COSPAS-SARSAT
JOINT COMMITTEE
NINETEENTH MEETING

7 – 14 June 2005
London, UK

REPORT TO THE COSPAS-SARSAT COUNCIL

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COSPAS-SARSAT JOINT COMMITTEE

REPORT OF THE NINETEENTH MEETING

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee (JC-19) was opened on Tuesday, 7 June 2005. The meeting was chaired by Mr. Rick Vizbulis (USA), who extended his welcome to all the delegates and introduced the Chairpersons of the two Working Groups:

Operations Working Group:	Mr. Steve Huxley (UK)
Technical Working Group:	Mr. Michel Sarthou (France)

A list of participants is included at Annex 1. The meeting was attended by delegations from:

Algeria
Argentina
Australia
Brazil
Canada
Chile
China (People's Republic of)
Denmark
France
Hong Kong, China
Indonesia
Italy
ITDC
Japan
Korea (Republic of)
Netherlands (The)
Nigeria
Norway
Pakistan
Peru
Poland
Russia
Saudi Arabia
Singapore
South Africa
Spain
Switzerland
Thailand
Tunisia
Turkey
United Kingdom
United States of America

The following international organisations were also represented:

Comité International Radio Maritime (CIRM)
the European Space Agency (ESA)
EUMETSAT
the Galileo Joint Undertaking (GJU)
the International Mobile Satellite Organization (IMSO)
the International Telecommunication Union (ITU)
the Radio Technical Commission for Maritime Services (RTCM)

A list of documents submitted to JC-19 is included at Annex 2.

AGENDA ITEM 1: APPROVAL OF AGENDA

1.1 The Joint Committee noted the provisional agenda for JC-19 as provided in document JC-19/1/1 (Secretariat).

1.2 The Joint Committee also noted document JC-19/1/2-Rev.1 (Secretariat) which provided information on Council decisions of interest to the Joint Committee.

1.3 The Joint Committee further noted the draft work plan for the meeting as provided in document JC-19/1/3 (Chairman).

1.4 The Joint Committee agreed that the requests of the Council would be considered under the appropriate agenda items as indicated in the work plan, and approved the agenda as included at Annex 3.

AGENDA ITEM 2: SYSTEM STATUS AND OPERATIONS REPORTS

2.1 Cospas-Sarsat Report on System Status and Operations

2.1.1 The Joint Committee noted from document JC-19/2/1 (Secretariat) that:

a) the draft Cospas-Sarsat Report on System Status and Operations No. 21 (January to December 2004) was prepared by the Secretariat on the basis of reports by 28 Participants; and

b) several Participants had not submitted annual reports while others were received after the draft Cospas-Sarsat Report on System Status and Operations No. 21 was completed.

2.1.2 The Joint Committee noted from document JC-19/2/1 that, in 2004:

a) the Cospas-Sarsat System comprised seven polar-orbiting and five geostationary satellites, 43 operational LEOLUTs, 13 GEOLUTs, 26 operational MCCs, about 379,000 406 MHz beacons and 620,000 121.5 MHz beacons;

b) data provided by Participants indicated that at least 1,462 persons had been rescued in 439 distress incidents assisted by Cospas-Sarsat and the total number of persons rescued since 1982 had reached 18,579 in 5,290 distress incidents;

c) the 406 MHz system was used in 55.1% of events, assisting in the rescue of 1,018 persons, and the 121.5 MHz system assisted in the rescue of 444 persons;

d) 67% of all SAR events assisted by Cospas-Sarsat were maritime incidents, 24% were PLB events and 9% were aviation incidents; and

e) 14 sources of persistent 406 MHz interference were reported by Participants performing routine interference monitoring in the 406.0 - 406.1 MHz band (compared with 28 interference sources in 2002 and 27 interference sources in 2003).

2.1.3 The Joint Committee noted from discussion of the draft Cospas-Sarsat Report on System Status and Operations that in 2004:

a) in comparison with 2003, the figures showed a small decrease in the 406 MHz false alert rate computed as a ratio of the total beacon population (i.e. 2.7% in 2004 against 2.9% in 2003); and

b) the average false alert rate computed from a SAR response perspective as a ratio of the total number of alerts was 97.7% for 121.5 MHz and 95.8% for 406 MHz beacons (98.2% and 95.7% respectively in 2003).

2.1.4 The Joint Committee agreed:

a) that all Cospas-Sarsat Participants should review the draft Cospas-Sarsat Report on System Status and Operations No. 21 (January to December 2004) and provide their comments to the Secretariat prior to 1 September 2005;

b) that the final Report would be prepared by the Secretariat for submission to the Thirty-Fifth Council Session in November 2005 (CSC-35), taking into consideration all comments received from Participants and the reports received before 1 September 2005;

c) to request all Cospas-Sarsat Participants to provide their 2005 annual reports no later than 31 March 2006 and in accordance with the approved format of document C/S A.003;

d) to invite all MCC operators to provide SAR incident reports on a quarterly basis according to the format provided in Annex B to document C/S A.003; and

e) to request all Ground Segment operators performing routine interference monitoring in the 406.0 - 406.1 MHz band to provide monthly interference reports on persistent interferers to the Secretariat, using the reporting format as presented in Annex C to document C/S A.003, and to the ITU in accordance with their national procedures.

2.2 Status Reports by Participants

2.2.1 Algeria

Algeria's report on System status and operations was provided as document JC-19/2/4.

Algeria reported that the Algerian ground segment had been working well in 2005. The ALMCC, which had reached FOC status in 1996, was operating normally. In 2005, the Algerian alert system was enhanced by the implementation of one new LEOLUT and one new GEOLUT, located at Algiers. It was noted that the commissioning reports for these LUTs were submitted to JC-19.

It was also noted that the ALMCC was linked with the SPMCC as part of the new South Central DDR.

A Cospas-Sarsat SAR exercise was conducted in February 2005 at a national level in order to promote Cospas-Sarsat issues.

2.2.2 Argentina

Argentina's report on System status and operations was provided as document JC-19/2/18. During 2004, the system provided data for six different SAR missions, as reported to the Secretariat.

Argentina reported that the ground segment was operating to full capacity. Cospas-Sarsat alert data was being distributed to all RCCs in its service area, in compliance with Cospas-Sarsat operational requirements. The latest system upgrades were reported in document JC-19/4/22.

Tests of combined LEO/GEO processing started in May 2005. The ground segment system provider advised that anomalies found in the data collected from the LEOLUT called for further analysis. More information was expected from the provider before testing continued.

FTP-VPN had been operational since 1 April 2005 as the primary communication interface with the nodal MCC (USMCC). AFTN was the fall back interface and Telex was retained as a third choice. X.25 would be phased-out in June 2005. The migration of AFTN services in Argentina to AMHC was scheduled to start in August 2005.

A web page (www.sass.gov.ar) had been created to provide information on matters of general interest relating to the Cospas-Sarsat Programme, and to promote the migration to 406 MHz beacons among users.

As reported in document JC-19/Inf.2 (Argentina), a procedures manual was distributed by the Satellite-Aided Distress Alert Service to all its RCCs, with prior approval from the Ministry for Foreign Affairs. Internal Satellite-Aided Distress Alert Service procedures had also been regulated in line with Cospas-Sarsat requirements.

2.2.3 Australia

The Australian report on System status and operations was provided as document JC-19/2/2.

