narrative

These messages are normally received from or sent to the USMCC.

5.3.4.4 BACKUP PROCEDURES AND AGREEMENTS

The backup procedure described herein is available for the whole Argentine Mission Control Centre (ARMCC) service area in such a way that the coverage in local mode provided by the LEOLUT stations of the Chilean Mission Control Centre (CHMCC) overlaps the LEOLUT coverage of the ARMCC.

The procedure whereby the backup service is implemented in case of an unexpected failure or scheduled interruption of the ARMCC service may occur and is expected to last more than four (4) hours is as follows:

The CHMCC sends Cospas-Sarsat alerts data to the ARMCC over AFTN.

During scheduled or unscheduled ARMCC outages, incoming AFTN data is re-routed to appropriate RCCs using the SIT 185 format as defined in the C/S A.002 document.

When this procedure is implemented, the ARMCC's duty personnel will contact the National RCCs (maritime and aerial) and advice them that CHMCC provide the Cospas-Sarsat alert distress distribution.

The ARMCC will attempt to pass them to its service area RCCs/SPOCs by manually "geosorting" them and using the AFTN link communication, facsimile and/or other alternative links.

The backup procedures for the ARMCC consist of the following steps:

a. Whenever backup service is required, the ARMCC notifies CHMCC and USMCC, requesting them to provide the backup service. The requirement is voice-transmitted to the USMCC and CHMCC by the ARMCC and optionally confirmed by means of Email or Fax.

b. The CHMCC notifies USMCC and ARMCC when the backup service is being provided.

c. The USMCC notifies CHMCC and ARMCC when the backup service is being provided. During the backup service provision, the USMCC sends to CHMCC the messages for and to be forwarded to ARMCC. The USMCC will hold the messages intended for ARMCC for re-transmission upon request.

d. The USMCC notifies all MCCs of the start of the backup service by means of a SIT 605 message (as established in C/S A.001, section 3.6).

e. The ARMCC sends a SIT 605 message when the ARMCC normal service is restored.

f. The USMCC sends a SIT 915 message to ARMCC and CHMCC notifying them that data distribution to / from ARMCC is back to normal.

g. The CHMCC sends a SIT 915 message to ARMCC and USMCC notifying them that data distribution to / from ARMCC is back to normal.

5.3.4.5 OTHER INFORMATION

The beacon database is maintained by the ARMCC.

5.3.5 ASMCC - SOUTH AFRICAN MISSION CONTROL CENTRE

Last updated: October 2014

5.3.5.1 ASMCC GENERAL

The South African Mission Control Centre is located in Milnerton (Cape Town). The ASMCC controls one LEOLUT with G-SARP. This LEOLUT is located at:

Latitude	Longitude
33° 52.80' S	018° 30.00' E

The South African MCC and LEOLUT operate 24 hours a day throughout the year.

The Maritime division of Telkom SA is responsible for the operation of the South African MCC and LEOLUT.

5.3.5.2 SPOCs SUPPORTED

Angola	Lesotho	Rwanda	Uganda
Botswana	Malawi	South Africa	Zambia
Burundi	Mozambique	St. Helena	Zimbabwe
Democratic Republic of Congo	Namibia	Swaziland	

The communication interfaces used by the ASMCC are:

AFTN FTP-VPN

5.3.5.3 SYSTEM INFORMATION MESSAGES

The ASMCC originates and receives the following System information:

Orbit vectors: receive from AUMCC;
SARP calibration: receive from AUMCC;
System status: originate and receive from AUMCC.

5.3.5.4 BACKUP PROCEDURES AND AGREEMENTS

In the event the ASMCC becomes unserviceable, the AUMCC will provide backup support to the ASMCC. All alerts for the ASMCC service area will be transmitted on SIT 185 format and faxed to a number nominated by the ASMCC. The ASMCC will ensure distribution to the RCCs it supports.

5.3.5.5 OTHER INFORMATION

To be determined.

5.3.6 AUMCC - AUSTRALIAN MISSION CONTROL CENTRE

Last updated: February 2018

5.3.6.1 AUMCC GENERAL

The Australian Mission Control Centre is co-located with the RCC Australia in Canberra. The AUMCC controls two advanced technology LEOLUTs (ATLUT-500) with G-SARP. These two LEOLUTs are located in lighthouses on the coast at:

	Latitude	Longitude	
Albany, Western Australia	35° 07.20' S	117° 53.94' E	(Cave Point Lighthouse)
Bundaberg, Queensland	24° 45.50' S	152° 24.77' E	(South Head Lighthouse)

These two LEOLUTs are known nationally as AULUTW (AULUT West - ID: 5033) and AULUTE (AULUT East - ID: 5032) and provide local mode coverage of the continental land mass and extending to seaward into the Indian and South Pacific Oceans and Coral and Tasman Seas.

Both LEOLUTs were registered with ITU in October 1999 (ID numbers: 96.944556 and 96.944558 - for Albany LEOLUT, 96.944552 and 96.944554 - for Bundaberg LEOLUT).

The AUMCC receives alert data from the Goudies Road GEOLUTs (ID: 5124 and NZGEO2 - ID: 5125) and distributes them in accordance with this document.

The AUMCC and LEOLUTs operate 24 hours a day throughout the year providing alert data through the co-located RCC in accordance with this document.

The AUMCC also assumes the nodal responsibilities for the Southwest Pacific DDR as defined at section 4.1 of this document.

The Australian Maritime Safety Authority (AMSA) is responsible for the management and operation of the Australian Cospas-Sarsat ground segment.

5.3.6.2 SPOCs SUPPORTED

American Samoa, Nauru, Samoa, Vanuatu, Australia, New Caledonia, Solomon Islands, Fiji, New Zealand, Tonga, Kiribati, Papua New Guinea, and Tuvalu.

American Samoa, Tonga, and Samoa are within the New Zealand SRR. Kiribati, Tuvalu, and Vanuatu are within the Fiji SRR. Nauru is within the Solomon Islands SRR.

The AUMCC, in supporting its service area, passes alerts to the following SRRs: Australia, New Zealand, Papua New Guinea, Solomon Islands and Fiji.

Alerts in vicinity of New Caledonia are passed to the SAR authority in Noumea.

5.3.6.3 SYSTEM INFORMATION MESSAGES

The AUMCC originates, receives and forwards System Information messages as follows:

Orbit vectors: receive from CMC and USMCC and forward to ASMCC, IDMCC, SIMCC and THMCC;

SARP calibration: receive from FMCC and forward to ASMCC, IDMCC, SIMCC and THMCC;

System status: originate, receive and forward from/to ASMCC, CMC, FMCC, IDMCC, JAMCC, SIMCC, SPMCC, THMCC and USMCC.

5.3.6.4 BACKUP PROCEDURES AND AGREEMENTS

The Australian and New Zealand LEOLUTs provide partial backup for each other as there is some overlapping local mode coverage.

An agreement is in place with the USMCC to provide backup of the AUMCC nodal responsibility. The following procedure has been agreed to:

In the event of a failure of the nodal AUMCC, the duty personnel will:

a. contact the USMCC and advise them to assume AUMCC nodal responsibilities;

b. request the USMCC to transmit AUMCC service area alerts in SIT 185 format. The AUMCC will attempt to pass them to its service area RCCs/SPOCs by manually geosorting them and using the RCC communication modes available; and

c. advise the USMCC that alerts from the local Australian or New Zealand LEOLUTs will be passed by the RCC in some form on a 'best effort' basis.

It should be noted that the RCC/AUMCC has a disaster recovery plan and if conditions are such that the primary site has to be abandoned then personnel will be transferred to an alternative site. This alternate site is already set up to support most of the RCC functions and some AUMCC functions.

5.3.6.5 OTHER INFORMATION

The AUMCC is responsible for the allocation of serial numbers for all serialized coded beacons and the maintenance of the Australian beacon database register and can be contacted at any time to obtain database information. Purchasers of beacons are required to complete a registration form (http://beacons.amsa.gov.au) giving details of craft, emergency contact numbers and beacon 15 Hex ID.

If national serial numbers, as provided by Australia's national authority, AusSAR (Email: ausbeacon@amsa.gov.au), are to be used, the Cospas-Sarsat type approval number (TAC) should NOT be inserted and bit 43 should be set to "0". If the TAC No is to be inserted, bit 43 should be set to "1" and the manufacturer's serial number of the beacon used.

EPIRBs and PLBs for sale in Australia should meet the requirements of the Australian Standard 4280. The 121.5 MHz homing transmitter referred to in Standard 4280 must be approved by the Australian Communications Authority or by a laboratory providing an equivalent service. Beacons being sold to the general public in Australia should have compliance folders that demonstrate the beacon meets the operational and environmental requirements of the Australian Standard.

EPIRBs carried by vessels under the Australian Navigation Act must comply with the relevant Parts of Marine Orders.

ELTs for sale in Australia are required to comply with Aviation Regulation 252.

5.3.7 BRMCC - BRAZILIAN MISSION CONTROL CENTRE

Last updated: February 2018

5.3.7.1 BRMCC GENERAL

The Brazilian Mission Control Centre (BRMCC) operates two Operational Control Consoles (OCCs). The first one as primary OCC located in Brasilia, the second one as secondary OCC being a backup facility co-located with ARCC-RE in Recife. Three LEOLUTs are located at Brasilia, Manaus and Recife; the BRMCC also operates two GEOLUTs at Brasilia and Recife with the following co-ordinates:

	Latitude	Longitude
LEOLUTs:		
Brasilia	15° 51.43' S	047° 54.16' W
Manaus	03° 01.39' S	060° 03.24' W
Recife	08° 08.30' S	034° 55.50' W
GEOLUTs:		
Brasilia	15° 51.43' S	047° 54.16' W
Recife	08° 08.30' S	034° 55.50' W

All Brazilian LEOLUTs can localise 406 MHz distress beacons in local and global coverage mode also Brazilian LEOLUTs can process 406 MHz interference data in local coverage mode.

The local mode coverage of the Brazilian LEOLUTs includes the central part of South America and western area of South Atlantic Ocean.

The BRMCC, GEOLUTs and LEOLUTs operate 24 hours a day throughout the year.

The communication interfaces used by BRMCC are:

AFTN FTP-VPN Voice Facsimile

5.3.7.2 SPOCs SUPPORTED

The BRMCC provides primary support to the Brazilian RCCs and Ascension Island and routes alert and notification (NOCR) messages to other countries and can receive these messages from them.

5.3.7.3 SYSTEM INFORMATION MESSAGES

The BRMCC originates and receives the following System information:

Orbit vectors:	receive from USMCC;
SARP calibration:	receive from USMCC;
System status:	originate to and receive from USMCC;
406 MHz SARR frequency calibration:	receive from USMCC.

5.3.7.4 BACKUP PROCEDURES AND AGREEMENTS

Brasilia, Manaus and Recife LUTs have overlapping local mode coverage areas to a greater or lesser extent with the following LEOLUTs: Parana, Callao, Florida and Santiago. It is therefore feasible for the Brazilian area to be partly covered in the case of failure or planned maintenance downtime.

The BRMCC operates two Operational Control Consoles (OCCs). The first one as primary OCC located in Brasilia, the second one as secondary OCC being a backup facility co located with ARCC-RE in Recife.

