
**COSPAS-SARSAT
MISSION CONTROL CENTRE
COMMISSIONING STANDARD**

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COSPAS-SARSAT
MISSION CONTROL CENTRE
COMMISSIONING STANDARD

History

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1. INTRODUCTION

1.1 Purpose

This document shall be used to verify that a new Mission Control Centre (MCC) or a new nodal MCC complies with the provisions of document C/S A.005 "Cospas-Sarsat Mission Control Centre Performance Specification and Design Guidelines". Participants connecting their MCC to the Cospas-Sarsat System or assuming the responsibility of a new nodal MCC in the Cospas-Sarsat System shall conduct tests and provide data as specified in this document.

1.2 Scope

The commissioning process outlined in this document is required to ensure that new MCCs and new nodal MCCs provide for reliable, timely and accurate exchange of alert data and System information within the Cospas-Sarsat Ground Segment.

The commissioning process includes preliminary actions to be performed by the responsible Ground Segment Operators, co-ordination required with other Ground Segment Operators involved in the commissioning tests, practical steps to be accomplished for implementing the commissioning tests, and the formal procedure leading to Council approval of the commissioning of the new MCC or the new nodal MCC in the Cospas-Sarsat System.

1.3 Reference Documents

- a. C/S A.001 "Cospas-Sarsat Data Distribution Plan"
- b. C/S A.002 "Cospas-Sarsat Mission Control Centres Standard Interface Description"
- c. C/S A.005 "Cospas-Sarsat Mission Control Centre Performance Specification and Design Guidelines"
- d. C/S T.002 "Cospas-Sarsat LEOLUT Performance Specification and Design Guidelines"
- e. C/S T.005 "Cospas-Sarsat LEOLUT Commissioning Standard"
- f. C/S T.009 "Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines"
- g. C/S T.010 "Cospas-Sarsat GEOLUT Commissioning Standard"
- h. C/S P.011 "Cospas-Sarsat Programme Management Policy"

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2. INTEGRATION OF NEW MCCS IN THE COSPAS-SARSAT SYSTEM

2.1 Pre-Integration Test

2.1.1 General

Prior to formal integration testing, the new MCC under development (DMCC) shall provide the Cospas-Sarsat Secretariat with information about its new LUT(s), proposed service area and all other information needed to amend the Annexes of document C/S A.001 (DDP). Upon completion of these steps the Cospas-Sarsat Joint Committee will designate a nodal MCC as the host MCC to which the DMCC will be connected. Bilateral arrangements between the DMCC and the host MCC needed to support integration testing are the responsibility of the respective Administrations. Any equipment needed for the commissioning test shall normally be provided by the DMCC.

Local User Terminal (LUT) commissioning, defined in documents C/S T.005 and C/S T.010, may take place at the same time that the MCC is being commissioned. If so, it is desirable that operational data exchange be scheduled after responsible Administrations have conducted preliminary tests to verify that their LUT(s) comply with the provisions of documents C/S T.002 and C/S T.009.

2.1.2 Preliminary Actions

Prior to undergoing commissioning, preliminary actions regarding participation in Cospas-Sarsat shall have been undertaken in accordance with the "Guidelines for Integration of New MCCs in the Cospas-Sarsat System" attached at Annex B to this document. The MCC under development (DMCC) shall have completed those actions specified in Steps A and B of the Guidelines at Annex B.

In preparation for formal commissioning, the DMCC shall ensure that:

- a. its LUT/MCC interface(s) function satisfactorily and that the LUT is able to provide the data needed to support message exchanges with the DMCC;
- b. it is capable of receiving and generating messages in accordance with the applicable requirements of document C/S A.005, and formatted in accordance with the provisions of document C/S A.002 (SID);
- c. it has conducted preliminary communications checks with the host MCC, using SIT 915 narrative messages and determined that the selected communications circuits are suitable for operational testing in accordance with the applicable requirements of document C/S A.005;

- d. it is capable of suppressing unwanted data in accordance with the applicable requirements of document C/S A.005; and
- e. it is capable of providing message traceability, national Ground Segment monitoring and information retrieval in accordance with the applicable requirements of document C/S A.005.

The foregoing preliminary actions are the responsibility of the DMCC. When they have been completed, the DMCC shall complete the standard declaration form at Annex H to this document and inform the host MCC accordingly and advise that it is ready for further testing.

2.1.3 Pre-Integration Test

The host MCC, when satisfied with the progress reported by the DMCC, will schedule a pre-integration test with the DMCC. The pre-integration test may include validation of SIT message formats, alert processing, operator capabilities and Geosort. The pre-integration test can be undertaken continuously or be interrupted to resolve any problems encountered.

To ensure the success of the formal integration test, it would be prudent to conduct the pre-integration test over a period of up to a week and resolve all noted deficiencies prior to the integration test. Results from the pre-integration test should not be treated as part of MCC commissioning integration test and should not be included in the MCC commissioning report.

2.2 Integration Test

2.2.1 General

The integration test involves the exchange of alert data to and from the DMCC in accordance with document C/S A.001.

Alert data referred to above, include all real-life alerts occurring during the integration test period and a series of pre-formatted messages generated by the host MCC to check C/S A.005 requirements. In addition, test-coded 406 MHz beacons should be deployed to supplement real-life beacon activations.

The integration test should last a minimum of 24 hours, but should not exceed 7 days.

2.2.2 Test Preparation

The DMCC should give as much advance notice as possible to the host MCC. The host MCC shall:

- a. notify all operational MCCs of the test period;

- b. co-ordinate 406 MHz beacon codes to be used for the test, and the individual beacon on/off times and locations (beacon locations shall be provided to the nearest 0.1 km);
- c. provide operational MCCs with predicted times for the 406 MHz test beacon detections; and
- d. ensure that a test plan has been developed that satisfies the test requirements of section 2.2.3.

2.2.3 Test Requirements

During the integration test, the message routings and formats defined in documents C/S A.001 (DDP) and C/S A.002 (SID) shall be used. The basic functions of the DMCC that shall be tested include the capability to:

- a. receive, process and forward alert data and System information in accordance with document C/S A.001 (DDP);
- b. selectively report or suppress transmission of alert data for a particular beacon when requested;
- c. re-transmit a specified message;
- d. respond to direct requests for information from other MCCs or SPOCs;
- e. retrieve information on request;
- f. generate a "notification of country of beacon registration" (NOCR) message;
- g. use all identified communication links;
- h. switch to back-up procedures identified by the DMCC in Annex II / C of document C/S A.001;
- i. process unlocated 406 MHz alerts;
- j. process ship security alerts; and
- k. process and forward alert data to SPOCs that the DMCC will service after FOC.

During the test, if any serious problems are noted either by the DMCC or other operational MCCs, the host MCC shall be immediately notified. The host MCC will assess the information provided and decide whether the test should continue, be delayed, or be re-scheduled at a later date. The decision will depend upon the impact of the problem on normal operations and the time needed for its correction.

2.3 Data Collection and Analysis

2.3.1 General

In order to facilitate data collection and analysis, key operational data should be collected and provided in the standard format defined at Annex B to this document. Each participating MCC shall retain copies of all incoming and outgoing messages exchanged with the DMCC during the test period. The DMCC shall also retain copies of all messages exchanged with other operational MCCs.

2.3.2 DMCC Data Collection

The DMCC shall provide the following data to the host MCC:

- a. a summary of LUT data (LUT Summary);
- b. a detailed summary of alert data exchanged (Alert Data Summary) including alerts forwarded to SPOCs if applicable;
- c. a summary of non-alert messages (Non-Alert Messages Summary); and
- d. a summary report on the status of its Ground Segment equipment (Ground Segment Status Summary).

Other operational MCCs shall provide the host MCC with a summary report of their own results, as necessary, noting only deficiencies which may warrant further examination.

2.3.2.1 LUT Summary

This report shall contain the following information:

- a. a list of all satellite passes tracked by the DMCC's associated LUT(s);
- b. AOS, LOS and LUT processing complete times for the above satellite passes;
- c. the number of Doppler locations produced for each pass that was tracked;
- d. the number of no Doppler location (unlocated) alerts for each pass; and
- e. the time that the MCC completed processing each pass.

2.3.2.2 Alert Data Summary

For each test and operational beacon detected during the test, the following data shall be provided:

- a. source of alert data (LUT or MCC);
- b. time received and message number if applicable;
- c. spacecraft identification;
- d. beacon identification;

- e. TCA, local/global mode;
- f. beacon Doppler location (latitude/longitude, A and B);
- g. encoded position data, if available
- h. service areas for above locations;
- i. processing disposition (e.g., suppressed);
- j. output destination and SIT;
- k. output message number; and
- l. time transmitted.