Australia reported that the Australian ground segment, comprising 2 LEOLUTs and the primary, back-up and training MCCs, were functioning normally. A new Bundaberg LUT was installed in 2004 and a new Albany LUT would become operational in 2005. As at 2 June 2005 there were 7,588 beacons on the Australian 406 MHz register. Beacon registrations had been increasing at about 200 beacons per month since January 2005. The AUMCC had provided back-up for the CMC and the Eastern DDR for an 18-hour period on 25 May 2005.

Implementation of FTP-VPN communications was progressing and was expected to be operational by August 2005.

The Australian RCC/AUMCC premises would be upgraded in 2005. The RCC/AUMCC was expected to relocate to a new back-up site for a one-month period whilst the upgrade took place.

2.2.4 Brazil

The Brazilian report on System status and operations was provided as document JC-19/2/28.

Brazil reported that the Brazilain ground segment was fully operational and comprised the following:

- One MCC with 2 OCCs (one back-up);
- One GEOLUT and one LEOLUT in both Brasilia and Recife;
- One LEOLUT in Manaus (to be commissioned); and
- LEO/GEO combined processing in Recife and Brasilia (to be commissioned).

The Manaus LEOLUT commissioning report and the Brasilia LEO/GEO combined processing commissioning report were submitted to JC-19.

The national authorities were continuing their educational efforts to promote the Cospas-Sarsat Programme throughout the country and in South America.

Brazil had presented information on the increase of the 406 MHz registered beacon population and other Cospas-Sarsat issues during the Carribean/South American (CAR/SAM) SAR meetings in 2003, 2004 and 2005.

2.2.5 Canada

The Canadian report on System status and operations was provided as document JC-19/2/25-Rev.1.

With respect to the space segment, Canada reported that 121.5 MHz SARR payloads were operational with the exception of Sarsat-8, which was at limited operations due to thermal cycling failure in the RF assembly. Two 243 MHz SARRs were similarly affected, with Sarsat-7 at limited operations, and Sarsat-8 non-operational. All 406 MHz SARR payloads were fully operational. On 20 May 2005, the Sarsat-10 SARR payload was launched and was currently being tested. Other SARR payloads were pending.

Commissioning tests of the Ottawa CTEC LEOLUT were complete and it was recommended for addition to the Cospas-Sarsat System. Availability of the LUTs and MCC was 99.8% and all were currently at FOC.

CMCC had reported on excessive interference on the 121.5 MHz frequency band from pirated Direct to Home (DTH) satellite access cards. The 121.5 MHz false alert rate remained largely unaffected, as CMCC could identify these spurious transmissions as interference.

Through its Transition to 406 Working Group, Canada was advancing national efforts to prepare for the 121.5 MHz satellite alerting phase-out.

2.2.6 Chile

The Chilean report on System status and operations was provided as document JC-19/2/21.

Chile reported normal operation of the Chilean Mission Control Center by the Chilean Air Force with three LUTs in Santiago, Punta Arenas and Easter Island (which is operated together with the Chilean Navy), and one GEOLUT, that receives information from GOES-12. These alert data are distributed among the five domestic RCCs in Chile and the SAR points of contact in Bolivia, Paraguay and Uruguay.

The primary communication link for the CHMCC was AFTN with X.25 as a secondary channel. From 1 May 2005 the CHMCC would no longer support Telex, due to the termination of the contract with the service provider because of the obsolescence of the system, the lack of spare parts and the excessive cost of maintenance.

This channel would be replaced by FTP-VPN, which should be enabled in the short-term. According to the scheduled terms in the proposed program, this channel should have already been in operation, but its implementation had been delayed due to the uncertainty of the new location of the CHMCC.

Chile reported that it had an agreement to back-up Argentina in the event that the ARMCC was unable to fulfill its obligations and that the USMCC served as a back-up to the CHMCC if it were disabled.

The Chilean Air Force was continuing its work with aeronautical authorities concerning the phase-out of 121.5/243 MHz satellite alerting. They had established temporary regulations in order to prepare the aeronautical community for deactivation of the mentioned frequencies.

During the period of operation, the CHMCC provided the alert data in an important case. The fishing ship "Gabriela I" sank 70 nautical miles from Arica City, and the 11 crewmembers were rescued by a ship of Chilean flag "Gavilán", which, later, arrived to Arica Harbour and the survivors were transferred to a local hospital.

Finally, it was reported to JC-19 that the CHMCC would be moved, according to the Government of Chile's decision to close Los Cerrillos Airport, where it was currently located. The move would be carried out in July 2006 to a new location which was yet to be determined. The new location, as well as the full operational status after the move, would be reported appropriately to the Cospas-Sarsat Programme.

2.2.7 China (P. R. of)

The representative of China introduced China's report on System status and operations as document JC-19/2/34 and reported that during 2004 the system ran normally. No new hardware or software replacements were made.

In the last year, there were 8 EPIRB real distress alerts in the CNMCC service area and China RCC rescued 115 people.

It was also reported that China was in the process of upgrading their LUT and MCC equipment. It was expected that the project would be completed by early 2006. According to the requirement of the nodal MCC, the X.25 link would be phased out and a new FTP-VPN link would be installed in the near future. An SSAS processing module would also be included in the new system.

The representative of China informed JC-19 of progress on the issue of the Vietnam MCC service area. The first meeting between representatives of China MCC, Hong Kong MCC and Vietnam MCC was held on 26 April 2005 in Vietnam. A consensus on the VNMCC service area was not reached, but it was agreed that another meeting should be held in May 2005 in China with a view to reporting the outcome to the JC-19 meeting. It was also agreed that Vietnam should propose a service area for discussion and that personnel attending the next meeting should come with authorisation to make an agreement from their respective government.

The delegate of China reported that Vietnam did not attend the second meeting, so no further progress had been made prior to the JC-19 Meeting. China would proactively liaise with Vietnam on this issue in the coming months.

2.2.8 Denmark

Denmark reported with reference to document JC-19/2/31 that the orbitography beacon at Thule performed within specification and that this orbitography beacon was monitored by Norway.

A total of 2,089 406 MHz beacons were registered in the Danish registries.

2.2.9 France

The French report on System status and operations was provided as document JC-19/2/14.

During the January to December 2004 time period, the space segment, composed of Sarsat-4, -7, -8 and -9 (Sarsat-4 was decommissioned on 16 June 2004), and the ground segment, composed of a dual LEOLUT system, a GEOLUT, an orbitography and time reference beacon and the Toulouse MCC, had been operational and no significant problems had occurred.

The LUT/MCC availability was as follows:

MCC system availability:	99.89%	
LEOLUT data availability:	99.25%	(Dual LUT System)
GEOLUT data availability:	99.21%	

The French representative also reported that:

- Sarsat-10 was launched on 20 May 2005 and the SARP payload was ready to enter IOC,
- the FTP-VPN channel was operational as a primary link between the FMCC and the USMCC, the SPMCC and the JMCC. New FTP-VPN links would soon be established with all the nodal MCCs as well as with the MCCs inside the Central DDR,
- the first of five third generation SARP-3 payloads would fly on METOP 1 (Sarsat-11), scheduled for launch in April 2006,
- the Kerguelen reference beacon was now operational at 406.022 MHz,
- the French 406 MHz beacon registration database was under commissioning and would be operational in September 2005,
- an RFQ for the MCC equipment replacement would be issued in September 2005,
- a Central DDR meeting was held in Southampton on 22-24 February 2005,
- the FMCC commissioned the SPMCC as a nodal MCC on 5-11 April 2005.

The FMCC had taken part in the annual System level test.

2.2.10 Hong Kong, China

The Hong Kong report on System status and operations was provided as document JC-19/2/17.