In the event of failure of primary OCC, Brazil has backup agreements and procedures in place with the USA. The following procedures have been agreed to:

a) the BRMCC (from Brasilia) notifies the USMCC whenever the backup service is required by means of Fax, Phone or Email;

b) the USMCC notifies the BRMCC (Brasilia) when the backup service commences by fax, phone or email. In case of failure of these contacts, USMCC shall notify the BRMCC (Recife), as contact list bellow;

c) the USMCC sends a SIT 605 message notifying the other MCCs of the BRMCC failure, and that the USMCC is performing backup service according to section 3.7, document C/S A.001;

d) the USMCC transmits alert messages or status messages, as appropriate, for the Brazilian service area to ARCC-RE using the BRMCC OCC-2 AFTN address (primary communication link) or via FTP-VPN link;

e) in the event that the USMCC is unable to communicate with the BRMCC (OCC-2 Recife) as described in “d” above, the USMCC shall transmit alerts for the Brazilian service area in SIT 185 format to the Brasilia ARCC (ARCC-BS) AFTN address (primary communication link) or via Fax. In this case, the USMCC will advise the ARCC-BS of their inability to communicate with the BRMCC (OCC-2 Recife). Other Brazilian ARCCs as well as BRMCC (Brasilia) will be advised by ARCC-BS;

f) the BRMCC (from Recife) advises the Brazilian ARCCs about the BRMCC failure and about the backup procedures;

g) the BRMCC (from Brasilia or Recife) will notify the USMCC as soon as the problem is solved, and will advise the time when the BRMCC (Brasilia) plans to restore normal operations;

h) when the BRMCC (Brasilia) returns to normal operations it will send a SIT 605 message notifying the USMCC and other MCCs that the BRMCC (Brasilia) has resumed normal operations;

i) the USMCC will send all requested missing messages to the BRMCC (Brasilia) using the contact lists available at www.cospas-sarsat.int.

5.3.7.5 OTHER INFORMATION

To be determined.

5.3.8 CMCC - CANADIAN MISSION CONTROL CENTRE

Last updated: February 2019

5.3.8.1 CMCC GENERAL

The Canadian Mission Control Centre is located in Trenton, Ontario and maintains a backup facility and CMCC server in Belleville, Ontario.

Canada has the following commissioned LUTs:

LEOLUTs:

Churchill, Manitoba
Edmonton, Alberta
Goose Bay, Labrador
Ottawa, Ontario (test / backup facility)

GEOLUTs:

Edmonton, Alberta
Ottawa (1), Ontario (test / backup facility)
Ottawa (2), Ontario

MEOLUTs (will be connected to operational system once LGM CMCC is commissioned:

Shirley's Bay, Ontario (near Ottawa)

Locations are provided on www.cospas-sarsat.int.

The LEOLUTs provide full coverage of Canadian SRRs from mid-Atlantic to the Gulf of Alaska and from the North Pole south to approximately 30 degrees north latitude. Operations are 24 hours per day, seven (7) days per week.

The communication interfaces used by the CMCC are:

Canadian RCCs:	FTP, Voice, Fax
LUTs to CMCC:	FTP
USMCC:	FTP-VPN, AFTN, Voice, Fax
AUMCC (as part of USMCC backup):	FTP-VPN, AFTN, Voice, Fax

5.3.8.2 SPOCs SUPPORTED

The CMCC has no SPOCs in its SRR. However, the CMCC provides primary support to three Canadian Joint Rescue Coordination Centres (JRCCs Victoria, Trenton and Halifax) and two Canadian Maritime Rescue Sub-Centres (MRSCs Quebec, and St John's), and through JRCC Halifax, to Saint Pierre and Miquelon (French Islands off the south coast of Newfoundland).

CMCC distributes unlocated and NOCR alerts for Saint-Pierre-et-Miquelon to FMCC through the USMCC. On a national level to assist the coordination between RCC Gris-Nez and JRCC Halifax, CMCC also sends Saint-Pierre-et-Miquelon unlocated alerts to JRCC Halifax.

5.3.8.3 SYSTEM INFORMATION MESSAGES

Canada originates and receives the following System information messages:

SARR command:	originate to USMCC;
SARR command verification:	receive from USMCC;
SARR frequency calibration offset:	originate to USMCC;
System Status:	originate and receive, as required;
Narrative:	originate and receive, as required;
Orbit Vectors:	receive via USMCC;
SARP calibration:	receive via USMCC.

5.3.8.4 BACKUP PROCEDURES AND AGREEMENTS

The LUTs operated by the CMCC and USMCC provide overlapping coverage of each other's areas of responsibility.

In the event of a complete CMCC failure, Canada has a backup agreement and procedure in place with the USMCC. The USMCC would route alert data directly to appropriate Canadian JRCCs and MRSCs.

In the event of a USMCC failure, the USMCC has a backup agreement and procedure in place with CMCC and AUMCC. CMCC would assume USMCC national Sarsat responsibility and send alerts directly to the appropriate US RCCs and SPOCs. For alerts outside the USMCC SRR, CMCC will send alerts via FTP-VPN or AFTN to AUMCC, as AUMCC assumes nodal responsibilities for USMCC. The USMCC provides CMCC with the current Geosort data for its national RCCs and SPOCs.

Canada has installed a completely functional backup system for CMCC at Belleville, Ontario. In the event of the need to transition to this alternate location, CMCC would inform the USMCC as soon as possible. Once all communication links have been reconfigured, operation of the backup site would be transparent to external MCCs/agencies.

The CMCC will initiate a communications test once per quarter with the AUMCC and all the US RCCs. These communications tests are to test both modes of communications (FTPV/AFTN), using direct routing to / from AUMCC, to ensure that these routes are operational in the event MCC Backup Procedures are required.

5.3.8.5 OTHER INFORMATION

Registration of Beacons

A register for Canadian beacons is maintained by the Canadian Beacon Registry, located at CMCC in Trenton, Canada. The website is www.cbr-rcb.ca.

5.3.9 CHMCC - CHILEAN MISSION CONTROL CENTRE

Last updated: December 2015

5.3.9.1 CHMCC GENERAL

The Chilean Mission Control Centre is located in Los Cerrillos, Santiago. The CHMCC controls three LEOLUTs and one GEOLUT at the following locations:

	Latitude	Longitude
LEOLUTs:		
Punta Arenas	53° 00.36' S	070° 50.82' W
Santiago	33° 29.70' S	070° 42.24' W
Easter Island	27° 09.01' S	109° 26.22' W
GEOLUT:		
Santiago	33° 29.70' S	070° 42.24' W

All Chilean LEOLUTs can localize 406 MHz distress beacon alerts in local and global coverage mode.

The local mode coverage of the Chilean LEOLUTs covers the areas of Chile, Argentina, Bolivia, Paraguay, Uruguay, part of Brazil, Peru, Pacific Ocean and Antarctica.

The CHMCC also controls one GEOLUT located in Santiago.

The CHMCC, LEOLUTs and GEOLUT operate 24 hours a day throughout the year.

The Chilean Air Force (FACH) is responsible for the operation of the Chilean MCC, LEOLUTs and GEOLUT.

The communication interfaces used by the CHMCC are:

Chilean RCCs	AFTN, Telephone, Fax, E-mail
SPOCs	AFTN, Telephone, Fax, E-mail (Bolivia. Uruguay y Paraguay)
Chilean MRCC	FTP-VPN, Telephone, Fax, E-mail
USMCC	FTP-VPN, AFTN, Telephone, Fax, E-mail (nodal)

5.3.9.2 SPOCs SUPPORTED

The Chilean Mission Control Centre receives alert data from the LEOLUTs and GEOLUT and from other Cospas-Sarsat MCCs in accordance with document C/S A.001. It provides Cospas-Sarsat alert data to the following countries (SPOCs):

Bolivia
Paraguay
Uruguay

5.3.9.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at CHMCC:

Orbit vectors:	received from USMCC;
SARP calibration:	received from USMCC;

System status: received and originated as required;
Narrative: received and originated as required.

5.3.9.4 BACKUP PROCEDURES AND AGREEMENTS

In the unlikely event of a CHMCC failure, Chile has backup agreements and the following procedures in place with the USA:

a. The CHMCC shall notify the USMCC by phone or email when the back service is required.

b. The USMCC shall notify the CHMCC by phone, fax or email when the backup service commences.

c. The USMCC shall send a SIT 605 message notifying the other MCCs of the failure of the CHMCC and that the USMCC is performing backup service according to section 3.7 of document C/S A.001. The USMCC shall also notify the CHMCC's SPOCs of the same information by SIT 915 message.

d. The data distribution procedures and formats during the backup are the follows:

If the alert message is located within Chile's search and rescue area, all messages shall be sent by the USMCC directly to Santiago RCC (AFTN address SCTIYCYX), using a SIT 185 message.

If the alert message is located within the search and rescue area of any of the Chilean's SPOCs (Bolivia, Paraguay and Uruguay); the USMCC shall send the alert message directly to the SPOC where the alert has been located, using a SIT 185 message.

The AFTN addresses for the Chile's SPOCs are:

- Bolivia (BOLISPOC: SLLPZRZX),
- Paraguay (PARASPOC: SGASSARX) and,
- Uruguay (URUGSPOC: ZUMUYCYX).

e. Once the failure is overcome, the CHMCC shall notify the USMCC and other MCCs that the CHMCC has resumed normal operations using a SIT 605 message. The CHMCC shall also notify its SPOCs that it has resumed normal operations by a SIT 915 message.

f. By default, the USMCC shall send all held system information messages (including SIT 605, 215, 216 and 417 messages) and all held alert messages within the Chilean Service Area to the CHMCC when the CHMCC resumes its normal operation.

5.3.9.5 OTHER INFORMATION

Beacon Registration

A 406 MHz EPIRBs / ELTs have been approved for carriage on Chilean vessels and aircraft. A database of Chilean registered Cospas-Sarsat maritime beacons is maintained by the General Directorate of Maritime Territory and Merchant Marine, and another database of Chilean registered Cospas-Sarsat aviation beacons is maintained by the General Directorate of Civil Aviation. The CHMCC also maintains a copy of the Chilean register for Cospas-Sarsat aviation beacons.

5.3.10 CNMCC - CHINESE MISSION CONTROL CENTRE

Last updated: October 2012

5.3.10.1 CNMCC GENERAL

The Chinese Mission Control Centre is co-located with the China Maritime Search and Rescue Centre and controls two LEOLUTs installed at the Ministry of Communications at the following location:

Latitude	Longitude
39° 54.30' N	116° 25 00.05' N

The local mode of the Chinese LEOLUTs covers the main land of China, the East China Sea, the Yellow Sea and the part of the South China Sea.

Both LEOLUTs can locate transmitters and distress beacons in local mode as well as global mode. The Beijing (1) LEOLUT includes a Ground Search and Rescue Processor (G-SARP) to process the repeater band. The Beijing (2) LEOLUT is used as a backup of Beijing (1).

The CNMCC and LEOLUTs operate 24 hours a day throughout the year and provide alert data to Chinese RCCs and to SPOCs within the CNMCC service area in accordance with document C/S A.001 and national procedures.

5.3.10.2 SPOCs SUPPORTED

The CNMCC provides primary support to Chinese RCCs.

The communication interfaces used by the CNMCC are:

AFTN FTP-PNV Voice Facsimile

5.3.10.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at CNMCC:

Orbit vectors: received from JAMCC;
SARP calibration: received from JAMCC;
System status: originated to and received from JAMCC.

5.3.10.4 BACKUP PROCEDURE AND AGREEMENTS

The LEOLUTs at Beijing, Incheon, Nakhodka, among others, have overlapping local mode coverage areas. It is therefore feasible for one to backup the other in case of failure or planned maintenance downtime. Co operation in the coverage of individual satellites passes may also be feasible in the future.

In the unlikely event of a CNMCC failure, China has backup agreements with Hong Kong.

5.3.10.5 OTHER INFORMATION

A register of maritime EPIRBs is maintained at China Transport Telecommunications Centre. The CNMCC is able to get access to the register.

5.3.11 CMC - COSPAS MISSION CENTRE

Last updated: December 2015

5.3.11.1 CMC GENERAL

The Cospas Mission Centre (i.e., the Russian Mission Control Centre) is located in Moscow and controls three national LUTs at the following locations:

	Latitude	Longitude
LEOLUT Moscow *	55° 37.30' N	037° 30.63' E
LEOLUT Nakhodka	42° 51.52' N	132° 47.44' E
GEOLUT Moscow	55° 44.60' N	037° 43.36' E

Note: * Under development.