2.3.2.3 Non-Alert Messages Summary

A summary of all messages exchanged that do not contain alert data shall be provided as follows:

- a. message SIT (including non-SIT);
- b. message number/numbers if retransmission;
- c. originator;
- d. destination;
- e. time transmitted; and
- f. time received (if incoming).

2.3.2.4 Ground Segment Status Summary

This is a general report prepared by the DMCC giving the status of its Ground Segment equipment during the test and any unusual problems that might have affected its performance, together with an assessment of its readiness to continue 24 hours per day operations.

2.3.3 Performance Specifications not Part of the Integration Test

The DMCC shall, in connection with the operational test, declare that it is capable of performing the responsibilities listed in document C/S A.005 that are not part of the operational test. The declaration shall be sent to the host MCC which shall compare it to the operational test results as applicable. Any follow up questions from the host MCC shall be answered by the DMCC. The host MCC shall include the DMCC declaration together with its own comments, in its report on the commissioning test.

2.3.4 Analysis

The host MCC, upon receipt of the above data, will examine it to determine whether the DMCC meets the commissioning criteria as outlined in documents C/S A.001 and C/S A.005. This analysis will involve the DMCC and other MCCs, as necessary. If deficiencies are noted, the DMCC shall correct these deficiencies and notify the host MCC when it is ready to repeat the relevant portion of the integration test.

2.3.5 MCC Commissioning Report

The DMCC shall prepare the preliminary MCC Commissioning Report using the data gathered for analysis. The Report shall be prepared according to the format provided in Annex D, and forwarded to the host MCC for review and completion. The host MCC shall complete the Report and forward it to the Secretariat prior to the date the DMCC is expected to achieve full operational capability (FOC), for consideration at the next Joint Committee meeting.

2.4 Commissioning of New MCCs

When the integration test is completed and accepted by the host MCC and the procedure of the formal association of the new Ground Segment Provider has been completed, the DMCC is considered operational in an Initial Operational Capability (IOC). The host MCC shall advise other Ground Segment Operators of the change in status in accordance with document C/S A.001 (DDP), using the format specified in Annex H of this document.

The host MCC, through its designated Agency, shall forward the "MCC Commissioning Report" to the Cospas-Sarsat Secretariat and recommend that the DMCC be commissioned. The report will be reviewed by the Joint Committee and approved by the Cospas-Sarsat Council at their next meeting to formally confirm that the new MCC is commissioned in the Cospas-Sarsat System, and to direct the Secretariat to update the document C/S A.001 (DDP). However, the new MCC will be allowed to operate in the Cospas-Sarsat System in the IOC and FOC status under the responsibility of the Ground Segment Provider at the IOC/FOC dates confirmed by the host MCC, independent of the dates of the next Joint Committee and Council meetings.

During the Initial Operational Capability phase, the new MCC will participate in all Cospas-Sarsat Ground Segment operations as a fully functional MCC. The only limitation placed on the new MCC's operation during the IOC phase is that the service area of the new MCC is limited to its national search and rescue region. However, the Ground Segment Provider of the new MCC will ensure that the LUT commissioning tests have been completed, and the LUT commissioning report has been forwarded to the Secretariat, as applicable, before distributing the LUT alert data in the Cospas-Sarsat System when the new MCC attains IOC status.

If no significant problems are discovered during the IOC phase the new MCC will normally assume Full Operational Capability (FOC), including the servicing of its service area as coordinated in accordance with Annex G to this document, at the FOC date. The FOC date is automatically set at the IOC date plus 3 months, or as agreed with the Joint Committee prior to integration testing. The IOC phase can be extended by an additional nine months if problems are discovered during the operation of the MCC. If the MCC is not able to transition to FOC at the end of the one year period the new MCC will be considered not operational and will be documented as "under development". When the new MCC is ready to be reintegrated into the System it must retest the elements that prevented it from reaching FOC status and again operate in an IOC phase until it is ready to reach FOC. The host MCC will ensure that the MCC commissioning report has been completed and forwarded to the

Secretariat for submission to the Joint Committee before confirming the FOC date of the new MCC.

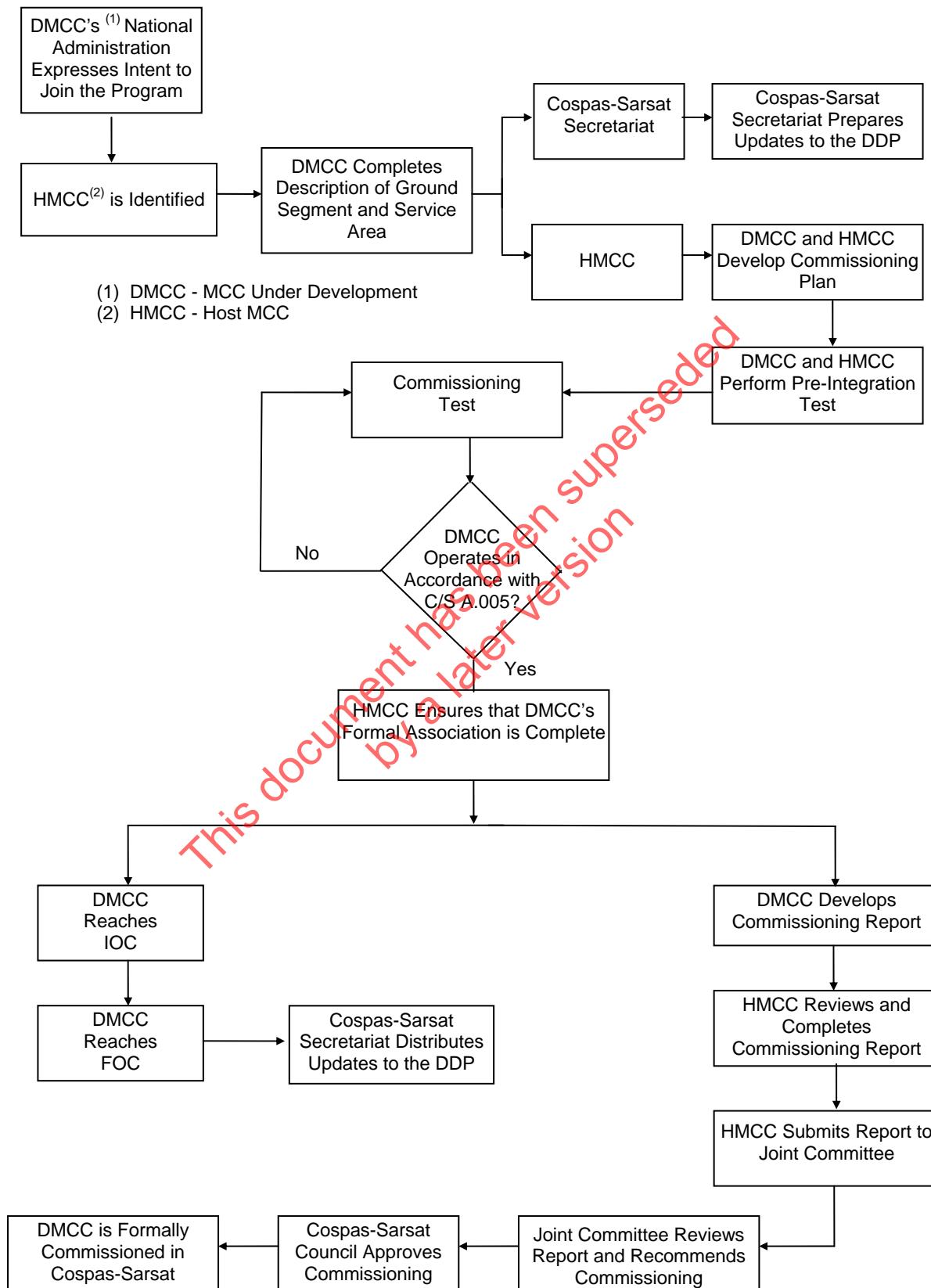
At Full Operational Capability date the new MCC shall confirm to SPOCs in its service area, all MCC operators and the Cospas-Sarsat Secretariat, its change of status.

The complete commissioning process is represented in Figure 2.1 and the evolution from IOC to FOC status is described at Step D of Annex B "Guidelines for Integration of New MCCs in the Cospas-Sarsat System".