Hong Kong reported that the 406 MHz beacon population in 2004 included 925 EPIRBs and 134 ELTs. The HKMCC and the two HKLUTs were fully operational and had recently undergone a software upgrade.

The HKMCC and TAMCC conducted an annual back-up exercise successfully in January 2005. The nodal JAMCC, the USMCC and the AUMCC were thanked for their assistance in the exercise.

2.2.11 Indonesia

The Indonesian representative introduced document JC-19/2/3-Rev.1 and reported that during the period from 1 January to 31 December 2004, the IDMCC and Jakarta LUT were fully operational, but that the Ambon LUT was not operational. Indonesia planned to decommission the Ambon LUT and to install a new LUT at Makassar, in line with the Indonesian ATC master plan.

Indonesia also reported the number of registered 406 MHz ELTs and EPIRBs was 34 and 37 respectively.

Interference in the 406 MHz band had been detected at Bengkulu between 7 December 2004 and 24 March 2005, but it was currently under control as no further interference existed.

The government of Indonesia was preparing to establish a connection to AFTN and create a network for secure FTP which would be in operation at the end of 2005.

2.2.12 Italy

The Italian report on System status and operations was provided as document JC-19/2/16. The Italian MCC was working properly throughout 2004. Results of the annual System test, performed in January 2005, pointed out some software errors which were resolved by the software technician.

From the beginning of 2005, the Italian Mission Control Centre ceased supporting the SPMCC as the SPMCC became nodal MCC for the new South Central DDR. The Italian delegate expressed his appreciation to the SPMCC for their former cooperation.

It was expected that a GEOLUT would be added to the system in Bari to speed up support of the 406 MHz beacon detection.

Currently, 2,646 EPIRBs and 519 ELTs were registered on the beacon register. It was expected that numbers would increase due to the phase-out of 121.5-243 MHz satellite alerting.

A software company had been contacted to undertake the update of the beacon register with a special Internet interface which would permit online beacon registration directly by the owner with special password and user name authorisation. The interface would also encourage the same users to interact with the Cospas-Sarsat Italian website, for better understanding of the Cospas-Sarsat System.

Just prior to JC-19, an email concerning ELT coding was sent to all beacon manufacturers, highlighting the coding procedure for Italian ELTs. Many Italian ELTs were being coded with serial numbers, a procedure unacceptable to Italy. This created problems for SAR services in determining the beacon source in case of activation, as the Italian Satellite Station did not register that type of beacon.

The email requested that beacon manufacturers refer to the Italian page of the C/S S.007 document, where the coding procedures accepted by Italy were explained.

It was also noted that since the beginning of this year, Italy began to accept a 24-bit aircraft address as a new approved coding procedure, as there were new beacons with a GPS device that required coding in this manner.

It was requested that this information be updated in C/S S.007.

2.2.13 ITDC

Following the JC-18 recommendation, the TAMCC successfully installed FTP-VPN for communications with the JAMCC and the HKMCC, as well as a support service for the SSAS function on 26 December 2004.

The annual mutual back-up test between the HKMCC and the TAMCC for 2004 was successfully completed on 28 January 2005, which was a little late, as the TAMCC undertook a software upgrade in December 2004.

From October until 20 December 2004, when the system software was upgraded and hardware repaired, the two LUTs had not been operational with 406 MHz SARP data.

The detailed report on System status and operations was provided as document JC-19/2/12.

ITDC noted the incident that took place in February 2005, when the Taiwanese gravel ship Jui-Tai No.8 and its 18 crewmen went missing. The representative of ITDC emailed Programme Participants for assistance and although the ship was not found, he expressed his appreciation to the 14 countries that had attempted to assist in the matter.

2.2.14 Japan

Japan's report on System status and operations was summarised in document JC-19/2/22.

Japan also remarked on the planned replacement of its MCC and LUT, scheduled for the 2006 fiscal year (between April 2006 and March 2007), and that FTP-VPN was operational with the HKMCC, the TAMCC, the USMCC and the FMCC. Japan also stated that Telex had been terminated in March 2005 and that X.25 would be terminated in March 2006.

2.2.15 Korea (Rep. of)

Korea's report on System status and operations was provided as document JC-19/2/27.

The Korean LUTs and MCC, located in Daejeon, were operating normally, with no significant events or anomalies during the period of operation.

At the end of 2004, the number of registered 406 MHz beacons by category was 4,214 EPIRBs and 258 ELTs. With respect to 121.5 MHz beacons, there were approximately 229 ELTs.

The number of 406 MHz beacon activations reported to RCCs/SPOCs within the MCC service area included 19 distress alerts, 242 false alerts and 16 undetermined. The 406 MHz beacon false alert rate was 93.14%.

The number of false alerts had increased proportionally to the increase in beacon population. To reduce the false alert rate, the KOMCC, through meetings among the related departments, had requested that the KORCC operators who actually controlled false alerts in the field, and beacon users, should pay attention to the cause of false alerts and endeavour to avoid causing the same kinds of false alerts again.

The FTP-VPN link was about to be implemented and AFTN was expected to be installed in 2006.

The administrative procedure to relocate the LUT/MCC from Daejeon to Incheon was on-going. The relocation work would be finished early 2006.

2.2.16 Netherlands (The)

The report on the Netherlands System status and operations was provided as document JC-19/2/6-Rev.1.

The Dutch representative presented the figures for the Netherlands for the year 2004.

The Netherlands observed a slight increase in the amount of alerts from PLBs and ELTs, however the overall figures showed no significant change from previous years.

Mail exchange with regard to NOCR messages was reported. The Dutch representative noted a year of excellent cooperation with the French MCC in Toulouse and expressed his gratitude for this continued cooperation.

2.2.17 Nigeria

The Nigerian report on System status and operations was provided as document JC-19/2/19.

Nigeria reported that following submission of the Abuja LEOLUT commissioning report to JC-18, the Council at its 33rd Open Session in October 2004, had approved the commissioning of the Abuja LEOLUT into the Cospas-Sarsat System.

It was also reported that the NIMCC was updated in September 2004 to process ship security alert messages.

It was noted that work had begun on the installation of AFTN and FTP-VPN communication links. As soon as these installations were completed, testing for commissioning would begin with the SPMCC.

The NIMCC and national aviation and maritime administrations had set up a committee to organise a national workshop for beacons users. The workshop was expected to educate users on beacon handling, beacon registration and the phase-out of 121.5 MHz satellite alerting. The workshop was planned for July 2005.

2.2.18 Norway

Norway's report on System status and operations was presented as document JC-19/2/15.

Norway reported that the Bodoe GEOLUT was declared at IOC on 5 April 2005 and that the commissioning report had been submitted to the Secretariat and JC-19.

The NMCC was still in the process of installing FTP-VPN. This work was scheduled to be completed in August 2005.

The NMCC, together with the UKMCC, was working on a new back-up procedure for the NMCC.

A coverage test for MSG-1 in the Northern hemisphere was being conducted. An EPIRB was fitted on a Norwegian Coastguard vessel operating between 75^o and 80^o North.

2.2.19 Pakistan

The representative for Pakistan expressed his pleasure at taking part in the Joint Committee after a long absence. It was hoped that a more active involvement with the Programme could be achieved. Recent discussions were aiming to not only upgrade the system but to provide 406 MHz beacons to the relevant agencies for test and trials. PALUT/PAMCC were commissioned in 1990 and whilst quickly attaining IOC, did not achieve FOC due to continued communication problems. These problems had since been resolved using dedicated AFTN and FTP-VPN links.