LEOLUTs can localise transmitters and distress beacons in local mode and global mode.

The local mode coverage of the Russian LEOLUTs includes Europe, northern and central parts of Asia, western part of North Pacific, north-eastern part of Africa.

The Russian MCC and LEOLUTs operate 24 hours per day throughout the year.

The CMC also assumes the nodal responsibilities for the Eastern DDR as defined at section 5.3 of this document.

The agency Morsviazsputnik is responsible for operation of the Russian MCC and LEOLUTs.

5.3.11.2 SPOCs SUPPORTED

The CMC service area includes the territory of Armenia, Azerbaijan, Belarus, Bulgaria, Czech Republic, Hungary, Kazakhstan, Kyrgyz Republic, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Tajikistan, Turkmenistan and Uzbekistan.

Note: There is an overlap with the TRMCC service area over Georgia and Ukraine.

The CMC routes alert data to RCCs of the Russian Federation and to other States in its service area and to the AUMCC, FMCC, INMCC, JAMCC, PAMCC, SPMCC and USMCC in accordance with the document C/S A.001 (DDP).

The following communication lines are used by the CMC:

Russian RCCs:	PSTN (Public Switched Telephone Network) communications, Fax
Russian LUTs:	FTP, PSTN communications
AUMCC:	FTP-VPN, AFTN
FMCC:	FTP-VPN, AFTN
INMCC:	FTP-VPN, AFTN
JAMCC:	FTP-VPN, AFTN
PAMCC:	FTP-VPN, AFTN
SPMCC:	FTP-VPN, AFTN
USMCC:	FTP-VPN, AFTN

5.3.11.3 SYSTEM INFORMATION MESSAGES

The CMC originates and receives the following System information messages:

Orbit vectors:	originate to AUMCC, FMCC, INMCC, JAMCC, PAMCC, SPMCC and USMCC and receive from USMCC;
SARP calibration:	receive from FMCC, forward to INMCC and PAMCC;
System status:	originate to and receive from AUMCC, FMCC, INMCC, JAMCC, PAMCC, SPMCC and USMCC.

5.3.11.4 BACKUP PROCEDURES AND AGREEMENTS

In the case of complete failure of the CMC, the FMCC will assume the duties of the CMC. FMCC will send validated Cospas-Sarsat alert data to INMCC and PAMCC, and within the CMC service area to designated SPOCs or RCCs.

5.3.11.5 OTHER INFORMATION

Beacon Registration

A register on national units equipped with beacons is maintained at the CMC.

5.3.12 CYMCC - CYPRUS MISSION CONTROL CENTRE

(Under development until commissioned once the MEOSAR system is at IOC)

Last updated: December 2015

5.3.12.1 CYMCC GENERAL

The Cyprus Mission Control Centre (CYMCC) is located at Larnaca, Cyprus. The CYMCC controls a MEOLUT located at Larnaca.

The MEOLUT is located at the following co-ordinates:

Latitude	Longitude
34º 51.90′ N	033º 23.02′ E

The CYMCC and MEOLUT operate 24 hours a day throughout the year.

The communication interfaces used by CYMCC are as follows:

FTP-VPN (TBD) AFTN Facsimile Voice

5.3.12.2 SPOCs SUPPORTED

The CYMCC provides primary support to JRCC Larnaca and routes alert and notification (NOCR) messages to other countries and can receive these messages from them.

5.3.12.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at CYMCC:

System status: originate and receive as required;
Narrative: as required;
Orbit vectors: receive via FMCC;
SARP calibration: receive via FMCC.

5.3.12.4 BACKUP PROCEDURES AND AGREEMENTS

The CYMCC operates two (2) Mission Control Centres (MCCs), one of them being a backup. In the event of failure of both MCCs, Cyprus has backup agreements and procedures in place with Italy. The following procedures have been agreed to:

a) Whenever the backup service is required, the CYMCC notifies the ITMCC by means of Fax, Telephone or Email.

b) The ITMCC notifies the CYMCC when the backup service commences by Fax, Telephone or Email.

c) The ITMCC sends a SIT 605 message notifying all other MCCs of the CYMCC failure and that ITMCC is performing backup service according to section 3.7, document C/S A.001.

d) The CYMCC advises JRCC Larnaca about the CYMCC failure and about the backup procedures.

e) The ITMCC transmits alerts for the Cyprus service area in SIT 185 format to JRCC Larnaca using the AFTN network (primary communication link) or via Fax.

f) In the event that the ITMCC is unable to communicate with the JRCC Larnaca as described above, the ITMCC shall transmit alerts for the CYMCC service area in SIT 185 format to JRCC Larnaca via satellite fax and satellite telephone.

g) The CYMCC will notify the ITMCC about the problem status and will advise the time when the CYMCC plans to restore normal operations.

h) When the CYMCC returns to normal operations it will send a SIT 605 message notifying the ITMCC and other MCCs that the CYMCC has resumed normal operations. The CYMCC will also notify the JRCC Larnaca that it has resumed normal operations.

i) The ITMCC will send all requested missing messages to the CYMCC and will notify it about the events handled during the backup.

j) The ITMCC shall contact with the CYMCC using the contact lists available at www.cospas-sarsat.int.

Note: Address to JRCC (co-located with CYMCC) until finalization of communication details.

k) The ITMCC shall contact with JRCC Larnaca using the contact lists available at www.cospas-sarsat.int.

l) The CYMCC shall contact with the ITMCC using the contact lists available at www.cospas-sarsat.int.

5.3.12.5 OTHER INFORMATION

Beacon Registration

The CYMCC has access 24/7 to all Cypriot beacon registries (EPIRBs, ELTs and PLBs with country codes209, 210 and 212).

Registration of EPIRBs is provided by the Department of Merchant Shipping, Cyprus.

Registration of ELTs is provided by the Department of Civil Aviation, Cyprus.

Registration of PLBs is provided by JRCC Larnaca.

Location of CYMCC

The CYMCC is collocated with the JRCC Larnaca.

5.3.13 FMCC - FRENCH MISSION CONTROL CENTRE

Last updated: February 2019

5.3.13.1 FMCC GENERAL

The French Mission Control Centre is co-located with dual LEOLUTs, one GEOLUT and one MEOLUT in Centre National d'Études Spatiales (CNES) technical centre in Toulouse.

The French Administration (Civil Aviation and Maritime Affairs) is responsible for validation and transmission of alert data to MCCs and SPOCs, in accordance with C/S A.001 and national procedures.

The FMCC also assumes the nodal responsibilities for the Central DDR as defined at section 5.3 of this document.

The French Mission Control Centre receives alert data from the Toulouse dual LEOLUT, and GEOLUT and MEOLUT, and from other Cospas-Sarsat MCCs in accordance with the document C/S A.001.

AFTN and FTP-VPN are used for communication with other MCCs. AFTN, FTP-VPN and Fax are used for communication with the supported SPOCs.

The LEOLUTs are equipped with dedicated antennas which makes possible tracking of all Cospas-Sarsat satellites passing over Toulouse, unless two satellites are in conflict (i.e., pass at the same time). The dual LEOLUTs can localise transmitters and distress beacons in both the global and local modes. Interferers in the 406.0 MHz to 406.1 MHz frequency band are localised in the local mode and this information is provided to the French Telecommunication Administration for action through ITU. The Toulouse LEOLUTs provide local mode coverage of Europe, eastern half of North Atlantic and Africa to latitude 20 degrees North. Operations are 24 hours per day throughout the year.

The French GEOLUT points to MSG-4 satellite at 0°.

The MEOLUT 2276 deployed in 2016 is a hybridization of the four dish antennas with a phase-array antenna located on the Thales Alenia Space (TAS) Toulouse site. MEOLUT 2276 tracks and processes MEOSAR L-band (using the phase-array antenna signals) and S-band (using the dish-antenna signals) satellites. All the RF signals are gathered together in a single signal processing server for alert generation.

5.3.13.2 SPOCs SUPPORTED

FMCC provides Cospas-Sarsat alert data to the following countries / territories:

EUROPE	
Andorra	(2)
Austria	
Belgium	
France	
Germany	
Gibraltar	
Liechtenstein	(1)

AFRICA Region
Chad
Djibouti
Morocco
Tunisia

INDIAN OCEAN	
Comoros	(3)

CARIBBEAN Region	
Anguilla	(3)
Antigua and Barbuda	(3)
Dominica	(3)
Guadeloupe (F)	
Martinique (F)	
Montserrat	(3)
Saint Kitts and Nevis	(3)

Luxemburg	
Monaco	(2)
Netherlands	
Portugal	
Switzerland	

Crozet Archipelago	(F)
Kerguelen Islands	(F)
Madagascar	
Mauritius	
Reunion (+ Mayotte)	(F)

Saint Lucia	(3)

SOUTH AMERICAN Region	
Guiana	(F)
Surinam	

ATLANTIC OCEAN	
Azores	(4)
Madeira	(4)

PACIFIC OCEAN	
French Polynesia	(F)
Pitcairn	(3)

(1) FMCC provides alert data via Switzerland SPOC.
(2) FMCC provides alert data via French SPOC.
(3) FMCC provides alert data via French overseas SPOC.
(4) FMCC provides alert data via Portugal SPOC.
(F) French overseas country / department / territory.

Cospas-Sarsat alerts localised inside the FMCC service area are forwarded to the responsible SPOC or RCC. For alerts localised inside the FMCC service area in a country which has not designated a SPOC, the FMCC forwards alert data to the CROSS Gris-Nez (Gris-Nez MRCC) for handling in accordance with agreed international SAR regulation.

5.3.13.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at FMCC:

SARP command:	originate to USMCC;
SARP command verification:	receive from USMCC;
System status:	originate and receive as required;
Narrative:	as required;
Orbit vectors:	receive from CMC and USMCC and forward to TRMCC, NMCC, ITMCC, GRMCC and UKMCC;
SARP calibration:	originate to AUMCC, CMC, ITMCC, JAMCC, NMCC, SPMCC, UKMCC, GRMCC, TRMCC and USMCC.

5.3.13.4 BACKUP PROCEDURES AND AGREEMENTS

LUT/MCC operators will forward written notice of intention to perform maintenance routines involving deactivation of the LUT/MCC well in advance. The MCC will inform all other MCCs as soon as a decision has been taken and confirm the times a minimum of two weeks prior to deactivation.

LUT/MCC operator will inform the associated MCC by the quickest possible means, followed by a written confirmation when an estimate of the duration of the downtime is available. The MCC will immediately inform the other MCCs.

In the case of complete failure of the FMCC or in case of circumstances outside one's control, the SPMCC will assume the duties of the FMCC. SPMCC will send validated Cospas-Sarsat alert data, within the FMCC and/or other MCC service areas to designated SPOCs or RCCs. All

validated Cospas-Sarsat alert data within the Central DDR service area will be directly transmitted to the Central DDR destination MCC.

In the case that SPMCC has to assume the backup duties for the FMCC, the Return Link Service (RLS) shall be interrupted during the backup period until such time as the Galileo programme decides to establish an operational redundant connection between the SPMCC and the Return Link Service Provider (RLSP).

In the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. FMCC will send validated Cospas-Sarsat alert data within the SPMCC service area

and within other areas to designated SPOCs or RCCs. In the Spanish SRR this will be RCC Madrid and CNCS (MRCC). It was agreed to periodically exchange test messages between FMCC and the Spanish RCCs (RCC Madrid and CNCS) to check the communication links. All validated Cospas-Sarsat alert data within the South Central DDR service area will be directly transmitted to the South Central DDR destination MCC.

Backup test between FMCC and SPMCC will be conducted on a "no noticed" basis as defined at section 3-7 (contingency procedure) of this document.