2.5 Change of Location of a Commissioned MCC

If the location of a commissioned MCC is changed, the responsible national Administration shall ensure that the MCC satisfies the requirements of document C/S A.005 (MCC specification) prior to resuming operations. Additionally, the national Administration shall submit to the Cospas-Sarsat Secretariat an amendment to the MCC commissioning report detailing the new location of the MCC, a description of the primary and back-up communications to associated LUTs and other MCCs, and a declaration that the MCC satisfies all C/S A.005 (MCC specification) requirements.

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Figure 2.1: MCC Commissioning Procedure

3. ESTABLISHMENT OF NEW NODAL MCCs

3.1 Principles for Establishing New Nodal MCCs

The implementation of a new nodal MCC in the Cospas-Sarsat System may significantly affect existing MCCs and nodal MCCs, requiring extensive coordination with all affected MCCs/nodal MCCs, software changes and possibly new communication links with existing nodal MCCs.

Therefore, the establishment of a new nodal MCC will be considered only if:

- a. a need for improving the Cospas-Sarsat data distribution system is recognized by the Cospas-Sarsat Council; the improvement may be achieved as a result of enhancing the reliability of data distribution, enhancing the effectiveness of data distribution or reducing the workload on an existing nodal MCC;
- b. an existing MCC is prepared to accept the responsibility of a nodal MCC for the new Data Distribution Regions (DDR) to be implemented; and
- c. the proposed new nodal MCC can provide all nodal functions for at least one other MCC in the new DDR.

3.2 Preliminary Actions

The following actions should be accomplished before a final decision can be made in the Council to proceed with the implementation of a new nodal MCC:

- a. the Joint Committee assesses the need to improve the exchange of alert and System data between MCCs in the Cospas-Sarsat System using the guidelines provided in Annex E;
- b. the Joint Committee assesses the capabilities of existing MCCs and makes a recommendation to Council on the practical options for developing a new nodal MCC;
- c. the Joint Committee recommends to Council that such improvement should be pursued with establishing one (or several) additional DDR(s);
- d. the Council approves the Joint Committee recommendation(s);
- e. after approval by the Council and acceptance by the proposed new nodal MCC(s), the Joint Committee identifies:
 - the new DDR(s) associated with the new nodal MCC(s);
 - the new structure of the inter-regional data distribution network; and
- f. the Council approves the new DDR(s) and the inter-regional network structure.

3.3 Regional Coordination and Commissioning Plan

3.3.1 Regional Coordination

The new nodal MCC shall coordinate all commissioning activities with assistance from the host nodal MCC before the new nodal MCC begins commissioning tests.

The commissioning plan can be coordinated through bi-lateral contacts. However, a regional meeting of all MCCs in the DDR and the host nodal MCC is recommended to develop and finalize the commissioning plan.

3.3.2 Commissioning Plan

The new nodal MCC shall analyze the additional requirements for a nodal MCC and ensure that they can be met. These requirements should include hardware enhancements, software enhancements and communication links at regional and inter-regional levels as required.

The new nodal MCC, in cooperation with the host nodal MCC, shall develop a commissioning plan that is coordinated with all MCCs involved in the commissioning process. The commissioning plan shall contain the following information as a minimum:

- a. procedures and schedule for connecting MCCs to the new nodal MCC and, if necessary, for connecting the new nodal MCC to other nodal MCCs;
- b. roles of participants;
- c. a description of the tests to be performed;
- d. a test schedule;
- e. data collection requirements for participants; and
- f. back-up arrangements for the new nodal MCC.

3.4 Commissioning of New Nodal MCCs

3.4.1 General

The new nodal MCC commissioning will involve testing communication links and exchange of test specific and alert data through the new nodal MCC. The intent of the commissioning process is to test alert data and System information distribution procedures including geographical sorting of alerts and specific nodal requirements outlined in document C/S A.005, section 6. The operational, functional, and performance requirements contained in C/S A.005, sections 3, 4, and 5 are not to be included in the commissioning tests for new nodal MCCs.

3.4.2 Pre-test Coordination

It is the responsibility of the host nodal MCC to notify all MCCs regarding the start of the commissioning test. The notification shall include information on the schedule of tests, the number and identification of test beacons and any special processing required.

The host nodal MCC, new nodal MCC and one of the MCCs in the DDR shall modify their MCC software for geographical sorting of alerts, communications addresses and/or links in order to begin commissioning tests.

3.4.3 Test Requirements

During the commissioning tests, the new nodal MCC shall be capable of:

- a. receiving, filtering and transmitting alert data to/from the MCC(s) in its DDR and to/from the host nodal MCC;
- b. receiving and transmitting system data within the DDR and between DDRs;
- c. verifying and validating system data;
- d. meeting nodal MCC requirements outlined in document C/S A.005; and
- e. demonstrating the functionality of back-up arrangements identified in the commissioning plan or maintaining the option to return to the initial configuration of the DDR on a temporary basis until such back-up arrangements can be made.

During the tests, if any serious problems are noted by any participating MCCs, the host nodal MCC will be notified and it shall assess whether the test should continue, be delayed or be re-scheduled for a later date. If necessary, the initial configuration of the DDR should be restored.

3.5 Nodal MCC Data Collection and Analysis

3.5.1 General

In order to facilitate the data analysis, the new nodal MCC shall collect test specific data in accordance with sections C and D of Annex C to this document. Furthermore, each participating MCC shall retain copies of all incoming and outgoing alert and system messages and forward them to the host nodal MCC. Each participating MCC should attempt to collect test specific data in accordance with sections C and D of Annex C.

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3.5.2 New Nodal MCC Data Collection

The new nodal MCC shall provide the following operational data for all test specific alerts:

- source of alert (LUT, host nodal MCC or MCC in the DDR)
- time alert received, SIT and message number
- spacecraft identification
- beacon ID
- TCA
- beacon Doppler location (latitude/longitude, A or B position)
- encoded position (if available)
- service areas for above positions
- transmit flags for above positions
- disposition of processed data (transmitted, suppressed as redundant, or suppressed as anomalous)
- output destination (RCC, MCC in the DDR or host nodal MCC)
- time of transmission, message number and SIT

The new nodal MCC shall also provide the following summary for System information:

- type of message
- source of message
- disposition of processed data (list of MCC(s) to which the message was forwarded or suppressed and reason for suppression)
- time message was received and time processing completed or message was transmitted

3.5.3 Performance Specifications not Part of the Commissioning Tests

The new nodal MCC shall, in conjunction with the commissioning test, declare that it is capable of performing the responsibilities listed in document C/S A.005 that are not part of the commissioning tests. The declaration will be made to the host nodal MCC and if possible verified by the host.

3.5.4 Analysis

The host nodal MCC will collect and analyze data from other MCCs, as necessary. The data shall be analyzed to ensure that the new nodal MCC meets the commissioning criteria as outlined in document C/S A.005 and operates in accordance with document C/S A.001. If any deficiencies are noted, the host nodal

MCC will notify the new nodal MCC. After the deficiencies are corrected, the relevant portions of the commissioning tests will be repeated.

3.5.5 Nodal MCC Commissioning Report

After all the MCCs in the proposed DDR are integrated successfully, the new nodal MCC will complete the nodal MCC commissioning report (provided as Annex F to this document) and forward it to the host nodal MCC. The host nodal MCC will review the report and forward it to the Cospas-Sarsat Secretariat.

3.6 Commissioning Procedure and Implementation

The new nodal MCC will connect to one other MCC within the proposed DDR and test alert and system data distribution procedures. When tests with the first MCC have been successfully completed, the host nodal MCC will declare the new nodal MCC at IOC. The host nodal MCC shall advise all ground segment operators of the change in status in accordance with document C/S A.001 (DDP).

At IOC the new nodal MCC is expected to provide the nodal functions for one MCC in the new DDR. The new nodal MCC should then proceed with the testing and integration of the remaining MCCs in the DDR as provided in the commissioning plan. Such changes should not affect other nodal MCCs except the host nodal MCC.

If links to other nodal MCCs are required as per the commissioning plan, the new nodal MCC will proceed with testing these links.

The new nodal MCC shall complete and forward the nodal MCC commissioning report to the host nodal MCC. The host nodal MCC, through its designated agency, shall forward the nodal MCC commissioning report to the Cospas-Sarsat Secretariat and recommend that the new nodal MCC be commissioned. The report will be reviewed by the Joint Committee and approved by the Cospas-Sarsat Council at their next meeting.

The host nodal MCC will coordinate the FOC date for the new nodal MCC, with all nodal MCCs involved, and inform all ground segment operators.

At the FOC date, all nodal MCCs involved will implement the new data exchange matrix and the geographical sorting of alert data as provided in the document C/S A.001 (DDP).