The PALUT/PAMCC were operational within Pakistan and alert and location data was being forwarded to the Civil Aviation Authority (CAA), the Maritime Security Agency (MSA) and other relevant agencies on a regular basis.

The representative expressed his appreciation to Mr. Daniel Levesque and Ms. Cheryl Bertoia in the Secretariat for their assistance.

2.2.20 Peru

Peru's report on System status and operations was submitted as document JC-19/2/20. No additional presentation was made at JC-19.

2.2.21 Poland

Poland reported that the Republic of Poland had finished in-State official procedures required for State involvement in international relations. The Resolution of the Council of Ministers on the Association of the Republic of Poland with the Cospas-Sarsat Programme was passed on 25 April 2005.

The Resolution authorised the President of the Civil Aviation Office to sign the Letter of Notification of Association with the International Cospas-Sarsat Programme as a User State. According to the Resolution, the Polish Civil Aviation Authority - Civil Aviation Office would take the role of leading administrative body in both aeronautical and maritime Search and Rescue matters as the cooperating agency to the Cospas-Sarsat Programme. In accordance with in-State procedures, the Letter would be sent to the Secretary General of the International Civil Aviation Organization through the Ministry of Foreign Affairs.

The Polish delegation reported that work to establish a national beacon registration and coding policy had commenced as well as work on the beacon register, which would be available on a 24-hour basis.

2.2.22 Russia

Russia presented the report on System status and operations in documents JC-19/2/10 and JC-19/2/10-Add.1.

The Cospas-4 and Cospas-9 spacecraft were operational. Due to battery problems, Cospas-4 was defined as "not in continuous operation". The onboard equipment spontaneously switched off several times. Since 9 September 2002, Cospas-9 had only been operational in the 121.5 MHz mode.

LUT-2 (Arkhangelsk) and the CMC were operational.

LUT-1 (Moscow) was not operational and an upgrade was planned.

LUT-3 (Nakhodka) was in the final stages of modernisation, due for completion in August 2005.

The beacon population for 406 MHz registered beacons was 9,895 EPIRBs, 959 ELTs and 50 PLBs. The number of non-registered beacons was estimated at approximately 1,500 units.

2.2.23 Saudi Arabia

The representative from Saudi Arabia introduced the report on System status and operations provided as document JC-19/2/33.

Saudi Arabia reported that the SAMCC had been at FOC since 19 November 2000.

Two LUTs were connected to the SAMCC, one of which (SALUT2) was in operation.

As new licences had been approved for beacon distributors in Saudi Arabia, an increase of 406 MHz beacon registrations was expected in the next year.

System availability was approximately 95% for the MCC and 93% for the LUT. These low numbers reflect a software and hardware problem in the system during the last year.

An upgrade would be implemented to improve the performance of the system and to increase reliability.

2.2.24 Singapore

Singapore's report on System status and operations was provided as document JC-19/2/11.

Singapore reported that a new LUT and MCC were installed in March 2005 and the two commissioning reports were submitted to JC-19. Both the LUT and MCC were at IOC in early March 2005, with Australia assisting in the commissioning process.

Singapore and Thailand would be conducting a back-up test at the end of June 2005 per the Joint Committee requirement and Singapore would update the necessary documents regarding the back-up arrangements.

2.2.25 South Africa

South Africa referred the JC-19 delegates to the report on System status and operations provided as document JC-19/2/23.

There were no comments in addition to those provided in this document.

2.2.26 Spain

Spain's report on System status and operations was provided as document JC-19/2/13-Rev.1. The ground segment was formed by a LEOLUT, two GEOLUTs (one tracking the Goes-East satellite and one tracking the MSG-1 satellite) and the MCC. All the equipment was working properly and was fully operational, with an average availability of approximately 99.9%.

During 2004, Spain carried out commissioning tests on the MSG-1 GEOLUT. The results of this commissioning had been submitted to JC-19 as document JC-19/4/21.

The SPMCC results of the annual System level test that was carried out on 11-12 January 2005 showed that some test sequences did not generate the expected results. All except one problem had been resolved and the remaining problem was in the process of being resolved.

At the end of 2004, the 406 MHz beacon registration figures included 10,648 EPIRBs and 415 ELTs, which represented an increase of 18% and 21% respectively over the previous year.

The Spanish beacon false alert rate had decreased from 3.23% in 2003 to 2.17% in 2004.

In 2004, the SPMCC had implemented a new communication link to use FTP-VPN. In 2005, the SPMCC began operational use of FTP-VPN with the USMCC and the FMCC, using this as the primary line, and was working to establish this new link with the rest of the nodal MCCs.

So far in 2005 the most important issue to note was that Spain had carried out the nodal MCC commissioning tests in April. France, as host for the Spanish nodal MCC commissioning, had submitted the results to JC-19 as document JC-19/4/23.

2.2.27 Switzerland

Switzerland's report on System status and operations was presented as document JC-19/2/29.

Switzerland reported that there were 640 406 MHz ELTs and 650 406 MHz EPIRBs registered in the national database together with five PLBs. The 406 MHz ELT beacon population in Switzerland was growing fast, as the carriage of 406 MHz ELTs had been required by law since 1 January 2005 for all new aircraft and all aircraft engaged in commercial operations.

Registration of all PLBs, EPIRBs and ELTs was managed by the responsible national authorities through an Internet based database. The database and the new (J)RCC Zürich were managed and operated by a company called REGA (Swiss Air-Rescue). (J)RCC Zürich handled approximately 300 alerts (beacons, overdues, etc.) per year.

The Swiss representative expressed his gratitude to the French Mission Control Centre in Toulouse for their excellent support and ongoing assistance concerning Cospas-Sarsat matters.

2.2.28 Thailand

Thailand's report on System status and operations was presented as document JC-19/2/9.

The representative from Thailand reported that the THMCC was fully operational as were both LUTs.

At the end of 2004, the number of registered 406 MHz EPIRBs and ELTs was 362 and 172 respectively. The total alerts detected by the THMCC were 23 (EPIRB) for 406 MHz and 428 (ELT) for 121.5 MHz beacons including undetermined false alerts.

Regarding educational and regulatory action to reduce false alerts, it was noted that airlines (international commercial flights) had begun to replace 121.5 MHz beacons with 406 MHz ELTs in accordance with ICAO requirements. Thailand had made it mandatory that all aircraft be equipped with automatically activated ELTs transmitting at 406 MHz.

2.2.29 Tunisia

Tunisia had been a User State since 1994. Tunisia was interested in developing the alerting system, particularly by promoting an increased beacon population. The number of beacons registered was 145.

The number of beacon activations reported to the Tunisian SPOC during the January to May 2005 period was 17. Only two of them were classified as distress alerts and one was provided from a car/motorcycle rally.

The number of false alerts had decreased compared to previous years.

Tunisia also noted that it expected to conduct a SAR exercise in November 2005 in order to improve coordination between all administrations involved in SAR operations. Coordination between the French MCC and SPOCs receiving alerts was good.

2.2.30 Turkey

Turkey's report on System status and operations was presented as document JC-19/2/32.

Following the completion of the bidding process in September 2004 and signing of the contract in October 2004 for Turkey to become a Ground Segment Provider in the Cospas-Sarsat System, necessary equipment was installed during March and April 2005. Accordingly, two LEOLUTs, one GEOLUT and one MCC had been put in place in Ankara along with four RCCs assembled in Ankara and Istanbul.

In close cooperation with the Cospas-Sarsat Secretariat and the FMCC, the designated nodal MCC for Turkey, a number of preparatory meetings took place to plan TRMCC development. LUT commissioning tests were performed in late April and early May 2005. MCC commissioning with the French MCC was to be performed in September 2005.