In the case of complete failure of the CMC, the FMCC will assume the duties of the CMC. FMCC will send validated Cospas-Sarsat alert data within the CMC service area and within other areas to designated SPOCs or RCCs. All validated Cospas-Sarsat alert data within the Eastern DDR service area will be directly transmitted to the Eastern DDR destination MCCs.

In the case of complete failure of the ITMCC, the FMCC will assume the duties of the ITMCC. FMCC will send validated Cospas-Sarsat alert data within the ITMCC service area to designated SPOCs or RCCs.

5.3.13.5 OTHER INFORMATION

A database of French registered beacons (named French 406 MHz Beacon Registration Database) is maintained by FMCC. URL: https://registre406.cnes.fr.

Country codes supported by French registry:

COUNTRY CODE:	COUNTRY NAME:
226, 227, 228	France
329	Guadeloupe (French Department of)
347	Martinique (French Department of)
361	St. Pierre and Miquelon
501	Adelie Land
540	New Caledonia
546	French Polynesia
578	Wallis and Futuna
607	Saint Paul and Amsterdam Island
618	Crozet Archipelago
635	Kerguelen Islands
660	Reunion (French Department of)
745	Guiana (French Department of)

5.3.14 GRMCC - GREEK MISSION CONTROL CENTRE

Last updated: October 2014

5.3.14.1 GRMCC GENERAL

The Greek Mission Control Centre is located at Piraeus, Greece. The GRMCC controls a LEOLUT and a GEOLUT located at Penteli Mountain.

The LUTs are located at the following co-ordinates:

	Latitude	Longitude
LEOLUT	38° 04.85′ N	023° 52.98′ E
GEOLUT	38° 04.85′ N	023° 52.98′ E

The LEOLUT can localise transmitters and distress beacons in local mode and global mode.

The GRMCC and LUTs operate 24 hours a day throughout the year.

The communication interfaces used by GRMCC are as follows:

FTP-VPN AFTN Facsimile Voice

5.3.14.2 SPOCs SUPPORTED

The GRMCC provides primary support to the Greek JRCC and routes alert and notification (NOCR) messages to other countries and can receive these messages from them.

5.3.14.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at GRMCC:

Orbit vectors: receive from FMCC;
SARP calibration: receive from FMCC;
System status: originate to and receive from FMCC;
Narrative: receive and originate as required.

5.3.14.4 BACKUP PROCEDURES AND AGREEMENTS

The GRMCC operates two Operational Control Consoles (OCC), one of them being a backup. In the event of GRMCC becomes unserviceable, Greece has backup agreements and procedures in place with Italy. The following procedures have been agreed:

a) The GRMCC notifies the ITMCC whenever the backup service is required by means of Fax, Phone or Email. GRMCC notices ITMCC about the alert events which were handling before the failure.

b) The ITMCC notifies the GRMCC when the backup service commences by Fax/Phone or Email.

c) The ITMCC sends a SIT 605 message notifying the other MCCs of the GRMCC failure, and that the ITMCC is performing backup service according to section 3.7, document C/S A.001.

d) The ITMCC transmits alerts for the Greek service area in SIT 185 format to Greek JRCC using the Greek JRCC Telex (primary communication link) or via Fax.

e) In the event that the ITMCC is unable to communicate with the JRCC as described above, the ITMCC shall; transmit alerts for the GRMCC service area in SIT 185 format to the GRMCC via Fax. In that case, the ITMCC will advise the GRMCC of their inability to communicate with the Greek JRCC.

f) The GRMCC advises the Greek JRCC about the GRMCC failure and about the backup procedures.

g) The GRMCC will notify the ITMCC as soon as the problem is solved and will advise the time when the GRMCC plans to restore normal operations.

h) When the GRMCC returns to normal operations it will send a SIT 605 message notifying the ITMCC and other MCCs that the GRMCC has resumed normal operations. The GRMCC also notifies Greek JRCC that it has resumed normal operations.

i) The ITMCC will send all requested missing messages to the GRMCC and will notice it about the events handled during the backup.

j) The ITMCC shall contact GRMCC using the contact lists available at www.cospas-sarsat.int.

k) The ITMCC shall contact JRCC Piraeus using the contact lists available at www.cospas-sarsat.int.

l) The GRMCC shall contact ITMCC using the contact lists available at www.cospas-sarsat.int.

5.3.14.5 OTHER INFORMATION

Beacon Registration

a) A database of the Greek register for MMSIs (maritime beacons are coded only with MMSI) is maintained by the Merchant Ships Inspectorate / Radio Communication Department of Ministry of Shipping, Maritime Affairs and the Aegean, with a copy at the GRMCC.

b) A database of the Greek register for aviation Cospas-Sarsat beacons is maintained by the Hellenic Ministry of Development Competitiveness Infrastructure Transport and Networks / Civil Aviation Authority / Telecommunication Services Regulatory Framework Section D4/D, with a copy at the GRMCC.

c) A database of the Greek register for PLBs is maintained by the GRMCC, with a copy at JRCC Piraeus. An online database for registering PLBs is about to go live in order for citizens to be able to register their PLBs on their own.

5.3.15 HKMCC - HONG KONG MISSION CONTROL CENTRE

Last updated: October 2012

5.3.15.1 HKMCC GENERAL

The Hong Kong Mission Control Centre is located on Hong Kong Island in the MRCC controlling two advanced technology LEOSAR Local User Terminals (dual LEOLUT system) located on the Peak on Hong Kong Island at the following location:

Latitude	Longitude
22° 16.56' N	114° 08.76' E

Both LEOLUTs can locate transmitters and distress beacons in local mode as well as global mode.

The local mode coverage of the Hong Kong LEOLUT covers the area from Mongolia in the north to the south of Indonesia and from the eastern side of the Indian Ocean to the western part of the Pacific.

The HKMCC and LEOLUTs both operate 24 hours a day and provide alert data to countries within the HKMCC service area in accordance with document C/S A.001 and national procedures.

A second operator control console (OCC) is available as a backup MCC and is located at the VTC in Macau Ferry Terminal.

The Marine Department of Hong Kong is responsible for the operation of the HKMCC and the HKLEOLUT.

5.3.15.2 SPOCs SUPPORTED

Democratic People's Republic of Korea
Hong Kong, China
Macau
Philippines

The communications interfaces used by the HKMCC are:

FTP-VPN AFTN Facsimile Voice

5.3.15.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at HKMCC:

Orbit vectors:	receive from JAMCC;
SARP calibration:	receive from JAMCC;
System status:	originate to and receive from JAMCC.

5.3.15.4 BACKUP PROCEDURE AND AGREEMENTS

The HKMCC established a mutual backup procedure with the TAMCC for system outage on either side.

In the case of complete failure of the CNMCC, the HKMCC will assume the duties of the CNMCC.

In the case of complete failure of the VNMCC, the HKMCC will assume the duties of the VNMCC.

The LUTs at Hong Kong, Singapore and Japan have overlapping local mode coverage areas to a greater or lesser extent. It is therefore feasible for the Hong Kong area to be fully covered in the case of failure or planned maintenance downtime.

5.3.15.5 OTHER INFORMATION

Beacon Registration

A register of beacons is maintained at the HKMCC.

5.3.16 IDMCC - INDONESIA MISSION CONTROL CENTRE

Last updated: December 2016

5.3.16.1 IDMCC GENERAL

The Indonesia Mission Control Centre (IDMCC) controls one advanced technology Local User Terminal (ATLUT System) located in Jakarta at the following location:

	Latitude	Longitude
Jakarta	06°09.42' S	106°39.36' E

This LUT (5254) can locate transmitters and distress beacons in local mode as well as global mode.

The local mode coverage of the Indonesia LUT is able to cover the area of Brunei, Malaysia, Singapore, Papua New Guinea, Thailand (ASEAN Area) as well as Laos, Myanmar, South of Philippines and North Australia.

The IDMCC and LUT operate 24 hours a day (seven days a week) throughout the year.

The National SAR Agency (BASARNAS) is responsible for the operation of the IDMCC/LUT.

5.3.16.2 SPOCs SUPPORTED

The IDMCC provides primary support to RCC Timor-Leste and thirty-four Indonesia RSCs and routes alert and notification (NOCR) messages to other countries and can receive these messages from them.

The communications interfaces used by the IDMCC:

FTP-VPN AFTN Facsimile Telephone HF radios on 13.545 MHz and 11.445 MHz

5.3.16.3 SYSTEM INFORMATION MESSAGES

The IDMCC originates and receives System information to / from the AUMCC.

5.3.16.4 BACKUP PROCEDURES AND AGREEMENTS

The LUTs in Indonesia, Singapore and Australia have overlapping local mode coverage to greater or less extent. It is therefore feasible for the Indonesia to be fully covered in the case of failure or planned maintenance downtime.

In the event the IDMCC becomes unserviceable, the SIMCC will provide backup support to the IDMCC. All the alerts for the IDMCC service area will be transmitted in SIT 185 format to a fax number nominated by the IDMCC or via AFTN.

5.3.16.5 OTHER INFORMATION

Beacon Registration

The IDMCC of the National SAR Agency (BASARNAS) maintains the database of all registered 406 MHz beacons (ELTs, EPIRBs, PLBs).

5.3.17 INMCC - INDIAN MISSION CONTROL CENTRE

Last updated: October 2010

5.3.17.1 INMCC GENERAL

The Indian Mission Control Centre is located at Bangalore and controls two national LEOLUTs at the following locations:

	Latitude	Longitude
Bangalore	13°02.09' N	077°30.70' E
Lucknow	26°54.80' N	080°57.44' E

These LEOLUTs can locate transmitters and distress beacons radiating in both local mode as well as global mode.

The local mode coverage of the Indian LEOLUTs includes the entire Indian sub-continent and the adjacent sea regions and islands.

The INMCC also controls one GEOLUT located in Bangalore.

The Indian MCC and LUTs operate 24 hours a day throughout the year.

The Indian Space Research Organization (ISRO) of the Department of Space, Government of India is responsible for the operation of the Indian MCC and LUTs.

5.3.17.2 SPOCs SUPPORTED

Bangladesh	Maldives	Sri Lanka
Bhutan	Nepal	Tanzania
India	Seychelles	

5.3.17.3 SYSTEM INFORMATION MESSAGES

The INMCC originates and receives the following System information:

Orbit vectors: receive from CMC;
SARP calibration: receive from CMC;
System status: originate to and receive from CMC.

5.3.17.4 BACKUP PROCEDURES

The Indian LEOLUTs at Bangalore and Lucknow have large local mode overlaps which are taken into account in planning satellite pass scheduling.

In the unlikely event of the INMCC failure, the INMCC has backup agreements with the CMC.

5.3.17.5 OTHER INFORMATION

Beacon Registration

There is a plan to maintain a register of national units equipped with beacons at the INMCC.

5.3.18 ITMCC - ITALIAN MISSION CONTROL CENTRE

Last updated: October 2014

5.3.18.1 ITMCC GENERAL

The Italian Mission Control Centre is located in Bari, at the Italian Coast Guard Naval Base, together with one LEOLUT and one GEOLUT.

The LEOLUT is equipped with an antenna which tracks all Cospas-Sarsat satellites passing over Bari, unless two satellites are in conflict. The LEOLUT is able to localise transmitters and distress beacons in local mode and global mode. Interferers in the 406.0 MHz to 406.1 MHz frequency band are localised in the local mode and forwarded to the Italian Telecommunication Authority for subsequent action through the ITU.

The Bari LEOLUT provides local mode coverage in South-East and Central part of Europe, the Mediterranean Sea, part of Middle-East Asia and part of Central and East Africa, from latitude 71o N to 11o N.