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**ANNEXES TO THE DOCUMENT
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ANNEX A**LIST OF ACRONYMS USED IN C/S A.006**

AOS	acquisition of signal
CALC	calculated
DDP	document C/S A.001 "Cospas-Sarsat Data Distribution Plan"
DDR	data distribution region
DEST	destination
DISP	disposition
DMCC	MCC under development
FOC	full operational capability
HMCC	Host MCC
ID	identifier
IOC	initial operational capability
LAT	latitude
LOC	location
LON	longitude
LOS	loss of signal
LUT	local user terminal
MCC	mission control centre
MHz	megahertz
MSG	message
NO	number
NOCR	notification of country of beacon registration
NUM	number
RCC	rescue coordination centre
RX	receipt
SAT	spacecraft identifier
SID	document C/S A.002 "Cospas-Sarsat Mission Control Centres Standard Interface Description"
SIT	subject indicator type
SPOC	search and rescue point of contact
SRR	search and rescue region

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TCA	time of closest approach
TPC	time processing complete
TX	transmit
UNLOC	unlocated solution

- END OF ANNEX A -

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ANNEX B**GUIDELINES FOR INTEGRATION OF NEW MCCs
IN THE COSPAS-SARSAT SYSTEM**

1. The material hereunder is a textual flow-chart which sketches procedures for integrating an MCC under development (DMCC) into the existing Cospas-Sarsat Ground Segment.
2. The introduction of new MCCs in the Cospas-Sarsat System is supervised by the Cospas-Sarsat Joint Committee whose objectives include:
 - a) to improve the overall coverage and performance of the Cospas-Sarsat Ground Segment; and
 - b) to maintain technical control of the development of the Cospas-Sarsat MCC network.
3. The purpose of these procedures is to provide the Joint Committee with guidelines for coordinating the introduction of new MCCs into the existing Ground Segment and assist the DMCC in planning and performing the appropriate integration tests.
4. Step A may be completed outside of Joint Committee meetings, if necessary. All this information, albeit preliminary at times, should be sent directly to the Cospas-Sarsat Secretariat.
5. Step B should be conducted on a regional basis and, after agreement, be presented to the Joint Committee for adoption.
6. Step C and Step D should be conducted with the host MCC with which the DMCC is to be aligned.

STEP A Initial Ground Segment Description and LUT Coverage

Objective: Preliminary information gathering to assist the Joint Committee in deciding how the DMCC best fits into the existing System.

A-1 The Cospas-Sarsat Secretariat develops and updates the worldwide map of visibility areas of LEOLUTs in the Cospas-Sarsat System. The map should be a standard geographic coordinate system showing satellite visibility areas of all operational LEOLUTs.

- A-2** The DMCC identifies its new LUT(s) with: (1) coordinates, (2) address, (3) frequencies and (4) LUT antenna masks.
- A-3** With these coordinates, the Secretariat plots the new LEOLUT coverage on a map projection.
- A-4** The DMCC proposes its new service area, in accordance with the Cospas-Sarsat Programme Management Policy document (C/S P.011).
- A-5** The DMCC provides information required to amend the appropriate C/S A.001 (DDP) annexes: Annex I / D, SAR points of contact; Annex I / F, points of contact for 406 MHz beacon registers; Annex II / A, MCCs and LUTs; Annex II / C, Cospas-Sarsat MCCs; Annex II / D, SID implementation status; and Annex III / A, Regional (DDR) procedures or arrangements. The information may be preliminary at times, but should be kept updated.

STEP B Assignment of Service Area and Message Distribution Procedures

Objective: To determine the DMCC's responsibilities within the Cospas-Sarsat MCC network, consistent with the goal of improving System performance.

- B-1** The Joint Committee reviews the service area and the message routing assignments for System information and alert data distribution, including regional procedures, if any.

The following factors should be taken into account when developing and reviewing the service area of a new MCC:

- a) Aeronautical, maritime and terrestrial regions in which the MCC's national authorities facilitate or provide SAR services should become part of its MCC service area.
- b) SRRs: Where practical, any search and rescue region (SRR) will be entirely included within the service area of a given MCC.
- c) Communications Infrastructure: New service areas should maximize the efficiency with which alert data can be delivered.
- d) Exclusive LEOLUT Local Mode Coverage: When an SRR is under a LEOLUT's exclusive local-mode coverage, the SRR should ideally be included in the service area of the MCC associated with this LUT.
- e) Multiple LEOLUT Local Mode Coverage: When an SRR is under multiple LEOLUT's local mode coverage, the SRR should be included in the service area of only one MCC through agreements between the affected MCCs.

In the case where difficulties arise with the development of a new MCC's service area, the following additional factors should be considered:

- global communications capabilities;
- existing national SAR and bilateral/multilateral operational arrangements;
- common SAR area boundaries;
- common service area boundaries; and
- preferences declared by the country responsible for a SRR.

B-2 The Joint Committee selects a host MCC taking into account, among others, the following operational factors:

- a. geographical location and north/south structure of the network;
- b. global communications capabilities;
- c. national SAR arrangements;
- d. bilateral operational agreements;
- e. common service area boundaries; and
- f. common SAR area boundaries.

B-3 The Joint Committee reviews the service area of the DMCC to ensure that the service area is consistent with document C/S.P.011. Based on the declared service area and host MCC selection, the Joint Committee reviews the message routing assignments for System information and alert data distribution, including regional procedures, if any, and agrees the appropriate amendments of C/S A.001 (DDP) annexes.

B-4 Prior to the integration test, the DMCC establishes bilateral communication checks, message distribution and test procedures with each Cospas-Sarsat MCC with which it will exchange data operationally. This test should demonstrate correct message formatting using the required message fields.

STEP C

Integration Test

Objective: To test the DMCC's operational readiness and compliance with Ground Segment requirements.

Recommendation: Experience of DMCCs and host MCCs implementing the procedures outlined in this document has shown the considerable value of a detailed bi-lateral meeting over two or three days, if necessary, held prior to the integration test. This meeting should endeavour to develop a complete script of the integration test, clarify all aspects of the procedures, and define the methods and points of contact for the resolution of incidents during the integration testing and the necessary coordination of activities after the DMCC Initial Operational Capability has been established.

C-1 Prior to the integration test, the DMCC must state to the host MCC that it complies with applicable Ground Segment requirements as defined in Cospas-Sarsat System documents, and is prepared to initiate operational integration into the Cospas-Sarsat MCC network.

C-2 The DMCC should give as much notice as possible to the host MCC when scheduling its integration test. The integration test should be completed as soon as possible.

C-3 All MCCs scheduled to interface with the DMCC, as specified in Step B, shall participate in the test.

C-4 During the test, the DMCC will participate as an "operational MCC" in all Cospas-Sarsat Ground Segment operations. However, the integration test should not impact the distribution of operational alert data as per the current DDP. Therefore, only the DMCC will use the modified Annexes of C/S A.001 (DDP) during the test.

C-5 At the conclusion of the test, the DMCC and each participating MCC will evaluate the test results in accordance with the procedures, formats and requirements specified in the System documentation. Each participating MCC will notify the DMCC of any deficiencies in complying with Ground Segment requirements.

C-6 The DMCC will correct its deficiencies, if any, and notify the host MCC its readiness for repeating the relevant portion of the integration test. The host MCC will determine and coordinate the schedule of the new test and, if successful, will declare the DMCC operational.

C-7 The DMCC will prepare the preliminary "MCC Commissioning Report" and forward to the host MCC for review and completion.

STEP D Establishment of Initial and Full Operational Capability

Objective: To start operation at the Initial Operational Capability (IOC) date and assume Full Operational Capability (FOC) at the pre-determined FOC date.

Remark: Before confirming the DMCC IOC status, the host MCC shall assure itself that:

- the procedure for the formal association of the Ground Segment Provider (or the Ground Segment Operator) with the Cospas-Sarsat Programme has been completed; and
- all tests required for the integration of the DMCC in the Cospas-Sarsat Ground Segment have been successfully completed.

The FOC date of the new Cospas-Sarsat MCC is automatically set at IOC date plus three months. If confirmation of IOC status is delayed, the FOC date will be postponed by the same amount of time. MCCs which have not reached FOC within one year of the initial IOC date will be considered not operational, documented as "Under Development," and will require a retest of the elements which prevented it from reaching FOC. The MCC then must operate in an IOC phase again prior to reaching FOC.