In parallel, the Letter of Notification of Association was signed and submitted to the ICAO Secretary General in early May 2005. Turkey's association with the System became effective on 11 June 2005.

The commissioning of TRMCC was expected to proceed on the basis of the understandings reached at JC-19 with a view to obtaining IOC in September/October 2005 and FOC by the end of 2005. In this regard, the next meeting with the French MCC was to be held in Toulouse, France on June 15-16, 2005.

As of June 2005, the number of registered EPIRBs and ELTs within Turkey was 467 and 205 respectively.

2.2.31 United Kingdom

The United Kingdom's report on System status and operations was provided as document JC-19/2/8.

It was reported that the OCC and its back-up were fully operational at Kinloss (100% availability) and the slave OCC at Falmouth was also working normally.

UK LEOLUT – 100% serviceability.

UK GEOLUT – 99.7% serviceability.

In the near future, the UK would replace the LEOLUT ATLUT500 processor with a LUT600 processor. When this change occurred the LEOLUT600 would assume the 2321 identity.

LEO/GEO commissioning with MSG-1 would be completed after the change to the new LEOLUT600.

GEOLUT commissioning with MSG-1 was carried out and the commissioning report was submitted as document JC-19/4/8.

The available communication links in use were reported as being X.25, AFTN and Telex (limited future life but no termination date was available yet). The planned FTP-VPN testing arranged with the CMCC had started and it was expected that testing with other MCCs would commence in the near future, with full implementation before September 2005.

The UKMCC had regained its direct operational communications with the CMCC via AFTN and a Memorandum of Understanding (MOU) had been drafted. The UK representative expressed his thanks to the CMCC for their cooperation.

The back-up of the NMCC was ongoing.

As at 31 May 2005 the approximate number of 406 MHz beacons registered in the UK databases were as follows:

EPIRBs:	19,000
ELTs:	1,800
PLBs (for use in maritime environment only):	674

The UK was still experiencing problems with 406 MHz PLBs being sold by manufacturers and agents for inappropriate use in relation to existing UK regulations. In addition, PLBs coded with a UK country code were being sold for export to other countries that have their own beacon registries and regulations for PLB use.

2.2.32 USA

The USA report was documented at JC-19/2/24 and JC-19/2/24-Add.1. The USA reported that during 2004 there were more than 200 persons rescued with the assistance of the Cospas-Sarsat System. In terms of the space segment, NOAA-18 (Sarsat-10) had been launched on 20 May 2005 and was currently under test. An initial operational capability was expected to be declared after the JC-19 Meeting. In addition to Sarsat-10, Sarsat-6, -7, -8, and –9 continued to operate in a low-earth orbit.

In the geostationary orbit, GOES-9, -10, and –12 were operational providing coverage for the Pacific and Atlantic Oceans as well as the Western hemisphere in general. GOES-N was scheduled to be launched on 23 June 2005.

Five Global Positioning System (GPS) satellites in the Block IIR series were providing a MEOSAR capability on an experimental basis.

The ground segment, including the USMCC and 10 LEOLUTs was operational. The USA also began operations for two GEOLUTs in Maryland. With the introduction of the new LEOLUTs, the LEOLUTs previously operating in Texas were decommissioned. The USA was also developing an experimental MEOLUT which was expected to be completed by the end of 2005. The orbitography beacon in Antarctica had been switched to 406.022 MHz and would begin operation in July 2005. Finally, the USMCC and all the LUTs in Maryland were expected to be moved to the new NOAA Satellite Operations Facility in November 2005.

The total number of 406 MHz beacons registered had passed 120,000. Of particular note were the more than 6,500 ELTs and 5,000 PLBs registered. The USA was focusing on preparations for the phase-out of 121.5 MHz satellite alerting and had established the Phase Out Working Group under the National Search and Rescue Committee.

2.2.33 CIRM

The representative from the Comité International Radio Maritime (CIRM) outlined that CIRM was an international organisation that represented maritime equipment manufacturers and related organisations interested in radio communications and navigation equipment predominantly for the commercial shipping market. CIRM had observer status at the IMO and made regular contributions to the work of the MSC, COMSAR and NAV committees. CIRM also participated in the work of ITU working party 8B and the international standards development work of IEC TC80. Most major 406 MHz beacon manufacturers were members of CIRM and participated in the work of Cospas-Sarsat, especially in the work of the Joint Committee and the TWG.

CIRM valued its ongoing relationship with Cospas-Sarsat and looked forward to participating at the meeting.

Further information on CIRM could be found at www.cirm.org.

2.2.34 ESA/GJU

The representatives of the European Space Agency (ESA) and GJU (Galileo Joint Undertaking) expressed their appreciation for the invitation to attend the JC-19 Meeting. ESA had been supporting Cospas-Sarsat through a number of programmes (MSG, METOP). ESA would continue such cooperation, including supporting MEOSAR systems in association with the European Union, with the aim of further augmenting future Search and Rescue efforts.

The in-orbit validation phase (IOV) of Galileo, based on four satellites in-orbit and the appropriate ground infrastructure, was initiated at the end of 2004. The IOV constellation included SAR payloads in accordance with C/S R.012 (MIP). The procurement of SAR transponders for Galileo satellites was expected to start in September of 2005, while the SAR antenna procurement would be ongoing.

The MEOLUT contract was awarded on 4 May 2005. The contract was aimed at developing a full MEOLUT capability for the coverage of the European region, with in-orbit validation starting in the second half of 2008. The contract also included the development of a return link service capability to provide a communication link from SAR rescue teams to activated beacons.

2.2.35 EUMETSAT

The EUMETSAT representative reported that MSG-1 had officially entered operational service at 3.4^{o}W on 27 January 2004. The launch of MSG-2 was forecast for the end of August 2005. Commissioning of the satellite at 10.5^{o}W would be conducted jointly with CNES in Toulouse, France, as for MSG-1.

The switch off of MSG-1 GEOSAR Payload (or MSG-2 should MSG-1 demonstrate superior performance) would be done at a mutually agreed date, several months after launch. Six months after launch, MSG-2 would be relocated at 0^{o}.

The launch of the METOP satellite was planned for April 2006.

2.2.36 ITU

The ITU was represented at the JC-19 Meeting by the Head of the data processing and publication division of the Radiocomunication Bureau who was pleased to report and further discuss the ongoing activities in the ITU related to Cospas-Sarsat.

The first issue concerned the cases of harmful interference originated by unauthorised emissions in the 406.0-406.1 MHz band. An oral report on the actions undertaken by the ITU was made under agenda item 8 (Interference Monitoring).

The ITU also wished to address the issue of updating EPIRB information recorded in its maritime databases, available via the Internet through the MARS system.

2.2.37 RTCM

The representative from the Radio Technical Commission for Maritime Services (RTCM) outlined that RTCM was an international non-profit scientific, professional and educational organisation. RTCM had over 100 member organisations (not individuals) that were both non-government and government. RTCM Special Committees provided a forum in which government and non-government members worked together to develop technical standards and consensus recommendations in regard to issues of particular concern.

Technical standards developed by the Special Committees relevant to the work of Cospas-Sarsat included 406 MHz Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) and 406 MHz Satellite Personal Locator Beacons (PLBs).

Further information on RTCM could be found at www.rtcm.org.

RTCM was honoured to be a part of the JC-19 Meeting and the work done on 406 MHz beacon issues in both the OWG and the TWG.