The ITMCC works 24 hours per day throughout the year. A dedicated team is responsible for validation of alert data and transmission to MCCs and SPOCs throughout the world, in accordance with document C/S A.001 and national procedures. ITMCC is equipped with a backup server which replaces the primary one in case of failure or scheduled downtime for maintenance. All the Cospas-Sarsat alert data are continuously replicated in the backup server, hence, in case of primary unexpected outage the MCC operator could switch on the backup server in a very short time.

Concerning communication links, the ITMCC uses FTP-VPN to exchange data with MCCs and when not available AFTN. To send Cospas-Sarsat alert data to SPOCs or RCCs the ITMCC uses AFTN and Fax. Telephone communications are also available with national and international SAR contacts.

5.3.18.2 SPOCs SUPPORTED

The Italian Mission Control Centre receives alert data from the Bari LEOLUT and GEOLUT and from other MCCs according to document C/S A.001. It provides alert data to the following countries:

AFRICA:		ASIA:	MIDDLE EAST:
Eritrea	Somalia	Israel	Palestine
Ethiopia	South Sudan		
Kenya	Sudan		

EUROPE:		
Albania	Italy	Serbia
Bosnia and Herzegovina	Malta	Slovenia
Croatia	Montenegro	The Former Yugoslav Rep. of Macedonia
Cyprus*	San Marino	Vatican City

Note: * Until IOC of Cyprus MCC (CYMCC).

5.3.18.3 SYSTEM INFORMATION MESSAGES

The following messages are received or originated at the Italian MCC:

System status:	originate and receive as required;
Narrative:	as required;
Orbit vectors:	receive via FMCC;
SARP calibration:	receive via FMCC.

5.3.18.4 BACKUP PROCEDURES AND AGREEMENTS

The Bari LEOLUT has overlapping local mode coverage areas with the following LEOLUTs in the Central Data Distribution Region: Combe Martin, Toulouse, Tromsoe, Penteli and Ankara. It is feasible for one to backup the other in case of failure or planned maintenance downtime.

LUT operators will forward written advance notice of routine maintenance deactivation of the LUT. The MCC will advise all others MCCs as soon as decision has been taken and confirm the times a minimum of two weeks before deactivation. In case of failure, the LUT operators will inform the MCC which will notice the downtime to other MCCs in CDDR using the appropriate SIT message.

In the case of complete failure or unavailability of the ITMCC, the FMCC will assume the duties of the ITMCC sending the SIT 605 to all MCCs notifying the ITMCC failure. The FMCC will send validated Cospas-Sarsat alert data within the ITMCC service area to designated RCCs or SPOCs.

ITMCC provides backup to GRMCC and TRMCC in case of their scheduled or not scheduled downtimes according to agreements established with these MCCs.

5.3.18.5 OTHER INFORMATION

Beacon Registration

The ITMCC provides registration of EPIRBs, ELTs and PLBs. The ITMCC maintains the beacon registry and provides information 24 hours per day throughout the year to SPOCs or RCCs.

5.3.19 JAMCC - JAPAN MISSION CONTROL CENTRE

Last updated: December 2015

5.3.19.1 JAMCC GENERAL

The Japan Mission Control Centre is located at the Japan Coast Guard Headquarters in Tokyo. The JAMCC controls one LEOLUT at Gunma at the following location:

Latitude	Longitude
36°25.56' N	138°57.30' E

The Japan LEOLUT can localise transmitters and distress beacons in local mode as well as global mode.

The local mode coverage of the Japan LEOLUT covers the area from Russia in the north to the western part of the Pacific and from China in the west to the central part of the Pacific.

The JAMCC and LUT operate 24 hours a day and send alert data to national RCCs within the JAMCC service area in accordance with document C/S A.001 and national procedures.

The JAMCC also assumes the nodal responsibilities for the Northwest Pacific DDR as defined at section 5.3 of this document.

The Japan Coast Guard (JCG) is responsible for the management and operation of the Japan Cospas-Sarsat ground segment.

5.3.19.2 SPOCs SUPPORTED

Japan

5.3.19.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at JAMCC:

Orbit vectors:	receive from CMC, USMCC and forward to CNMCC, HKMCC, KOMCC, TAMCC and VNMCC;
SARP calibration:	receive from FMCC and forward to CNMCC, HKMCC, KOMCC, TAMCC and VNMCC;
System status:	originate, receive and forward from / to AUMCC, CMC, FMCC, USMCC, CNMCC, HKMCC, KOMCC, SPMCC, TAMCC and VNMCC.

5.3.19.4 BACKUP PROCEDURE AND AGREEMENTS

In the event of a failure of the nodal JAMCC, the duty personnel will:

a) contact and advise the USMCC to assume JAMCC nodal responsibilities;

b) contact and advise the CNMCC, HKMCC, KOMCC, TAMCC and VNMCC to divert all their traffic to the USMCC and to expect System information direct from the USMCC;

c) request the USMCC to transmit JAMCC service area alerts in SIT 185 format. The JAMCC will attempt to pass them to its service area RCCs/SPOCs by manually geosorting them; and

d) advise the USMCC that JAMCC will pass alerts from Japanese LUTs in some form on a 'best effort' basis.

5.3.19.5 OTHER INFORMATION

Beacon Registration

A beacon registered on national units equipped with beacons is maintained at the JAMCC.

5.3.20 KOMCC - KOREA MISSION CONTROL CENTRE

Last updated: December 2016

5.3.20.1 KOMCC GENERAL

The Korea Mission Control Centre is located at the Korea Coast Guard Headquarters (KCG) in Sejong and controls one LEOLUT at the following Incheon location:

Latitude	Longitude
37°23.58' N	126° 38.94' E

The local mode of the Korea LEOLUT covers the area from the eastern part of Russia in the north to the Philippines and from the eastern part of China in the west to the western part of Pacific Ocean.

The LUT can locate transmitters and distress beacons in local mode as well as global mode.

The Korea MCC and LUT operate 24 hours a day throughout the year and send alert data to countries within the KOMCC service area in accordance with document C/S A.001 and national procedures.

The Korea Coast Guard is responsible for the operation of the KOMCC and LUT.

5.3.20.2 SPOCs SUPPORTED

Korea (Republic of)

5.3.20.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at KOMCC:

Orbit vectors: received from JAMCC;
SARP calibration: received from JAMCC;
System status: originated to and received from JAMCC.

5.3.20.4 BACKUP PROCEDURES AND AGREEMENTS

The LEOLUTs at Incheon and Gunma have overlapping local mode coverage areas. It is therefore feasible for one to backup the other in case of failure or planned maintenance downtime. Co-operation in the coverage of individual satellites passes may also be feasible in the future.

In the case of complete failure of the KOMCC, the JAMCC will assume the duties of the KOMCC. The following procedures apply:

a) Incheon LEOLUTs manually forward their alert data to the selected SPOCs/RCCs; and

b) the JAMCC provides alert data to the KOMCC via Fax for further distribution to SPOCs/RCCs by the KOMCC.

5.3.20.5 OTHER INFORMATION

Beacon Registration

A database of the Korean registered beacons is maintained at the KOMCC.

5.3.21 MYMCC – MALAYSIA MISSION CONTROL CENTER

(section under development) Last updated: February 2018

5.3.21.1 MYMCC GENERAL

The Malaysia Mission Control Centre is at the following address and location:
Malaysian Maritime Enforcement Agency / Maritime Academy Sultan Ahmad Shah / Prime Minister Department.
Sg. Ular, Gebeng,
26100 Kuantan
Malaysia

Latitude	Longitude
TBD	TBD

5.3.21.2 SPOCs SUPPORTED

Malaysia.

5.3.21.3 SYSTEM INFORMATION MESSAGES

To be determined

5.3.21.4 BACKUP PROCEDURE AND AGREEMENTS

To be determined

5.3.21.5 OTHER INFORMATION

A database of registered beacons is maintained by the Malaysia Maritime Enforcement Agency - MMEA.

5.3.22 NIMCC - NIGERIA MISSION CONTROL CENTRE

Last updated: February 2018

5.3.22.1 NIMCC GENERAL

Since 2016, the NIMCC has been out-of-service and configured as a SPMCC SPOC.

5.3.23 NMCC - NORWEGIAN MISSION CONTROL CENTRE

Last updated: October 2014

5.3.23.1 NMCC GENERAL

The Norwegian Mission Control Centre is a combination between the LEOLUT in Spitsbergen, a GEOLUT at Fauske and MCC in Bodoe. These form the NMCC with the Spitsbergen LEOLUT and the GEOLUT at Fauske as the technical bodies of the MCC, and MCC Bodoe as the operational body. The NMCC is integrated and co-located with JRCC Bodoe.

The LUTs are installed at the following locations:

	Latitude	Longitude
Spitsbergen LEOLUT	78° 13.74' N	015° 23.76' E
Fauske GEOLUT	67° 14.14' N	015° 17.87' E

The NMCC also provides global mode locations. The NMCC operates 24 hours per day, seven (7) days a week.

5.3.23.2 SPOCs SUPPORTED

The NMCC provides alert data to SPOCs in the NMCC service area including:

Denmark	Greenland	Norway
Estonia	Iceland	Sweden
Faroe Islands	Latvia	
Finland	Lithuania	

A summary of communication systems for these interfaces follows:

SPOCs in NMCC service area:	FTP	AFTN	Fax	Voice
FMCC:	FTP-VPN	AFTN	Fax	Voice
ITMCC:	FTP-VPN	AFTN	Fax	Voice
UKMCC:	FTP-VPN	AFTN	Fax	Voice
TRMCC:	FTP-VPN	AFTN	Fax	Voice
GRMCC:	FTP-VPN	AFTN	Fax	Voice
SPMCC (nodal backup):	FTP-VPN	AFTN	Fax	Voice

5.3.23.3 SYSTEM INFORMATION MESSAGES

NMCC originates and receives the following System information messages:

System status:	originate and receive, normally through FMCC;
Narrative:	for status messages;
SARP calibration:	via FMCC;
Orbit vectors:	via FMCC.

5.3.23.4 BACKUP PROCEDURES AND AGREEMENTS

The Spitsbergen LEOLUT has overlapping local mode coverage areas to a greater or lesser extent with the following LEOLUTs: Combe Martin and Toulouse. It is therefore feasible for one to back up the other in the case of failure or planned maintenance downtime.

In the case of complete failure of the NMCC, the UKMCC will assume the duties of the NMCC. UKMCC will send validated Cospas-Sarsat alert data, within the NMCC service area to designated SPOCs or RCCs.

In the case of complete failure of the UKMCC, the NMCC will assume the duties of the UKMCC. NMCC will send validated Cospas-Sarsat alert data, within the UKMCC service area to designated SPOCs or RCCs. In the UK SRRs this will be MRCC Falmouth.

5.3.23.5 OTHER INFORMATION

NMCC has access 24/7 to the Norwegian beacon registries (EPIRBs, ELTs and PLBs with country codes 257, 258 and 259).

The Ministry of Justice and Public Security is responsible for the administrative coordination of the Norwegian Rescue Service (http://www.regjeringen.no/en/dep/jd.html?id=463).

The NMCC is collocated with JRCC North-Norway.

5.3.24 PAMCC - PAKISTAN MISSION CONTROL CENTRE

Last updated: October 2010

5.3.24.1 PAMCC GENERAL

The Pakistan Mission Control Centre is located at the Space Research Centre (SPARCENT), SUPARCO Karachi and controls one Local User Terminal (LUT) and two Rescue Coordination Centres (RCCs) at Karachi:

Latitude	Longitude
24° 56.76' N	067° 08.16' E

The PALUT can locate distress beacons in local mode, as well as in global mode. In addition, the PALUT can process the repeater channel for interference monitoring.

The local mode-coverage of the PALUT includes countries from Saudi Arabia to China and the Commonwealth of Independent States (CIS) to Sri Lanka.

The PALUT and PAMCC are operating 24 hours a day throughout the year. The Pakistan Space and Upper Atmospheric Research Commission (SUPARCO) is responsible for the PALUT and PAMCC operations while RCC1 is operated by Pakistan Civil Aviation Authority (CAA) and RCC2 is operated by Pakistan Maritime Security Agency (MSA).