- D-1** When the integration test is completed and no deficiencies are noted by the host MCC, the DMCC is considered operational in an Initial Operational Capability.
- D-2** During IOC phase, the new MCC is permitted to participate in all Cospas-Sarsat Ground Segment operations (i.e. exchange of alert data and System information through the Cospas-Sarsat MCC network). However, the service area of a new MCC at IOC is limited to its national search and rescue region.
- D-3** The host MCC shall notify all Ground Segment Operators of the new MCC IOC status (Annex H) and confirm the tentative date for Full Operational Capability. Prior to FOC, the new MCC shall ensure that it has established appropriate arrangements with SPOCs in its service area for the distribution of alert data. At FOC date, the updated data distribution procedures contained in C/S A.001 (DDP) will be implemented.
- D-4** At Full Operational Capability date, the new MCC assumes all its operational responsibilities, including servicing its service area as determined under Step B. The new MCC shall confirm to SPOCs in its service area, all MCC operators and the Secretariat, its change of status at FOC date.
- D-5** Prior to FOC date, the host MCC, through its designated Agency, shall forward the "MCC Commissioning Report" to the Cospas-Sarsat Secretariat and recommend commissioning of the new MCC. The report shall be reviewed by the Joint Committee and approved by the Cospas-Sarsat Council at their next meetings.

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ANNEX C**FORMAT FOR REPORTING DMCC TEST DATA**

For nodal MCC commissioning, report data in accordance with sections C and D. For the commissioning of non-nodal MCCs, report data in accordance with sections A to D.

A. LUT Summary Database

<u>Field</u>	<u>Description</u>	<u>Detailed Format</u>	<u>Remarks</u>
1	LUT identifier	nnnn	Note 2
2	Spacecraft identifier	nnn	Note 2
3	Orbit number	nnnnn	
4	LUT AOS	YYDDDhhmm	
5	LUT LOS	YYDDDhhmm	
6	LUT TPC	YYDDDhhmm	
7	NIL	Not used	
8	Number of 406 MHz locations	nnnn	
9	Number of no Doppler location (unlocated) solutions	nnnn	
10	Comments	AAAAAAAA	

B. LUT Summary Database (dBase Structure)

<u>Field</u>	<u>Field Name</u>	<u>Type</u>	<u>Width</u>	<u>Decimal</u>
1	LUT_ID	Numeric	4	
2	SAT	Numeric	3	
3	ORBIT_NO	Numeric	5	
4	LUT_AOS	Numeric	9	
5	LUT_LOS	Numeric	9	
6	LUT_TPC	Numeric	9	
7	NIL	Not used	Not used	
8	NUM_406	Numeric	4	
9	NUM_UNLOC	Numeric	4	
10	COMMENTS	Character	8	

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C.

Alert Data Summary Database

<u>Field</u>	<u>Description</u>	<u>Detailed Format</u>	<u>Remarks</u>
1	MCC identifier	nnnn	Note 2
2	Beacon location	AAAAAAAAAAAA	Nearest town or sea area
3	Beacon identifier	AAAAAAAAAAAAAA	Note 1
4	Spacecraft identifier	nnn	Note 2
5	Calculated TCA	YYDDDhhmm	Note 3
6	Input message number	nnnnn	Note 4
7	Source of message	nnnn	Note 2
8	Receipt time	YYDDDhhmm	
9	MCC TPC	YYDDDhhmm	
10	Disposition	AA	Note 5
11	Output message number	nnnnn	
12	Transmit time	YYDDDhhmm	
13	SIT identifier	nn	Note 2
14	Destination	AAAA	
15	A MCC Service Area	AAAA	
16	A latitude	snn.nnn	
17	A longitude	snnn.nnn	
18	B MCC Service Area	AAAA	
19	B latitude	snn.nnn	
20	B longitude	snnn.nnn	
21	Solution in local mode ?	L	True if in local mode
22	Encoded MCC Service Area	AAAA	
23	Encoded latitude	snn.nnn	
24	Encoded longitude	snnn.nnn	
25	Alert type	A	Note 6
26	Comments	AAAAAAAA	

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Notes:

- 1) 15 character default hex identifier.
- 2) According to C/S A.002 (SID).
- 3) If no Doppler location use time of first data point.
- 4) Use 0 if not available.
- 5) Codes to show processing disposition.

ab - for data processed for output	ab - for data suppressed
PR - NOCR	SR - redundant/located
PP - passed for output/located	SV - redundant/unlocated
PV - passed for output/unlocated	SN - suppressed national procedure
PM - merged for output	SM - suppressed/merged
	SO - suppressed other reason
- Fields 11 - 14 are used only if solution is processed for output.
- 6) Distress (D) or Ship Security Alert (S)

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D. Alert Data Summary Database Structure

<u>Field</u>	<u>Field Name</u>	<u>Type</u>	<u>Width</u>	<u>Decimal</u>
1	MCC_ID	Numeric	4	
2	BEACON_LOC	Character	11	
3	BEACON_ID	Character	15	
4	SAT	Numeric	3	
5	CALC_TCA	Numeric	9	
6	IN_MSG	Numeric	5	
7	FROM	Numeric	4	
8	RX_TIME	Numeric	9	
9	MCC_TPC	Numeric	9	
10	DISP	Character	2	
11	OUT_MSG	Numeric	5	
12	TX_TIME	Numeric	9	
13	SIT	Numeric	3	
14	DEST	Character	4	
15	A_MCC	Character	4	
16	A_LAT	Numeric	7	3
17	A_LON	Numeric	8	3
18	B_MCC	Character	4	
19	B_LAT	Numeric	7	3
20	B_LON	Numeric	8	3
21	LOCAL	Logical	1	
22	E_MCC	Character	4	
23	E_LAT	Numeric	7	3
24	E_LON	Numeric	8	3
25	A_TYPE	Character	1	
26	COMMENTS	Character	8	

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ANNEX D**MCC COMMISSIONING REPORT**

Country or national Administration: _____

Location of MCC: _____

Cospas-Sarsat Identifier: _____

Start of Commissioning Period: _____

End of Commissioning Period: _____

Section 1 contains information on the communication links established by the DMCC. Section 2 contains a summary of the commissioning results where the Method of Compliance is declaration by the national Administration (D), verification by the host MCC (V), verification by the national Administration (Vn), measurement by the host MCC (M), or measurement by the national Administration (Mn). Section 3 contains a summary of SIT messages exchanged. Section 4 contains explanatory comments necessary to amplify the results contained in the summary table of section 2. Section 5 contains any other relevant information concerning the conduct of the commissioning test, while section 6 contains the recommendations of the host MCC towards the commissioning of the MCC under test.

1. COMMUNICATION LINKS

Provide information on each link that will be used operationally by the DMCC, to LUTs, RCCs, SPOCs, and other MCCs. Include links required to back-up other MCCs.

Destination Name	Network Type (e.g., FTP)	Link Address	Direction of Data to DMCC (Input, Output, Both)	Pass/ Fail	Comments

2. SUMMARY TABLE

Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/Fail	Method of Compliance	Declaration/Verification or Comments
OPERATIONAL REQUIREMENTS						
3.1 General Operations						
3.1.1	Establish procedures for alert data distribution	n/a			D	
3.1.2	Respond to request for information				V	
3.1.3	Account for all messages				D/V	Limited verification by HMCC
3.1.4	Configurable to selectively process or suppress alert data				V	See note ¹
3.1.5	Voice communication with other MCCs				V	
3.1.6	Transmit solution data for McMurdo and Longyearbyen ORB beacons from LEOLUTs				V	
3.1.7	Transmit solution data for designated reference beacon from GEOLUTs				V	
3.2 Availability						
3.2	Operational 24/7 with people available to respond, as needed	24 hour availability			D/V	Limited verification by HMCC
3.3 LUT Co-ordination						
3.3.1	Process associated LUT data				D	
3.3.2	Transmit System data to LUT				D	
3.4 Data Communication						
3.4.1	Internal communication links	n/a	n/a	n/a	n/a	
3.4.2	Use of communication networks defined in C/S A.002				V	
	Receive messages in non-SIT format				V	

¹ In the Central Data Distribution Region, if the 5 km accuracy ratio falls below 60% and/or the 20 km accuracy ratio falls below 80%, (i.e. $R.5(i,j) < 0.6$ and/or $R.20(i,j) < 0.8$) for a LEOLUT(i) / LEOSAT(j) combination, each MCC shall demonstrate the ability to process alert messages provided by LEOLUT(i) when processing LEOSAT(j) based only on the 406 MHz beacon message - the Doppler solution data shall not be distributed (see document C/S A.003 section 2.5.4.2).

Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/Fail	Method of Compliance	Declaration/Verification or Comments
3.4.3	Communication links as defined in C/S A.001				V	
	Maintain at least two international networks				V	
	Bilateral agreements with other MCCs	n/a	n/a	n/a	D	Describe, if any
3.4.4	Communication links with SPOCs in service area				D	
	Access to two communication links recommended	Via national SAR authority if necessary			D	
	Communication links documented in C/S A.001				V	
3.4.5	Communications use standards and protocols in C/S A.002				D/V	Limited verification by HMCC
3.4.6	Communications links and networks operate simultaneously				D	
3.5 Data Formats						
3.5.1	Internal data formats	n/a	n/a	n/a	n/a	
3.5.2	Use of required SIT message formats	C/S A.002			V	See section 2.2
	Send orbit vectors and SARP calibration to LUTs	C/S A.002			D	
	Change message format to SIT 915 if required				V	
3.5.3	Use of SIT 185 message format	C/S A.002			V	
3.6 Monitoring of National Ground Segment						
3.6.1	Monitoring of associated LUTS	C/S A.003			D	
3.6.2	Monitoring of MCC/LUT(s) communication link(s)				D	
3.6.3	Monitor operation of MCC				D/V	Limited verification by HMCC for filtering of corrupt data
3.6.4	Monitor external communications				D/V	Limited verification by HMCC
3.6.5	Notify status if anomaly detected, and implement back-up procedures, if required	C/S A.001 and C/S A.003			D	

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Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
3.7 Back-up Provisions						
3.7.1	Implement back-up procedures, as required				D	Describe back-up procedures
	Inform other MCCs using status message	C/S A.001			V	
3.7.2	Failure of associated LUT(s)				D	
3.7.3	Transmit messages manually				D	
	Bilateral agreement for transfer of LUT data if MCC inoperative	Recommended			D	
3.8 Re-routing of Messages						
3.8	Reroute messages				D/V	Optional – describe and verify any capabilities
3.9 406 MHz Beacon Register						
3.9	Maintain access to national 406 MHz beacon register				D/V	
	Request information from other States' registers				V	
	Respond to request for beacon register information				V	
3.10 Information Archival and Retrieval						
3.10	Archive and retrieve messages				D/V	
	Retransmit information to requesting entity				V	
3.10.1	Retrieve alert data				V	Describe interrogation modes tested
3.10.2	Retrieve C/S messages				V	Describe interrogation modes tested
3.11 Test and Exercise Co-ordination and Reporting						
3.11	Participate in test and exercises as requested	C/S A.001 and C/S A.003			D	
	Collect and report data using agreed formats	C/S A.003			D	
3.12 Interference Control						
3.12	Co-operate to locate and remove interference	n/a	n/a	n/a	D	Provide description of national arrangements
	Collect 406 MHz interference through SARR channel of associated LUTs				D	Optional
	Report on detected interferers	C/S A.003			D	

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Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
3.13 Orbitography/Reference Beacon Operation						
3.13	Provision of orbitography or reference beacon, if applicable	n/a	n/a	n/a	D	Provide short description of national arrangements.
	Process orbitography and reference beacon detections	n/a	n/a	n/a	D	Provide short description of how beacons are processed by MCC.
3.14 Reporting Requirements						
3.14	Reporting	C/S A.003			D	
FUNCTIONAL REQUIREMENTS						
4.1 Data Acquisition						
4.1	Receive messages without loss				D/V	Limited verification by HMCC.
	Time tag and store incoming data				D/V	Limited verification by HMCC.
	Stored electronic data retrieved electronically				D	
	Incoming data accessible to operator				V	
4.2 Data Validation						
4.2.1	Validate format and consistency of SIT messages	C/S A.001 and C/S A.002			V	
	Request retransmission of message				V	
4.2.2	Validate alert messages	C/S A.001, Annex III/B			V	
4.3 Process Data Selectively						
4.3.1	Selectively process data				V	
4.3.2	Suppress transmission of alert data for specific beacon				V	
4.4 Position Matching						
4.4	Use position matching criteria for alerts according to C/S A.001	C/S A.001			V	
4.5 Ambiguity Resolution						
4.5.1	Use the criteria contained in C/S A.001 to resolve ambiguity	C/S A.001			V	
4.5.2	Stop exchange of alert data to other MCCs after ambiguity resolution				V	
	Selectively continue transmission after ambiguity resolution				V	
4.5.3	Use of other means at national level to resolve ambiguity				D	Provide short description.

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Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
4.6 Geographic Sorting of Alert Data						
4.6	Geographically sort beacon locations				V	
4.7 Filtering Redundant Alert Data						
4.7	Filter solutions	C/S A.001, Annex III/B			V	
	Determine better quality solutions	C/S A.001, Annex III/B			D/V	Limited verification by HMCC.
	Image position determination prior to ambiguity resolution	C/S A.001, section 3.2.3 and C/S A.002, Appendix B.2 to Annex B			V	
4.8 Notification of Country of Beacon Registration (NOCR)						
4.8	Provide NOCR messages	C/S A.001			D/V	Limited verification by HMCC. See sections 1, 2.2.
4.9 Ship Security Alerting						
4.9	Process ship security alerts	C/S A.001, Annex III/B			D/V	Limited verification by HMCC.
PERFORMANCE REQUIREMENTS						
5.1 Availability						
5.1	Availability	Operational 99.5% over 1 year			D/M	Limited measurement by HMCC during test period.
5.2 Communication Links						
5.2	Implement procedures to ensure specifications are met	n/a	n/a	n/a	D	Provide short description of any procedures implemented
LUT/MCC						
5.2.1.1	Receive data from LUT(s)	within 10 min. 99% of time			Mn	Provide summary to HMCC.
5.2.1.2	Lost messages from LUT(s)	< 0.1%			Mn	Provide summary to HMCC.
MCC/MCC						
5.2.2.1	Transfer data to other MCCs	within 15 min. 99% of time			M	
5.2.2.2	Lost or corrupted messages to other MCCs	< 0.1%			M	
5.2.2.3	Availability of communication link to other MCCs	99% each day			M	
MCC/SPOC						
5.2.3	Availability of MCC to SPOC communication	95% each day			Mn	Provide summary to HMCC.

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Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Pass Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
5.3 Alert Data Processing Capacity						
5.3.1	Process associated LUT distress alert data	at least 100 alerts			D	
5.3.2	Process distress alert data from other MCCs	forecast number of beacons			D	
5.4 System Information Processing Capacity						
5.4	Send and receive System information messages	15 per day			D	
5.5 QMS Continuous Monitoring & Objective Assessment Capacity						
5.5	Transmit solution data per QMS procedures	3 days			V	
5.6 Processing Time						
5.6	Processing time for alert data	15 minutes 99% of time			Mn	Provide summary to HMCC.
5.7 Processing Integrity						
5.7.1	Maintain accuracy of distress alert location	no more than 0.2 km from received data			V	Compare locations sent by the DMCC to locations sent to the DMCC.
5.7.2	Accurately Geosort beacon locations to appropriate RCC/SPOC	± 25 km of Geosort boundary			V	
5.7.3	Maintain accurate time reference	within ± 25 sec			D/V	Provide description of capability. Limited verification by HMCC.
5.7.4	Maintain integrity of transiting data	no corruption			D/V	Limited verification by HMCC.
5.8 Access to Archived Information						
5.8.1	Archive data and messages	at least 30 days			V	
5.8.2	Respond to request for archived alert data and messages	60 minutes			V	
5.8.3	Respond to request for alert data and messages covering last 48 hr	30 minutes			V	
5.9 Additional Timing Requirements						
5.9.1	Suppress alert data	10 minutes			V	
5.9.2	Implement back-up procedures	60 minutes			V	
5.9.3	Access beacon register	15 minutes			V	
5.9.4	Forwarded retrieved information to requestor	15 minutes			V	

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3. SIT MESSAGE FORMAT

Provide information for all SIT messages that will be exchanged by the DMCC operationally, including those that are mandatory according to document C/S A.002 (SID) and those listed as implemented in C/S A.001 (DDP).