2.2.38 Other Participants

The Joint Committee noted the reports on System status and operations provided by Germany (JC-19/2/7), Greece (JC-19/2/5) and India (JC-19/2/26) who were not represented at the JC-19 Meeting. New Zealand, Sweden and Vietnam did not attend the JC-19 Meeting and had not provided a report.

AGENDA ITEM 3: SPACE SEGMENT MATTERS

3.1 Space Segment Status

Sarsat LEOSAR Payloads

3.1.1 The Joint Committee noted from document JC-19/3/1 (Secretariat) and information provided by Canada, France and the USA:

a) the status of Sarsat LEOSAR satellites Sarsat-6, Sarsat-7, Sarsat-8, Sarsat-9 and Sarsat-10;

b) that at the end of March 2004, the 121.5 MHz repeater performance of the Sarsat-8 satellite began degrading;

c) that the NOAA-N (Sarsat-10) spacecraft was launched from Vandenberg Air Force Base, California, USA on Friday, 20 May 2005 and was expected to be declared at IOC in the near future; and

d) the following anticipated launch dates for Sarsat payloads:

METOP-A (Sarsat-11)	April 2006
NOAA-N’ (Sarsat-12)	June 2008
NPOESS (C-1) (Sarsat-13)	November 2009
METOP-B (Sarsat-14)	June 2010.

Cospas LEOSAR Payloads

3.1.2 The Joint Committee noted from documents JC-19/3/1 and information provided by Russia:

a) the status of Cospas LEOSAR satellites Cospas-4 and Cospas-9, and in particular that Cospas-4 operation would remain intermittent due to battery problems, with limited availability in the Southern hemisphere; and

b) that launches of the small dedicated satellites Cospas-11 and Cospas-12 were planned for 2006 and 2007, respectively.

GEOSAR Payloads

3.1.3 The Joint Committee noted from document JC-19/3/1 and information provided by the USA:

a) the status of GEOSAR satellites GOES-East (GOES-12) at 75^{o}W, GOES-West (GOES-10) at 135^{o}W and GOES-9 at 155^{o}E; and

b) the following anticipated launch dates for future GOES GEOSAR satellites:

GOES-N	June 2005
GOES-O	July 2007
GOES-P	October 2008
GOES-R	April 2012.

3.1.4 The Joint Committee noted from document JC-19/3/1 that:

a) the GEOSAR satellite INSAT-3A (93.5^{o} E) was operational; and

b) INSAT-3D (83.5^{o}E) was planned for launch in 2006 and would serve as an in-orbit spare for INSAT GEOSAR operations.

3.1.5 The Joint Committee noted from documents JC-19/3/1, JC-19/Inf.9 (Secretariat) and information provided by France that:

a) the EUMETSAT geostationary satellite Meteosat Second Generation (MSG-1) was operational at 3.4°W;

b) the MSG-2 launch was expected in 2005 and would be followed by a commissioning phase at 10.5°W during which both MSG-1 and MSG-2 GEOSAR missions would operate in parallel; and

c) MSG-2 would replace MSG-1 (staying at 3.4°W) as the operational MSG satellite about 7 months after the launch.

Future Russian GEOSAR Payloads

3.1.6 The Joint Committee noted from document JC-19/3/1 and information provided by Russia that the Russian geostationary satellite Electro-L, which would include a 406 MHz repeater payload with a broad beam downlink, was planned for launch in the second quarter of 2007 and would be positioned at 76ºE.

3.2 Space Segment Frequency Matters

No documents were submitted for consideration under this agenda item.

3.3 Other Space Segment Matters

SARP-3 Instrument

3.3.1 The Joint Committee noted from document JC-19/Inf.3 (France):

a) the description of the Sarsat SARP-3 instrument, which was scheduled to be launched in early 2006 on the METOP-A satellite;

b) that the SARP-3 would support existing 406 MHz beacons and a possible “new generation” beacon that would be able to operate with half the standard beacon power while still providing superior bit error rate performance; and

c) that France had developed a new time reference beacon that would be used in conjunction with the SARP-3 instrument to optimise LEOLUT Doppler location performance.

3.3.2 The Joint Committee noted from discussion concerning the SARP-3 downlink data structure, that:

a) all LEOLUTs would require a modification to their software to process SARP-3 data; and

b) although the description of the SARP-3 downlink data structure was defined in document C/S T.003 (LEOSAR space segment description), a file containing an actual example of the downlink data stream would be useful for testing LEOLUT software modifications.

3.3.3 The Joint Committee noted from discussion concerning the new time reference beacon, that:

a) the burst repetition interval of the time reference beacon would be 30 seconds plus a small fixed duration no greater than 10 milliseconds;

b) France was conducting analysis to define the value for the additional "small fixed duration" that would optimise LEOLUT processing of Sarsat SARP-2 and SARP-3 data;

c) LEOLUTs would require a modification to their software to accommodate the pulse repetition interval of the new reference beacon; and

d) failure to modify the LEOLUT software prior to the introduction of the new time reference beacon would adversely affect the LUT Doppler location accuracy performance.

3.3.4 The Joint Committee noted the views expressed by participants concerning a possible new generation beacon supported by the SARP-3 instrument, and that any testing of new designs should be conducted in a 406 MHz channel not currently used by operational beacons.

3.3.5 The Joint Committee agreed (TWG-19/AI.1) to invite:

a) France to develop a test file of the SARP-3 downlink, and to provide this file to LEOLUT manufacturers on request;

b) France and other interested Participants to conduct analysis to define the optimum pulse repetition interval for the new time reference beacon and to report their findings to CSC-35;

c) France to distribute a System wide message announcing the date for the introduction of the new time reference beacon and the beacon's pulse repetition interval, as soon as this information was available;

d) Ground Segment operators to modify their LEOLUT software prior to the launch of the METOP-A satellite to:

- process the SARP-3 downlink,
- maintain their LEOLUT Doppler location performance when the new time reference beacon is introduced in the System; and

e) France to propose updates to the orbitography beacon specification (C/S T.006) and the DDP (C/S A.001) describing the characteristics of the new time reference beacon, for consideration at JC-20.

3.3.6 The Joint Committee also agreed that:

a) after the introduction of the new time reference beacon, LEOLUTs that had not yet been modified should only use time calibration information distributed by France in SIT 415 messages for processing data from Sarsat SARP instruments; and

b) any development testing in support of “new generation beacons” should be conducted in 406 MHz channels not used by operational beacons.

MSG-2

3.3.7 The Joint Committee noted the letter from EUMETSAT to Cospas-Sarsat copied in document JC-19/Inf.9 (Secretariat), and that:

a) the earliest planned launch date for the second MSG satellite was 23 August 2005;

b) MSG-2 would initially be placed at 10.5°W for commissioning testing, during which time the GEOSAR instruments on both MSG-1 and MSG-2 would be available;

c) the MSG-2 satellite would be moved to 0° longitude and replace MSG-1 as the operational MSG satellite approximately seven months after its launch; and

d) the decision regarding whether to turn-off the MSG-1 SAR payload, or conversely the MSG-2 SAR payload, would be taken by EUMETSAT in consultation with Cospas-Sarsat based upon demonstrated performance during the GEOSAR payload commissioning tests.