5.3.24.2 SPOCs SUPPORTED

Pakistan

5.3.24.3 SYSTEM INFORMATION MESSAGES

The PAMCC receives and originates System status information from / to the CMC.

5.3.24.4 BACKUP PROCEDURES AND AGREEMENTS

In the unlikely event of the PAMCC failure, the PAMCC has backup agreements with the CMC.

5.3.24.5 OTHER INFORMATION

A register of national units equipped with beacons will be maintained in the IBRD and locally at PAMCC.

5.3.25 PEMCC - PERUVIAN MISSION CONTROL CENTRE

Last updated: October 2013

5.3.25.1 PEMCC GENERAL

The Peruvian Mission Control Centre is located in Callao and controls two LUTs located at the following co-ordinates:

	Latitude	Longitude
LEOLUT	12° 01.84′ S	077° 07.79′ W
GEOLUT	12° 01.85′ S	077° 07.80′ W

The local mode coverage of the Peruvian LEOLUT covers the areas of Bolivia, Colombia, Costa Rica, Ecuador, French Guiana, Guatemala, Guyana, Panama, Paraguay, Surinam, Uruguay, Venezuela, and parts of Argentina, Brazil, and Chile, and extends 3,000 nm into the Pacific Ocean to the West.

The PEMCC and LUTs operate 24 hours a day throughout the year.

The General Direction of Captaincies and Coast Guard of the Peruvian Navy (DICAPI) is responsible for the PELUT, PEMCC and Peruvian RCCs operations.

5.3.25.2 SPOCs SUPPORTED

PEMCC provides primary support to the Peruvian RCCs.

5.3.25.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at PEMCC:

Orbit vectors: received from USMCC;
SARP calibration: received from USMCC;
System status: received and originated as required;
Narrative: received and originated as required.

5.3.25.4 BACKUP PROCEDURES AND AGREEMENTS

In the unlikely event of a PEMCC failure, Peru has a backup agreement with Argentina. In accordance with the following procedures, the ARMCC will assume the duties of the PEMCC:

a) The PEMCC notifies the ARMCC when the backup service is required by Phone or optionally by Email.

b) The ARMCC notifies the PEMCC when backup service commences by Phone, Fax or Email.

c) The ARMCC sends a SIT 605 message notifying all MCCs of the PEMCC failure and that the ARMCC is performing backup service according to section 3.7 of document C/S A.001.

d) The ARMCC transmits alerts for the Peruvian service area in SIT 185 format to PEMCC via Fax or Email;

e) Once the failure is overcome, the PEMCC sends a SIT 605 message notifying the ARMCC and all MCCs that the PEMCC has resumed normal operations.

f) The ARMCC will send all requested missing messages to the PEMCC.

5.3.25.5 OTHER INFORMATION

406 MHz EPIRBs have been approved for carriage on Peruvian vessels. A beacon register of Peruvian beacons is maintained at the PEMCC.

The PEMCC is responsible for the allocation of serial numbers for all serialized coded beacons and the maintenance of the Peruvian 406 MHz beacon database register and can be contacted at any time to obtain database information. Purchasers of 406 MHz beacons are required to follow the registration procedure provided in DICAPI's Unique Text of Administrative Procedures (TUPA): www.serviciosalciudadano.gob.pe/tramites/11794/3413.htm.

5.3.26 QAMCC - QATAR MISSION CONTROL CENTRE

(Effective after QAMCC IOC)

Last updated: February 2019

5.3.26.1 QAMCC GENERAL

The Qatar Mission Control Centre is located at Doha, Qatar. The QAMCC controls a LEOLUT and a GEOLUT at the same location as the QAMCC.

The LUTs are located at the following co-ordinates:

	Latitude	Longitude
LEOLUT	25° 30.00′ N	051° 27.24′ E
GEOLUT	25°29.94′ N	051° 27.25′ E

The QAMCC and LUTs operate 24 hours a day throughout the year.

Ministry of Defence through Doha Joint Rescue Coordination Centre (DJRCC) is responsible for management and operation of the Qatar Cospas–Sarsat ground segment.

5.3.26.2 SPOCs SUPPORTED

The QAMCC provides primary support to the Qatar JRCC and routes alert and notification (NOCR) messages to other countries and can receive these messages from them.

The communication interfaces used by QAMCC are as follows:

FTP-VPN and AFTN.

5.3.26.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at QAMCC:

Orbit vectors: receive from SPMCC;
SARP calibration: receive from SPMCC;
System status: originate to and receive from SPMCC;
Narrative: receive and originate as required.

5.3.26.4 BACKUP PROCEDURES AND AGREEMENTS

In case of complete failure of the QAMCC, the SPMCC will assume the duties of the QAMCC. The SPMCC will send validated Cospas-Sarsat alert data within the QAMCC service area to designated SPOCs. Operators will forward a written notice to their backup MCC of intention to perform maintenance routines requiring a backup at least 24 hours in advance.

As described in the SPMCC section, in the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. In that case, the QAMCC will change its configuration in order to consider the FMCC as its current nodal MCC until the backup situation is finished. When the backup is finished, the QAMCC will revert to its normal configuration in order to consider the SPMCC as its nodal MCC.

5.3.26.5 OTHER INFORMATION

Beacon Registration

All Qatar coded EPIRBs, ELTs and PLBs operating on 406 MHz shall have to be registered on the International Beacon Registration Database (IBRD).

5.3.27 SAMCC - SAUDI ARABIAN MISSION CONTROL CENTRE

Last updated: December 2016

5.3.27.1 SAMCC GENERAL

The Saudi Arabian Mission Control Centre is co-located with the RCC in Jeddah. The SAMCC controls two LEOLUTs with G-SARP. These two LUTs are located at:

Latitude	Longitude
21° 39.90' N	039° 08.76' E

These two LEOLUTs are known as SALUT1 (ID: 4031) and SALUT2 (ID: 4032) and provide local mode coverage of the whole Middle East region.

The Saudi MCC and LEOLUTs operate 24 hours a day throughout the year providing alert data through the co-located RCC.

The Saudi General Authority of Civil Aviation (GACA) is responsible for the management and operation of the Saudi Cospas-Sarsat ground segment.

5.3.27.2 SPOCs SUPPORTED

Bahrain	Lebanon	Saudi Arabia
Jordan	Oman	Syria
Kuwait	Qatar*	Yemen

Note: * Until IOC of Qatar MCC (QAMCC).

The communication interfaces used by the SAMCC are:

FTP-VPN AFTN

5.3.27.3 SYSTEM INFORMATION MESSAGES

The SAMCC originates and receives the following System information messages:

Orbit vectors: receive from SPMCC;
SARP calibration: receive from SPMCC;
System status: originate and receive from SPMCC.

5.3.27.4 BACKUP PROCEDURES AND AGREEMENTS

In the case of complete failure of the SAMCC, the SPMCC will assume the duties of the SAMCC. SPMCC will send validated Cospas-Sarsat alert data within the SAMCC service area to designated SPOCs.

In a backup situation, it is not guaranteed that messages sent to the Saudi Arabia primary AFTN address are received by the SAMCC/Jeddah RCC staff, for that reason a secondary AFTN address has been implemented to provide message service to the Jeddah RCC during backup.

Therefore, in case of any situation that SPMCC has to backup SAMCC, the SPMCC will send alerts within the Saudi Arabia MCC service area to the Jeddah RCC using the secondary AFTN

address, which was provided for that purpose. In case the AFTN link is unavailable, the SPMCC will use the Fax.

Operators will forward a written notice to their backup MCC of intention to perform maintenance routines requiring a backup at least 24 hours in advance.

As described in SPMCC section, in the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. In that case, the SAMCC will change its configuration in order to consider the FMCC as its current nodal MCC until the backup situation is finished. When the backup is finished, the SAMCC will revert to its normal configuration in order to consider the SPMCC as its nodal MCC.

5.3.27.5 OTHER INFORMATION

To be determined.

5.3.28 SIMCC - SINGAPORE MISSION CONTROL CENTRE

Last updated: October 2010

5.3.28.1 SIMCC GENERAL

The Singapore Mission Control Centre is located at the Singapore Air Traffic Control Centre, LORADS Complex, Biggin Hill at the following location:

Latitude	Longitude
01° 23.40' N	103° 59.10' E

Singapore's LEOLUT at Changi Airport Terminal 2 can locate transmitters and distress beacons in local mode as well as global mode.

The local mode coverage of Singapore LEOLUT is able to cover the ASEAN areas (Brunei, Indonesia, Malaysia, Singapore and South West of Philippines) as well as Cambodia, Laos, Myanmar and North West of Australia.

A second operator control console (OCC) serves as a backup MCC and is located at the LORADS Complex Rescue Co-ordination Centre (RCC). A third OCC is located at the Maritime and Port Authority of Singapore, Tanjong Pagar Complex.

The Singapore MCC and LEOLUT operate 24 hours a day throughout the year.

The Civil Aviation Authority of Singapore and the Maritime Authority of Singapore are responsible for the operation of the Singapore LEOLUT and MCC.

5.3.28.2 SPOCs SUPPORTED

The SIMCC can provide alert data to SPOCs in the SIMCC service area including:

Brunei	Myanmar
Malaysia	Singapore

The communication interfaces used by SIMCC are:

AUMCC:	FTP-VPN	AFTN	Voice
SPOCs:	AFTN	Voice	

5.3.28.3 SYSTEM INFORMATION MESSAGES

The SIMCC originates and receives the following System information messages:

Orbit vectors:	receive from AUMCC;
SARP calibration:	receive from AUMCC;
System status:	originate and receive from AUMCC.

5.3.28.4 BACKUP PROCEDURES AND AGREEMENTS

The LEOLUTs at Singapore, Australia, India and Hong Kong have overlapping local mode coverage areas to a greater or lesser extent. It is therefore feasible for the Singapore area to be fully covered in the case of failure or planned maintenance downtime.

In the event the SIMCC becomes unserviceable, the THMCC will provide backup support to the SIMCC. All the alerts for the SIMCC service area will be transmitted in SIT 185 format to a Fax number nominated by the SIMCC or via AFTN.

The SIMCC is a backup of the THMCC and IDMCC. Should the THMCC or IDMCC become unserviceable, messages will be passed via AFTN or Fax.

5.3.28.5 OTHER INFORMATION

Beacon Registration

A register of national ships equipped with beacons is maintained by the Maritime and Port Authority. Users of maritime EPIRBs installed on Singapore ships are required to register their EPIRBs with the Singapore Register, the Telecommunication Authority of Singapore (TAS), Radio Standard/Licensing Department.

A register of all aviation beacons is maintained by the Civil Aviation Authority of Singapore (CAAS). Users of aviation beacons carried on board Singapore registered aircraft are required to register their beacons with the CAAS. A register for both aviation and maritime beacons is available at the SIMCC.

5.3.29 SPMCC - SPANISH MISSION CONTROL CENTRE

Last updated: February 2018

5.3.29.1 SPMCC GENERAL

The Spanish Mission Control Centre is co-located with one LEOLUT in Instituto Nacional de Técnica Aeroespacial (INTA) at the Maspalomas Tracking Station in Gran Canaria, at the following location:

Latitude	Longitude
27°45.68' N	015°37.90' W

The LEOLUT is equipped with a dedicated antenna which makes possible tracking of all Cospas-Sarsat satellites passing over Canary Islands, unless satellites are in conflict.

The LEOLUT can localise transmitters and distress beacons in local mode and global mode. Interferers in the 406.0 MHz to 406.1 MHz band are localised in the local mode, and this information is provided to the Spanish Telecommunication Administration for action through ITU. The Maspalomas LEOLUT provides local mode coverage of North-Central Atlantic and North West Africa to latitude 0 degrees and operates 24 hours per day throughout the year.