SIT	Name	Pass/ Fail	Number of Messages Sent and Received			
			HMCC Tx	DMCC Rx	DMCC Tx	HMCC Rx
121	406 MHz Interferer Notification					
122	406 MHz Incident (No Doppler)					
123	406 MHz Position Conflict (Encoded Only)					
124	406 MHz Ambiguity Resolution (Encoded Only)					
125	406 MHz Incident					
126	406 MHz Position Conflict					
127	406 MHz Ambiguity Resolution					
132	NOCR (Encoded Only)					
133	NOCR					
185	Cospas-Sarsat 406 MHz Incident (No Doppler)					
185	Cospas-Sarsat 406 MHz Position Conflict (Encoded Only)					
185	Cospas-Sarsat 406 MHz Ambiguity Resolution (Encoded Only)					
185	Cospas-Sarsat 406 MHz Incident					
185	Cospas-Sarsat 406 MHz Position Conflict					
185	Cospas-Sarsat 406 Ambiguity Resolution					
185	Cospas-Sarsat NOCR (Encoded Only)					
185	Cospas-Sarsat NOCR					
215	Orbit Vectors					
216	Orbit Vectors					
415	SARP Calibration					
417	SARP-3 Calibration					
605	System Status					
915	Narrative					
925	406 MHz Beacon Registration Data					

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4. EXPLANATORY COMMENTS AS REQUIRED FOR ITEMS IN SECTION 2, SUMMARY TABLE

(List each comment by reference to test paragraph number from column 1 of Summary Table)

5. OTHER INFORMATION RELEVANT TO THE COMMISSIONING TEST

(Include any comments not covered elsewhere on the conduct, analysis, or results of the commissioning test)

6. RECOMMENDATIONS

- END OF ANNEX D

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ANNEX E**GUIDELINES FOR IMPLEMENTING NEW NODAL MCCs**

1. The material included hereunder is a textual flow-chart which sketches the procedures for integrating new nodal MCCs into the existing Cospas-Sarsat Ground Segment.
2. The introduction of a new nodal MCC in the Cospas-Sarsat System is supervised by the Joint Committee and approved by the Cospas-Sarsat Council with the objective of improving the Cospas-Sarsat data distribution system.
3. The purpose of this annex is to provide guidelines, used in conjunction with the contents of section 3, for coordinating the introduction of a new nodal MCC and assisting the new nodal MCC in planning and performing the appropriate integration tests.
4. The guidelines are separated into the following steps.

STEP A**Determination of Need and Selection of New Nodal MCC**

A-1 The Joint Committee assesses the need to improve the exchange of alert and System data between MCCs in the Cospas-Sarsat System.

The improvement can be achieved by:

- improving the reliability of data distribution;
- improving the effectiveness of data distribution; or
- reducing the workload of an existing nodal MCC.

The reliability of alert data distribution may be increased with the introduction of a new nodal MCC and DDR. The increased reliability could be a result of a new nodal MCC's ability to validate alerts better at a regional level, or to monitor the system better at a regional level. The ability of a new nodal MCC to provide better back-up arrangements also increases reliability. Given that a nodal MCC may be a single point of failure in Cospas-Sarsat data distribution, reliability can be improved if the number of MCCs in a DDR remains small. Lastly, the reliability of data distribution may be improved due to a better communications infrastructure between the new nodal MCC and MCCs in the region and other nodal MCCs.

The effectiveness of alert data distribution may be improved by taking into consideration:

- language barriers - planning, coordination and problem resolution may be improved if personnel from different MCCs speak the same language;

- existing bilateral or regional operational arrangements - Cospas-Sarsat data distribution may be enhanced if ICAO or IMO regional plans exist for SAR services;
- overlapping LUT coverage areas - Cospas-Sarsat data distribution may be enhanced if data from LEOLUTs with overlapping coverage areas was limited to one region;
- geographic proximity and bordering SAR boundaries - planning, coordination and problem resolution may be improved if MCCs are in close proximity and within the same time zones;
- reduction in time for alert data distribution - effectiveness of alert data can be increased if the time for alerts to reach their final destination is reduced; and
- compatible communication links - Cospas-Sarsat data distribution may be enhanced if MCCs in a region share similar communication links; and languages.

The data distribution in Cospas-Sarsat may also be improved if one nodal MCC is not over burdened distributing alerts. The burden may be quantified by the size of the existing nodal MCC's service area, the size of the DDR, and the resources expended to complete the nodal MCC's mission. The size of the DDR can be measured in many different ways (e.g., the message filter factor from the Exercise of 1990), but ultimately must be reviewed on a case-by-case basis as the capabilities of different MCCs vary considerably.

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- A-2** The Joint Committee assesses the capabilities of existing MCCs and makes a recommendation to Council on the practical options for selection and development of a new nodal MCC.
- A-3** The Joint Committee recommends to Council that such improvement should be pursued by the establishment of a new nodal MCC and its associated DDR.
- A-4** The Council considers and approves the Joint Committee recommendation, as appropriate.
- A-5** After approval by the Council and acceptance by the proposed new nodal MCC, the Joint Committee identifies:
 - the new Data Distribution Region (DDR) associated with the new nodal MCC; and
 - the new structure of the inter-regional data distribution network.
- A-6** The Council approves the new DDR and the inter-regional network structure.

STEP B**Preparation for System Commissioning Test**

- B-1** The Joint Committee designates a host MCC to assist the new nodal MCC in System integration. The host MCC will usually be the existing nodal MCC in the DDR affected, and therefore, the nodal MCC in the best position to assist the new nodal MCC in the commissioning process.
- B-2** The new nodal MCC coordinates with MCCs in the proposed new DDR on procedures for exchange of data and communications media to be used.
- B-3** The new nodal MCC analyses the additional requirements for a nodal MCC and ensures they can be met. The requirements analysis includes the necessary hardware enhancements, software enhancements and communication links at regional and inter-regional levels.
- B-4** The new nodal MCC coordinates all commissioning activities, with assistance from the host nodal MCC, before commissioning tests begin.
- B-5** The new nodal MCC, in cooperation with the host nodal MCC, develops a commissioning plan that is coordinated with all MCCs involved in the commissioning process.

STEP C**Commissioning Test**

- C-1** The host nodal MCC notifies all MCCs regarding the start of the commissioning test.
- C-2** The host nodal MCC, the new nodal MCC and one of the MCCs in the new DDR modify their MCC software for geographical sorting of alerts, communications addresses and/or links in order to begin commissioning tests.
- C-3** The host nodal MCC, the new nodal MCC, and one MCC in the new DDR conduct the commissioning test according to the prepared Commissioning Plan.
- C-4** The host nodal MCC, the new nodal MCC, and the remaining MCCs in the new DDR conduct the commissioning test according to the prepared Commissioning Plan.
- C-5** Each MCC participating in the test collects test data in accordance with sections C and D of Annex C to this document.
- C-6** The new nodal MCC completes the nodal MCC commissioning report (provided as Annex F to this document) and forwards it to the host nodal MCC.

- C-7** The host nodal MCC collects and analyses data from participating MCCs, as necessary.
- C-8** The host nodal MCC, through its designated agency, forwards the new nodal MCC commissioning report to the Cospas-Sarsat Secretariat and recommends that the new nodal MCC be commissioned.
- C-9** The Joint Committee reviews the commissioning report and recommends approval by the Cospas-Sarsat Council at their next meeting.

STEP D**Establishment of Initial and Full Operational Capability**

Remark When the commissioning tests are completed and accepted by the host nodal MCC, the new nodal MCC is considered operational in an Initial Operational Capability (IOC), with respect to its nodal functions. The host nodal MCC shall advise all ground segment operators of the change in status in accordance with document C/S A.001 (DDP).

- D-1** At IOC the new nodal MCC provides the nodal functions for one MCC in the new DDR. Such change should not affect other nodal MCCs except the host nodal MCC.
- D-2** The new nodal MCC proceeds with the testing and implementation of the communication links to the remaining MCCs in the DDR, as provided in the commissioning plan.
- D-3** If no links to other nodal MCCs are required, and all MCCs in the DDR have been successfully connected to the new nodal MCC, the host nodal MCC declares the new nodal MCC at Full Operational Capability (FOC) and informs all Ground Segment Operators.
- D-4** If links to other nodal MCCs are required as per the commissioning plan, the new nodal MCC proceeds with testing these communication links. When all communication tests have been completed successfully, the host MCC coordinates the FOC date for the new nodal MCC with all nodal MCCs involved, and informs all ground segment operators.
- D-5** At the FOC date, all nodal MCCs involved implement the new data exchange matrix and the geographical sorting of alert data as provided in the document C/S A.001 (DDP).

ANNEX F**NODAL MCC COMMISSIONING REPORT**

Country or national Administration: _____

Location of MCC: _____

Cospas-Sarsat Identifier: _____

Start of Commissioning Period: _____

End of Commissioning Period: _____

Section 1 contains information on the communication links established with other MCCs to support nodal MCC functions. Section 2 contains a summary of the commissioning results where the Method of Compliance is declaration by the national Administration (D), verification by the host MCC (V), verification by the national Administration (Vn), measurement by the host MCC (M), or measurement by the national Administration (Mn). Section 3 contains explanatory comments necessary to amplify the results contained in the summary table of section 2. Section 4 includes any comments required on the commissioning process or new nodal MCC status. Finally, section 5 includes the recommendations of the host MCC as to the readiness of the new nodal MCC to be commissioned

1. COMMUNICATION LINKS

Provide information on each link that will be used operationally by the MCC to perform its nodal functions, as indicated in documents C/S A.001 and C/S A.005. This includes links to other MCCs in its DDR and to other nodal MCCs.