3.3.8 The Joint Committee noted from discussion:

a) that France planned to conduct MSG-2 GEOSAR commissioning testing during September and October 2005;

b) that to prevent possible interference to MSG GEOSAR operations, it was preferable that the MSG-2 GEOSAR payload be turned off while the satellite was being moved to its final position at 0°;

c) the information provided by EUMETSAT that it should be possible to accommodate a request from Cospas-Sarsat to turn off the MSG-2 GEOSAR payload while it was being moved to its final position;

d) that in the event of a decision to switch GEOSAR operations from MSG-1 to MSG-2, there might be a requirement for both payloads to be active at the same time in order to reconfirm payload performance at its final position and re-point GEOLUT antennas;

e) that individual MSG GEOLUT operators should conduct analysis to determine whether the MSG-1 and MSG-2 satellites would generate interference to each other while separated by 3.4°; and

f) EUMETSAT's request for information in respect of any observed changes in GEOSAR downlink power levels since the original MSG-1 GEOSAR payload commissioning.

3.3.9 The Joint Committee agreed (TWG-19/AI.2) to invite:

a) France to coordinate with EUMETSAT regarding the commissioning of the MSG-2 GEOSAR payload and the timing for activating and deactivating MSG GEOSAR payloads, and advise Ground Segment Operators of the details via System information messages;

b) MSG GEOLUT operators to conduct analysis to determine whether their GEOLUTs would experience interference if both the MSG-1 and MSG-2 GEOSAR payloads were active simultaneously at their final positions, and provide this information to the Secretariat; and

c) MSG GEOLUT operators to monitor the average C/No received for the Toulouse reference beacon, and advise EUMETSAT whether there had been a noticeable change since MSG-1 GEOSAR payload commissioning.

3.3.10 The Joint Committee expressed its appreciation to EUMETSAT for the excellent support and assistance provided in managing the introduction of the MSG GEOSAR instruments into the Cospas-Sarsat System.

AGENDA ITEM 4: GROUND SEGMENT MATTERS

4.1 Ground Segment Status

4.1.1 The Joint Committee noted from document JC-19/4/9 (Secretariat) the DDP tables that provided the expected status of the Cospas-Sarsat Ground Segment equipment assuming the JC-19 Meeting would recommend commissioning of MCCs and LUTs for which a report was submitted. The Cospas-Sarsat Ground Segment would then include:

a) 26 operational MCCs and 3 MCCs under development;

b) 44 operational LEOLUTS and 2 LEOLUTs under development; and

c) 18 operational GEOLUTs.

4.1.2 The Joint Committee noted the following information provided by Pakistan on their ground segment status:

a) the PAMCC and Pakistani LEOLUT were operational, but provided alerts and location data only to SAR agencies within the Pakistani territory;

b) the PAMCC was expected to undergo commissioning tests in July and August 2005 to achieve IOC and later FOC;

c) coordination with the CMC as nodal MCC was in progress and the commissioning tests would utilise an FTP-VPN channel as the primary communication link;

d) a new request for proposal to procure an MCC/LUT with LEO and GEO capabilities was expected to be announced within four months;

e) test and trials of 406 MHz EPIRBs, ELTs and PLBs were also expected within two to three months with a number of SAR agencies in Pakistan; and

f) a proactive approach was being followed to provide further information on the Cospas-Sarsat System to existing and potential users of the alert and location data provided by the PAMCC.

4.1.3 The Joint Committee:

a) noted that the status of Ground Segment equipment had been updated by JC-19 participants during the meeting, taking into account the review of documents submitted for MCC and LUT commissioning and the reports of the Participants; and

b) agreed the amendments to Table II/A.2 (summary status of MCCs), Table II/B.1 (details and status of LEOLUTs) and Table II/B.2 (details and status of GEOLUTs) of the DDP, as provided at Annex 4 to the JC-19 Report.

4.2 Review of LUT Commissioning Reports

Summary of LEOLUT Commissioning Reports

4.2.1 The Joint Committee noted the LEOLUT commissioning reports submitted for consideration and the summary of the analysis of each report provided below:

LEOLUT Commissioning Report Summary		
Country, Location, ID	Paper	Comments
Canada, CTEC Ottawa, 3168	JC-19/4/1	Failed error ellipse at 406 MHz and did not meet 406 MHz SARP data recovery because of antenna obstructions above 5 degrees at site location
USA, California-1, 3667	JC-19/4/3	Failed error ellipse at 406 MHz
USA, California-2, 3668	JC-19/4/3	Failed error ellipse at 406 MHz
Algeria, Algiers, 6052	JC-19/4/5	
Singapore, 5631	JC-19/4/6	
Brazil, Manaus, 7103	JC-19/4/12	Failed error ellipse at 121.5 MHz and 406 MHz, and also ambiguity resolution at 121.5 MHz
Australia, Albany, 5033	JC-19/4/14	Failed error ellipse at 406 MHz
New Zealand, Wellington, 5121	JC-19/4/16	Failed error ellipse at 406 MHz
Turkey, Ankara-1, 2711	JC-19/4/19-Rev.1	Failed error ellipse at 121.5 MHz and 406 MHz
Turkey, Ankara-2, 2712	JC-19/4/20-Rev.1	Failed error ellipse at 121.5 MHz

4.2.2 The Joint Committee noted from discussion concerning LEOLUT error ellipse performance that:

a) JC-18 had considered the impact of LEOLUTs failing error ellipse performance, and had agreed that such a non-compliance should not prevent the Joint Committee from recommending that the Council approve LEOLUT commissioning (JC-18 Report, section 4.4.5);

b) LEOLUTs included adjustable parameters for tuning error ellipse calculations to reflect site-specific conditions;

c) a large amount of site specific operational data, not normally available prior or during commissioning, was required for fine tuning the error ellipse parameters;

d) at least one Ground Segment Operator had advised that their SAR services used the error ellipse information, therefore, this alert message parameter should continue to be provided; and

e) error ellipse performance should continue to be reported as part of the commissioning process, however, it should not be a pass/fail criteria.

4.2.3 The Joint Committee agreed:

a) that failure to satisfy error ellipse performance requirements specified in document C/S T.005 should not prevent the Joint Committee from recommending that a LEOLUT should be commissioned into the System;

b) that error ellipse performance should continue to be reported as part of the commissioning process, however, it should not be a pass/fail criteria; and

c) to invite Participants to review the LEOLUT specification (C/S T.002) and commissioning standard (C/S T.005), and propose modifications for changing error ellipse performance from a "pass/fail" to a "reporting" requirement for LEOLUT commissioning (TWG-19/AI.3).

Algeria's LEOLUT at Algiers

4.2.4 The Joint Committee agreed that the Algiers LEOLUT met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.5 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at Algiers, Algeria.

Australia's LEOLUT at Albany

4.2.6 The Joint Committee agreed that, except for error ellipse performance, the Albany LEOLUT met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.7 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at Albany, Australia.

Brazil's LEOLUT at Manaus

4.2.8 The Joint Committee noted from the Manaus LEOLUT commissioning report (JC-19/4/12) and from discussion that:

a) the Manaus LEOLUT ambiguity resolution performance for 121.5 MHz alerts was approximately 56% in comparison to the required 70%;

b) the report also identified seven 121.5 MHz Doppler locations with large location errors;

c) further review by the JC-19 Technical Working Group confirmed that the large location error solutions were not from the test beacon, and therefore should have not been included in the report; and

d) when the above was accounted for, the Manaus LEOLUT satisfied Cospas-Sarsat location accuracy requirements for 121.5 MHz solutions by a considerable margin, and therefore should be commissioned into the System.

4.2.9 The Joint Committee agreed that, except for error ellipse performance and 121.5 MHz alert ambiguity resolution, the Manaus LEOLUT met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.10 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at Manaus, Brazil.