The SPMCC also controls two GEOLUTs which are co-located with the LEOLUT.

Alert data are validated and transmitted to MCCs and SPOCs, in accordance with document C/S A.001 and national procedures.

The SPMCC also assumes the nodal responsibilities for the South Central DDR as defined at section 5.3 of this document.

5.3.29.2 SPOCs SUPPORTED

The Spanish Mission Control Centre receives alert data from the Maspalomas LEOLUT and GEOLUTs and from other Cospas-Sarsat MCCs in accordance with document C/S A.001. It provides Cospas-Sarsat alert data to the following countries:

Benin	Gabon	Mauritania
Cameroon	Gambia	Nigeria
Cape Verde	Ghana	Sao Tome and Principe
Central African Republic	Guinea	Senegal
Congo	Guinea-Bissau	Sierra Leone
Côte d'Ivoire	Liberia	Spain
Equatorial Guinea	Mali	Togo

The communication interfaces used by the SPMCC are:

AEMCC:	FTP-VPN	AFTN
ALMCC:	FTP-VPN	AFTN
AUMCC:	FTP-VPN	AFTN
CMC:	FTP-VPN	AFTN
FMCC:	FTP-VPN	AFTN
JAMCC:	FTP-VPN	AFTN
SAMCC:	FTP-VPN	AFTN
USMCC:	FTP-VPN	AFTN

5.3.29.3 SYSTEM INFORMATION MESSAGES

The following System information is received / originated at SPMCC:

Orbit vectors:	receive from CMC and USMCC and forward to AEMCC, ALMCC and SAMCC;
SARP calibration:	receive from FMCC and forward to AEMCC, ALMCC and SAMCC;
System status:	originate, receive from and forward to AEMCC, ALMCC, AUMCC, CMC, FMCC, JAMCC, NIMCC, SAMCC and USMCC.

5.3.29.4 BACKUP PROCEDURE AND AGREEMENTS

The Maspalomas LEOLUT has overlapping local mode coverage areas with the following LEOLUTs: Bari, Combe Martin, Maspalomas, Ouargla and Toulouse. It is feasible for one to backup the other in case of failure or planned maintenance downtime. Co-operation in the coverage of individual satellite passes may also be feasible in the future.

The LUT operators will forward written advance notice of routine maintenance deactivation of a LUT. The MCC will advise all others MCCs as soon as decision has been taken and confirm the times a minimum of two weeks before deactivation. In case of failure, the LUT operators will inform the associated MCC in the quickest possible way followed by a written confirmation when an estimate of the duration of the downtime is available. The MCC will inform immediately the MCCs in South Central DDR and the nodal MCCs.

In the case of a complete failure of the SPMCC, the FMCC will assume the duties of the SPMCC. FMCC will send validated Cospas-Sarsat alert data within the SPMCC service area and within other areas to designated SPOCs or RCCs. In the Spanish SRR this will be RCC Madrid and CNCS (MRCC). It was agreed to periodically exchange test messages between FMCC and the Spanish RCCs (RCC Madrid and CNCS) to check the communication links. All validated Cospas-Sarsat alert data within the South Central DDR service area will be directly transmitted to the destination MCC.

In the case that SPMCC has to assume the backup duties for FMCC, SPMCC will be able to process and relay the alert messages originally created for FMCC, that is to say, with MF #5 set to 2270.

In the case that SPMCC has to assume the backup duties for the FMCC, the Return Link Service (RLS) shall be interrupted during the backup period until such time as the Galileo programme decides to establish an operational redundant connection between the SPMCC and the Return Link Service Provider (RLSP).

In the case of complete failure of the AEMCC, the SPMCC will assume the duties of the AEMCC. The SPMCC will send validated Cospas-Sarsat alert data within the AEMCC service area to Abu Dhabi SAR Coordination Center for further distribution to AEMCC designated SPOCs.

In the case of a complete failure of the ALMCC, the SPMCC will assume the duties of the ALMCC. The SPMCC will send validated Cospas-Sarsat alert data within the ALMCC service area to designated SPOCs. In the Algerian SRR this will be Algiers RCC (this AFTN address is DAALZSZX).

In case of complete failure of the QAMCC, the SPMCC will assume the duties of the QAMCC. The SPMCC will send validated Cospas-Sarsat alert data within the QAMCC service area to designated SPOCs. Operators will forward a written notice to their backup MCC of intention to perform maintenance routines requiring a backup at least 24 hours in advance.

In the case of a complete failure of the SAMCC, the SPMCC will assume the duties of the SAMCC. The SPMCC will send validated Cospas-Sarsat alert data within the SAMCC service area to designated SPOCs.

The SPMCC has the capability to re-route messages to another MCC. However, although this capability is available, there is no agreement with any other MCC to use this message re-routing.

5.3.29.5 OTHER INFORMATION

Beacon Registration

A database of the Spanish register for maritime Cospas-Sarsat beacons is maintained by the General Directorate of Merchant Navy, and another database of the Spanish register for aviation Cospas-Sarsat beacons is maintained by the General Directorate of Civil Aviation, with a copy of both databases at the SPMCC.

5.3.30 TAMCC - ITDC / TAIPEI MISSION CONTROL CENTRE

Last updated: February 2019

5.3.30.1 TAMCC GENERAL

The ITDC / Taipei Mission Control Centre is located in the building of Maritime and Port Bureau (MPB), MOTC. in Taipei city. Two LEOSAR Local User Terminals (dual LEOLUT system) are located at Keelung Coast Radio Station with the following co-ordinates:

Latitude	Longitude
25° 08.10' N	121° 45.42' E

Both LEOLUTs can localise transmitters and distress beacons in local mode and global mode.

The local mode coverage of the ITDC LEOLUTs includes the area from Eastern part of the Indian Ocean to Western part of the Pacific Ocean.

The TAMCC and LEOLUTs operate 24 hours a day throughout the year.

The Civil Aeronautics Administration and the Maritime Department of the Ministry of Transport and Communications are responsible for the operation of the TAMCC and LEOLUTs.

5.3.30.2 SPOCs SUPPORTED

The TAMCC provides primary support to Chinese Taipei RCCs.

The communication interfaces used by TAMCC are:

FTP-VPN AFTN Voice Facsimile

5.3.30.3 SYSTEM INFORMATION MESSAGES

The TAMCC originates and receives the following System information messages:

Orbit vectors: receive from JAMCC;
SARP calibration: receive from JAMCC;
System status: originate to and receive from JAMCC.

5.3.30.4 BACKUP PROCEDURES AND AGREEMENTS

The TAMCC established a mutual backup procedure with the HKMCC for system outage on either side.

ITDC LEOLUTs have overlapping local mode coverage areas to a greater or lesser extent with the following LEOLUTs: Guam, Hong Kong, Cengkareng, Nakhodka, Singapore, Incheon and Gunma. It is therefore feasible for the Chinese Taipei area to be fully covered in the case of failure or planned maintenance downtime.

5.3.30.5 OTHER INFORMATION

Beacon Registration

A register of national ships equipped with beacons is maintained by the Directorate General of Telecommunications (DGT). Users of maritime EPIRBs installed on Chinese Taipei ships are

required to register their EPIRBs with the Directorate General of Telecommunications (DGT), Radio Standard/Licensing Department.

5.3.31 THMCC - THAILAND MISSION CONTROL CENTRE

Last updated: October 2010

5.3.31.1 THMCC GENERAL

The Thailand Mission Control Centre (THMCC) is located at the Department of Aviation in Bangkok. The THMCC controls two LEOLUTs.

The Thai LEOLUTs provide full capability processing, including G-SARP processing of the transponded SARR data and combined LEO/GEO processing, according to the relevant Cospas-Sarsat specifications. The local coverage area of the Thai LEOLUTs includes the Bay of Bengal, parts of the Indian Ocean, and the South China Sea, as well as the land area of South Asia, including all of Thailand and the Malaysian Peninsula.

The entire Thai Ground Segment is designed for 24 hours, seven days a week, operations.

5.3.31.2 SPOCs SUPPORTED

In its initial operational configuration, the Thai MCC will support the RCCs in Thailand.

5.3.31.3 SYSTEM INFORMATION MESSAGES

The THMCC will receive and process the following System information messages:

Orbit Vectors
SARP Calibration Data
SARR Calibration data
System Status
Narrative
The THMCC is capable of originating the following system information messages:
System Status
Narrative
These messages will normally be received from, or sent to, the designated nodal MCC.

5.3.31.4 BACKUP PROCEDURES AND AGREEMENTS

In the event the THMCC becomes unserviceable, the SIMCC will provide backup support to the THMCC. All alerts for the THMCC service area will be transmitted in SIT 185 format and to a Fax number nominated by THMCC or via AFTN. The THMCC will ensure distribution to the RCCs and SPOCs it supports.

The local coverage area of the Thai LEOLUTs overlaps with the coverage area of LEOLUTs operated by Hong Kong, China, India, Indonesia, Singapore, and ITDC. In the fringe coverage areas, there is also some overlap with LUTs operated by China (P. R. of), Japan, Korea, Pakistan, and the USA (Guam).

5.3.31.5 OTHER INFORMATION

None.

5.3.32 TRMCC - TURKEY MISSION CONTROL CENTRE

Last updated: December 2016

5.3.32.1 TRMCC GENERAL

The Turkey Mission Control Centre is located at the Main SAR Coordination Centre (MSRCC) building (G.M.K. Bulvari No: 128/A, 06570 Maltepe, Ankara). Two LEOLUTs and one GEOLUT are installed at the Ankara Esenboga Airport.

LUTs are located at the following co-ordinates:

	Latitude	Longitude
LEOLUT (1)	40° 08.45' N	032° 59.38' E
LEOLUT (2)	40° 08.44' N	032° 59.38' E
GEOLUT	40° 08.42' N	032° 59.40' E

Turkey LEOLUTs can localise transmitters and distress beacons in local mode and global mode.

The TRMCC and LEOLUTs operate 24 hours a day throughout the year.

The communication interfaces used by TRMCC are as follows:

AFTN FTP-VPN Facsimile Voice

5.3.32.2 SPOCs SUPPORTED

The TRMCC provides primary support to the Turkey RCCs and routes alert and notification (NOCR) messages to other countries and can receive these messages from them. The TRMCC distributes alert data for the following SPOCs: Afghanistan, Georgia*, Iran, Iraq, and Ukraine*.

Note: * There is an overlap with the CMC service area.

5.3.32.3 SYSTEM INFORMATION MESSAGES

The TRMCC originates and receives the following System information messages:

Orbit vectors: receive from FMCC;

SARP calibration: receive from FMCC;

System status: originate to and receive from FMCC;

Narrative: received and originated as required.