Destination MCC	Network Type (e.g., FTP)	Link Address	Direction of Data to Nodal MCC (Input, Output, Both)	Pass/ Fail	Comments

2. SUMMARY TABLE

Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
Operational Requirements						
6.1.1	On-site staff 24/7		n/a		D	
6.1.2	Access to communication links		n/a		D	
	Send and receive simultaneously		n/a		D	
6.1.3	Monitor operation of C/S System within DDR		n/a		D	
6.1.4	Develop back-up procedures				V	Present back-up plan to HMCC
Functional Requirements						
6.2.1	Validate messages for correct format	C/S A.002			V	
	Filter anomalous messages and notify sender				V	
6.2.2.1	Receive and process alert data				V	
6.2.2.2	Maintain data integrity				V	
6.2.3	Geosort beacon locations for all MCC service areas, as necessary				V	
6.2.4.1	Receive and process System information				V	
6.2.4.2	Validate and transmit System information	C/S A.001 and C/S A.003			V	
	Report invalid data to appropriate MCC				V	
6.2.5	Narrative Information Processing				V	
Performance Requirements						
6.3.1	Availability of MCC functions	99.5% over one year	n/a		D/V	Limited verification by HMCC during test period.
	Implement back-up if non-availability > 1 hour	n/a	n/a	n/a	D	Provide short statement of procedures
6.3.2	Availability of inter-nodal MCC communication	99.5% each day	n/a		D	
6.3.3.1	Capacity to process expected volume of distress alert data	n/a	n/a	n/a	D	Provide short statement of capability
6.3.3.2	Capacity to transmit expected volume of distress alert data	n/a	n/a	n/a	D	Provide short statement of capability

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Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
Co-ordinating Requirements						
6.4.1	Co-ordinate development of communication links within DDR	n/a	n/a	n/a	D	Provide short statement of plans to develop links
6.4.2	Act as focal point for C/S matters within DDR	n/a	n/a	n/a	D	Provide short statement of plans to accomplish requirements of C/S A.005, section 6.4.2
6.4.3	Provide support and assistance to developing MCCs within DDR	n/a	n/a	n/a	D	Provide short statement of plans to accomplish these requirements

3. EXPLANATORY COMMENTS AS REQUIRED FOR ITEMS IN SECTION 2, SUMMARY TABLE

(List each comment by reference to test paragraph number from column 1 of Summary Table)

4. OTHER INFORMATION RELEVANT TO THE COMMISSIONING TEST

(Include any comments not covered elsewhere on the conduct, analysis, or results of the commissioning test)

5. RECOMMENDATIONS

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ANNEX G

MCC COMMISSIONING GUIDELINES

G.1 COSPAS-SARSAT COMMISSIONING POLICY

The general principles of the Cospas-Sarsat Council policy regarding Ground Segment equipment commissioning, including MCC commissioning, are provided in the document C/S P.011 "Cospas-Sarsat Programme Management Policy". These principles shall prevail if any discrepancy is found in these guidelines for MCC commissioning.

G.2 MCC COMMISSIONING PROCESS

The following principles govern the implementation of the Cospas-Sarsat MCC Commissioning Standard (C/S A.006).

G.2.1 In preparation for its commissioning and integration into the Cospas-Sarsat Ground Segment, the developmental MCC (DMCC) shall follow the steps indicated in the "Guidelines for Integration of New MCCs in the Cospas-Sarsat System", (Annex B to C/S A.006). These pre-test actions include:

- coordinating its future service area and communication links with other Cospas-Sarsat MCCs;
- determining, in coordination with the Joint Committee, the Host MCC which accepts to participate in the DMCC commissioning tests; and
- developing the required bilateral arrangements between DMCC and the Host MCC.

G.2.2 The DMCC will be responsible for equipment which may be required for performing the commissioning tests. Costs associated with performing the commissioning tests should be addressed in bilateral arrangements between the DMCC and the Host MCC, as appropriate.

G.2.3 A pre-test shall be run to identify possible SIT-format errors in messages issued by the DMCC or the Host MCC and all deficiencies shall be eliminated prior to the operational testing which will be performed for a minimum of 24 hours and a maximum of seven days.

G.2.4 The commissioning test plan shall include testing of all basic functional requirements and evaluating all performance parameters specified in the Cospas-Sarsat MCC Specification and Design Guidelines document (C/S A.005). For those functional requirements which cannot be tested and measured in a practical way, the DMCC shall provide a declaration stating that these capabilities are met.

G.2.5 The DMCC shall, in coordination with the Host MCC, analyze the test data and produce a Commissioning Report to be submitted to the Secretariat through the Host MCC Representative, for distribution to Ground Segment Providers and User States.

G.2.6 A statement by the Host MCC Representative that the requirements of document C/S A.005 "MCC Performance Specification and Design Guidelines" are met by the DMCC, shall be considered sufficient to declare that the DMCC is operational and ready for integration into the Cospas-Sarsat Ground Segment, as coordinated with the Joint Committee.

G.2.7 The Joint Committee shall, at its following meeting, review the DMCC report and recommend to the Cospas-Sarsat Council, as appropriate, formal commissioning of the DMCC.

G.2.8 The connection of a new LUT to an MCC which is currently in operation would not require repeating the Commissioning procedure for that MCC. However, the test of the LUT/MCC communication link, which is not part of the LUT commissioning procedure, will have to be performed by the MCC Operator, after it has been verified that the LUT meets the criteria of document C/S T.002 or C/S T.009.

G.3 GRANTING OF IOC AND FOC STATUS

In accordance with the Cospas-Sarsat policy for Ground Segment equipment commissioning as stated in document C/S P.011.

G.3.1 an MCC will be granted IOC status at the date agreed with the Nodal MCC after it has:

- declared its service area in accordance with document C/S P.011,
- demonstrated its capability to exchange Cospas-Sarsat data in accordance with the DDP, including with its own RCCs, and
- met the requirements of the MCC Performance Specification, C/S A.005, and the MCC Commissioning Standard, C/S A.006.

G.3.2 FOC status will be granted three months after IOC, provided that the MCC has satisfied all applicable Cospas-Sarsat performance requirements during IOC operation;

G.3.3 on reaching the FOC date the nodal MCC should confirm to all MCCs and the Secretariat that all necessary procedures have been established; and

G.3.4 commissioning of an MCC by the Cospas-Sarsat Council and the attribution of IOC and FOC dates are without prejudice to any bilateral discussions on service areas.

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ANNEX H**DECLARATION OF DMCC ON OPERATOR CAPABILITY**

The DMCC declares that its operators are capable of performing the following functions without the need for external support:

Nr.	TASK	Reference C/S A.005	YES	NO
1	Selectively report alert data for a particular beacon	3.10.1		
2	Selectively suppress or process transmission of alert data for a particular beacon	3.1.4, 4.3.1, 4.3.2 & 5.8.1		
3	Retransmit a specified message	3.10		
4	Respond to direct requests from MCCs and SPOCs	3.1.2		
5	Retrieve information on request	3.10, 3.10.1, 3.10.2 & 5.8.4		
6	Use all identified communication links	3.4.3		
7	Monitor its national ground segment	3.6		
8	Account for all messages received and transmitted	3.1.3		
9	Transmit narrative messages SITs 915, 925 and 605	3.5.2		
10	Access a beacon register	3.9, 5.8.3 & 5.8.4		
11	Notify status if an anomaly is detected & implement backup	3.6.5, 3.7 & 5.8.2		

Note: This declaration is to be provided to the HMCC prior to the integration test and formal commissioning.

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ANNEX I**DECLARATION OF DMCC INITIAL OPERATIONAL CAPABILITY**

Minimum information to be given by the Host MCC when declaring an MCC at IOC.

Date / Time IOC declared for MCC (ID) :

MCC Contact numbers for alerts :

Primary

Secondary

Other

Person to person contact numbers :

E-Mail Address :

MCC Telephone :

MCC Fax :

Officer-In-Charge Name :

LUT Commissioned and Report Submitted to the Secretariat (Yes / No) :

LUT Position:

City :

LUT ID :

GEOSORT Search & Rescue regions supported :

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