5.3.32.4 BACKUP PROCEDURES AND AGREEMENTS

TRMCC operates two Operational Control Consoles (OCC), one of them being a backup. In the event of failure of both TRMCC OCCs, Turkey has backup agreements and procedures in place with Italy. The following procedures have been agreed to:

a) Whenever the backup service is required, TRMCC notifies ITMCC by means of Fax, Telephone or Email;

b) ITMCC notifies TRMCC when the backup service commences by Fax, Telephone or Email;

c) ITMCC sends a SIT 605 message notifying the other MCCs of the TRMCC failure, and that ITMCC is performing backup service according to section 3.7, document C/S A.001;

d) TRMCC advises the Turkish RCCs and SPOCs about the TRMCC failure and the backup procedures;

e) ITMCC transmits alerts for the Turkish service area in SIT 185 format to:

- TRMCC using the Turkish MSRCC Fax, and
- TRMCC SPOCs using SPOCs communication links mentioned in item (l) below;

f) In the event that ITMCC is unable to communicate with TRMCC and/or TRMCC SPOCs as described above, ITMCC shall transmit alerts for the Turkish service area in SIT 185 format to MSRCC/Ankara via Inmarsat-C Telex or Fax. In this case, ITMCC will advise MSRCC/Ankara of their inability to communicate with TRMCC and/or the TRMCC SPOCs. Other Turkish RCCs and SPOCs as well as TRMCC will be advised by MSRCC/Ankara;

g) TRMCC will notify ITMCC as soon as the problem is solved, and will advise the time when TRMCC plans to restore normal operations;

h) When TRMCC returns to normal operations it will send a SIT 605 message notifying ITMCC and other MCCs that TRMCC has resumed normal operations. TRMCC will also notify its RCCs and SPOCs that it has resumed normal operations;

i) ITMCC will send all requested missing messages to TRMCC;

j) ITMCC shall contact TRMCC using the contact lists available at www.cospas-sarsat.int;

k) ITMCC shall contact MSRCC/Ankara using the contact lists available at www.cospas-sarsat.int;

l) ITMCC shall contact the TRMCC SPOCs using the contact lists available at www.cospas-sarsat.int for:

Iran (Tehran RCC):

- Iraq & Afghanistan (Qatar JPRC),
- Georgia,
- Ukraine;

m) TRMCC shall contact ITMCC using the contact lists available at www.cospas-sarsat.int.

5.3.32.5 OTHER INFORMATION

A register of beacons is maintained at the TRMCC.

5.3.33 UKMCC - UNITED KINGDOM MISSION CONTROL CENTRE

Last updated: February 2019

5.3.33.1 UKMCC GENERAL

The United Kingdom Mission Control Centre is located at Fareham, Hampshire, England. The hardware equipment is located at Kinloss, in NE Scotland and controls one LEOLUT and one GEOLUT located at Combe Martin, in SW England. The UKMCC has a hot backup MCC in a separate building, also located at Kinloss. The UKMCC is manned 24 hours per day throughout the year, including public holidays.

The UKMCC contact details can be obtained using the contact lists available at www.cospas-sarsat.int.

The UK LEOLUT operates in the global mode and provides local mode coverage of Europe, the Eastern half of the North Atlantic Ocean and part of Southern Scandinavia. Alert data from the UK LEOLUT and GEOLUT is transmitted to the UKMCC via two 64 kb Kilostream lines, one line feeding the Primary MCC and the other, the backup MCC. The UKMCC uses AFTN, FTP-VPN, Fax, point-to-point data-link and voice Telephone to distribute data to MCCs and RCCs.

5.3.33.2 SPOCs SUPPORTED

The UKMCC provides alert data to the United Kingdom's MRCCs and Police Forces, and to the Republic of Ireland's MRCC Dublin.

The UKMCC also provides alert and Notification of Beacon Registration (NOCR) messages to MCCs within the Central Data Distribution Region. Alert messages for areas outside the Central DDR are routed to the FMCC. NOCR messages are routed in accordance with Table 4-1 of document C/S A.001.

The communications interfaces used by UKMCC are:

UK MRCCs:	Fax	Voice	
Irish MRCC:	AFTN	Fax	Voice
UK Police:	Fax	E-mail (see note)	Voice

Note: All distress-alert transmissions to SPOCs, over whichever data medium, are accompanied by a telephone call.

5.3.33.3 SYSTEM INFORMATION MESSAGES

The following System information messages are received / originated at UKMCC:

Orbit vectors:	received from FMCC;
SARP calibration:	received from FMCC;
System status:	received and originated as required;
Narrative:	received and originated as required;
406 MHz SARR frequency calibration:	receive from CMCC.

5.3.33.4 BACKUP PROCEDURES AND AGREEMENTS

The Combe Martin LEOLUT has overlapping local mode coverage areas to a greater or lesser extent with the following LEOLUTs: Bari, Maspalomas, Ouargla, Spitsbergen, Tromsoe and Toulouse. It is therefore feasible for one to back up the other in the case of failure or planned maintenance downtime.

Co-operation in the coverage of individual satellites passes may also be feasible, but requires further study.

LEOLUT operators will forward a written notice of intention to perform maintenance routines involving deactivation of LEOLUT well in advance. The MCC will inform all other MCCs as soon as a decision has been taken, and confirm the times a minimum of two weeks prior to deactivation.

The LEOLUT operator will inform the associated MCC by the quickest possible means, followed by a written confirmation when an estimate of the duration of the downtime is available. The MCC will immediately inform the other MCCs.

The UKMCC has a backup facility also located at Kinloss but, in the case of complete failure of the UKMCC, the NMCC will assume the duties of the UKMCC. The NMCC will send validated Cospas-Sarsat alert data, within the UKMCC service area to designated SPOCs or RCCs. In the UK SRRs this will be MRCC Falmouth, and for Eire this will be MRCC Dublin.

The UKMCC provides backup facilities for the NMCC.

5.3.33.5 OTHER INFORMATION

An ELT register of UK serial-coded beacons is maintained at UKMCC.

A register of UK EPIRB beacons is maintained at MRCC Falmouth.

5.3.34 USMCC - UNITED STATES MISSION CONTROL CENTRE

Last updated: February 2018

5.3.34.1 USMCC GENERAL

The United States Mission Control Centre is located at the National Oceanic and Atmospheric Administration, Suitland, Maryland. The USMCC controls dual operational LEOLUTs at the following locations:

Fairbanks, Alaska
Wahiawa, Hawaii
Andersen AFB, Guam
Miami, Florida.

The LEOLUTs provide coverage of the U.S. SRRs from mid Atlantic to the western-Pacific, and from the North Pole south to approximately 15 degrees south.

The USMCC controls a LEOLUT at Suitland, MD known as the LEOSAR Support Equipment or LSE. The LSE is used for LEOLUT system development and testing. When not being used for development and testing, the LSE is used operationally.

The USMCC controls two operational GEOLUTs (MD1 and MD2) which are located in Suitland, MD. A third GEOLUT, the GEOSAR Support Equipment (GSE), is used for GEOLUT system development and testing but can also be used operationally, when available.

The USMCC also controls two operational MEOLUTs with six antennas each, located in Wahiawa, Hawaii and Miami Florida. These MEOLUTs normally operate in networked mode.

The USMCC uses a dedicated Private Internet Protocol (PIP) network for communications with its LUTs and the majority of its RCCs. AFTN and FTP-VPN are used for communication with other MCCs. AFTN, FTP-VPN and Fax are used for communication with the USMCC SPOCs.

The USMCC also assumes the nodal responsibilities for the Western DDR as defined at section 5.3 of this document.

The National Oceanic and Atmospheric Administration is the lead agency in the United States for the Cospas-Sarsat Programme.

5.3.34.2 SPOCs SUPPORTED

In support of the United States National Search and Rescue Plan, the USMCC provides alert and NOCR messages to U.S. Coast Guard and Air Force Rescue Co-ordination Centres. The USMCC distributes alert and NOCR messages to the following SPOCs:

CARIBBEAN:

Bahamas	(1)	Curacao		Jamaica	(1)
Barbados	(3)	Dominican Republic		Mexico	
Belize	(2)	El Salvador	(2)	Nicaragua	(2)
British Virgin Islands	(3)	Grenada	(3)	Panama	
Cayman Islands	(1)	Guatemala	(2)	St. Vincent and the Grenadines	(3)

Costa Rica	(2)	Haiti	(1)	Trinidad and Tobago	(3)
Cuba	(1)	Honduras	(2)	Turks and Caicos Island	(1)

(1) Alert messages for this SPOC are distributed to the USCG District 7 RCC.
(2) Alert messages for this SPOC are distributed to COCESNA (Corporación Centroamericana de Servicios de Navegación Aérea or Central American Corporation for Air Navigation Services).
(3) Alert messages for this SPOC are distributed to USCG Sector San Juan RCC.

SOUTH AMERICA:

Colombia	Guyana
Ecuador	Venezuela

ATLANTIC:

Bermuda

PACIFIC:

Marshall Islands	Northern Mariana Islands
Micronesia	Palau

Alert messages for all Pacific SPOCs are distributed to USCG District 14 MARSEC RCC.

5.3.34.3 SYSTEM INFORMATION MESSAGES

The USMCC processes the following System information messages:

SARR command verification:	originates to the CMCC;
SARP command verification:	originates to the FMCC;
SARR command:	receives from the CMCC;
SARP command:	receives from the FMCC;
System status:	originates, receives and sends;
Narrative:	originates, receives and sends;
Orbit vectors:	originates, receives, validates and sends;
SARP calibration:	receives, validates and sends;
406 MHz SARR frequency calibration:	receives, validates and sends.

5.3.34.4 BACKUP PROCEDURES AND AGREEMENTS

In the unlikely event of a USMCC failure, the USA has backup agreements and procedures in place with Australia and Canada. Australia provides backup for nodal MCC responsibilities and Canada and Australia together provide backup for other MCC alert data intended for U.S. RCCs and SPOCs. Accordingly, the USMCC has designated separate communications paths and procedures for RCCs and SPOCs. The USA has also installed an alternate system at a site in Wallops, VA. The backup procedures will be used during the period of time required to transition from the USMCC in Suitland, MD to the alternate site in Wallops, VA or if the USMCC in Suitland and the alternate site in Wallops experience a simultaneous outage such as may occur during a regional power outage.

The USMCC has provided Australia and Canada with Geosort data for its national RCCs and SPOCs. In the event of a USMCC outage that lasts or is expected to last more than 30 minutes, but less than one (1) hour, the CMCC will support the USMCC by sending alert data directly to the U.S. RCCs.

In the event of a USMCC outage that lasts or is expected to last more than one (1) hour, the AUMCC will assume nodal responsibilities for the Western DDR, and send alerts for the U.S. service area to the CMCC.

The USMCC does not have the capability to reroute or redirect traffic to another MCC.

5.3.34.5 OTHER INFORMATION

406 MHz EPIRBs / ELTs have been approved for carriage on U.S. vessels and aircraft and PLBs are authorized for personal use in the U.S. A beacon register for USA beacons is maintained at the USMCC.

5.3.35 VNMCC - VIETNAM MISSION CONTROL CENTRE

Last updated: December 2016

5.3.35.1 VNMCC GENERAL

The Vietnam Mission Control Centre is located at the Vietnam Maritime Communication and Electronics Company in Haiphong. The VNMCC controls one LEOLUT.

The Vietnam LEOLUT provides full processing, including G-SARP processing of the transponded SARR data, according to the relevant Cospas-Sarsat specifications. The local coverage area of the Vietnam LEOLUT includes the Bay of Bengal, parts of the Indian Ocean, and the South China Sea, as well as the land area of South Asia, including all of Vietnam.

The entire Vietnam ground segment is designed for 24 hours, seven days a week, operations.

5.3.35.2 SPOCs SUPPORTED:

Cambodia Vietnam
Laos

The communication interfaces used by the VNMCC are:

FTP-VPN AFTN Facsimile Voice

5.3.35.3 SYSTEM INFORMATION MESSAGES

The VNMCC receives and processes the following System information messages:

Orbit vectors: receive from JAMCC;
SARP calibration data: receive from JAMCC;
System status: originating to and receive from JAMCC.

The VNMCC is capable of originating the following System information messages:

System Status
Narrative

These messages are normally received from, or sent to JAMCC.

5.3.35.4 BACKUP PROCEDURES AND AGREEMENTS

In the event the VNMCC cannot provide its service, the HKMCC will provide backup to the VNMCC. All alerts in the VNMCC service area will be sent in SIT 185 format to designated RCCs/SPOCs via FTP-VPN, AFTN or Fax.

The local coverage area of the Vietnam LEOLUT overlaps with the LEOLUTs operated by Hong Kong, India, Indonesia, ITDC, Singapore, and Thailand. In the fringe coverage areas, there is also some overlap with LUTs operated by China, Japan, Korea, Pakistan, and the United States (Guam).

5.3.35.5 OTHER INFORMATION

None.

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