<u>Canada's LEOLUT at Ottawa</u>

4.2.11 The Joint Committee noted from the Ottawa LEOLUT commissioning report (JC-19/4/1) and from discussion concerning the reported anomaly in respect of the SARP data recovery rate that:

a) the failure to achieve the required 100% SARP data recovery rate on a few satellite passes was caused by several antenna obstructions at the LEOLUT site;

b) Canada was planning to raise their LEOLUT antenna to resolve this situation; and

c) for the interim period the LEOLUT continued to provide reliable solutions, and therefore should be commissioned into the System.

4.2.12 The Joint Committee agreed that, except for error ellipse performance and the SARP data recovery rate the LEOLUT at the Canadian Technical Evaluation Centre (CTEC) met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.13 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at the CTEC facility in Ottawa, Canada.

<u>New Zealand's LEOLUT at Wellington</u>

4.2.14 The Joint Committee agreed that, except for error ellipse performance, the Wellington LEOLUT met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.15 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at Wellington, New Zealand.

<u>Singapore's LEOLUT</u>

4.2.16 The Joint Committee agreed that the Singapore LEOLUT met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.17 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the LEOLUT located at Singapore.

Turkey's LEOLUTs at Ankara

4.2.18 The Joint Committee agreed that, except for error ellipse performance, the Ankara-1 and Ankara-2 LEOLUTs met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.19 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of Turkey's Ankara-1 and Ankara-2 LEOLUTs.

USA's LEOLUTs in California

4.2.20 The Joint Committee agreed that, except for error ellipse performance, the California-1 and California-2 LEOLUTs met all the requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005).

4.2.21 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the USA's California-1 and California-2 LEOLUTs.

Summary of GEOLUT Commissioning Reports

4.2.22 The Joint Committee noted the GEOLUT commissioning reports submitted for consideration and the summary of the analysis of each report provided below:

GEOLUT Commissioning Report Summary		
Country, Location, ID	Paper	Comments
USA, Maryland-1, 3674	JC-19/4/2	Tracks GOES-12 (East)
USA, Maryland-2, 3676	JC-19/4/2	Tracks GOES-10 (West)
USA, Maryland GSE, 3675	JC-19/4/2	Tracks GOES-12 (East)
Algeria, Algiers, 6053	JC-19/4/4	Tracks MSG satellite Failed frequency accuracy measurement
Norway, Fauske, 2572	JC-19/4/7	Tracks MSG satellite Failed frequency accuracy measurement
UK, Combe Martin, 2322	JC-19/4/8 & JC-19/4/8-Add.1	Tracks MSG satellite
Turkey, Ankara, 2713	JC-19/4/13	Tracks MSG satellite
Spain, Maspalomas,2243	JC-19/4/21	Tracks MSG satellite Failed frequency accuracy measurement

4.2.23 The Joint Committee noted from discussion concerning MSG GEOLUT frequency measurement accuracy performance that:

a) as presented in document JC-19/4/24 (France), during periods of eclipse it would not be possible for MSG GEOLUTs to meet the frequency measurement accuracy requirements identified in documents C/S T.009 and C/S T.010;

b) regardless of the accuracy of the frequency measurement, alerts from MSG GEOLUTs provided valuable information to SAR services and should be distributed in the System;

c) because LEO/GEO processing required reliable GEOSAR frequency measurements, concerns were expressed regarding the possible use of MSG GEOLUT data for LEO/GEO processing; and

d) no LEOLUTs had yet been commissioned to perform combined LEO/GEO processing using MSG GEOSAR data, and an action item had been established by JC-19 to evaluate this matter further (see JC-19 Report, section 4.4.6).

4.2.24 The Joint Committee agreed that failure to satisfy the frequency accuracy measurement requirement specified in document C/S T.010 should not prevent the Joint Committee from recommending the commissioning of a GEOLUT operating with the MSG satellite.

Algeria's GEOLUT at Algiers

4.2.25 The Joint Committee agreed that, except for its frequency measurement accuracy performance, the Algerian GEOLUT met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.26 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the GEOLUT located at Algiers, Algeria.

Norway's GEOLUT at Fauske

4.2.27 The Joint Committee agreed that, except for its frequency measurement accuracy performance, the Norwegian GEOLUT met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.28 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the GEOLUT located at Fauske, Norway.

Spain's GEOLUT at Maspalomas

4.2.29 The Joint Committee agreed that, except for its frequency measurement accuracy performance, the Maspalomas GEOLUT met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.30 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the GEOLUT located at Maspalomas, Spain.

Turkey's GEOLUT at Ankara

4.2.31 The Joint Committee agreed that the Ankara GEOLUT met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.32 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the GEOLUT located at Ankara, Turkey.

United Kingdom's GEOLUT at Combe Martin

4.2.33 The Joint Committee agreed that the Combe Martin GEOLUT met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.34 The Joint Committee **RECOMMENDED** that the Council approve the re-commissioning into the Cospas-Sarsat System of the GEOLUT located at Combe Martin, UK, to operate with MSG.

USA's GEOLUTs in Maryland

4.2.35 The Joint Committee agreed that the USA GEOLUTs Maryland-1, Maryland-2 and GSE met all the requirements of the "Cospas-Sarsat GEOLUT Commissioning Standard" (C/S T.010).

4.2.36 The Joint Committee **RECOMMENDED** that the Council approve the commissioning into the Cospas-Sarsat System of the USA's Maryland-1, Maryland-2 and GSE GEOLUTs.

Combined LEO/GEO Processing at Brasilia, Brazil

4.2.37 The Joint Committee noted from the commissioning reports for the LEO/GEO processing using the LEOLUT and GEOLUT located at Brasilia, provided in document JC-19/4/11 (Brazil), that:

a) the LEO/GEO processing did not satisfy the requirement for ambiguity resolution for marginal solutions;

b) analysis indicated that the discrepancy was caused by the large number of solutions with only two LEOSAR points comprising the marginal solution data set;

c) Doppler curves with only two LEOSAR data points did not provide sufficient information for resolving ambiguity;

d) when the two point solutions were removed from the data set the LEO/GEO processing passed ambiguity resolution; and

e) the two point solutions provided accurate Doppler locations regardless of the limitation in respect of ambiguity resolution.

4.2.38 The Joint Committee agreed that:

a) except for marginal solution ambiguity resolution, the combined LEO/GEO processing successfully met all requirements of the "Cospas-Sarsat LEOLUT Commissioning Standard" (C/S T.005); and

b) the two point solutions generated by the Brasilia LEOLUT provided valuable information for SAR services, and therefore should be distributed in the System.

4.2.39 The Joint Committee **RECOMMENDED** that the Council approve the commissioning of the combined LEO/GEO processing using the LEOLUT and GEOLUT located at Brasilia into the Cospas-Sarsat System.

4.2.40 The Joint Committee noted that document JC-19/4/25 (Brazil) providing the commissioning report for the combined LEO/GEO processing using the LEOLUT and GEOLUT located at Recife, Brazil had been submitted after the deadline for document submission and could not be reviewed at the JC-19 Meeting.

4.2.41 The Joint Committee agreed (JC-19/AI.1) to request the Secretariat to resubmit document JC-19/4/25 (Brazil) to the JC-20 Meeting in 2006.

4.3 Review of MCC Commissioning Reports

<u>Singapore MCC (SIMCC) Commissioning</u>

4.3.1 The Joint Committee noted from document JC-19/4/15 (Australia – Singapore) the report of the commissioning tests undertaken by the AUMCC with the SIMCC, and that:

a) the commissioning tests were conducted from 28 February to 3 March 2005 inclusive, over a period of four days;

b) the SIMCC successfully met the requirements of document C/S A.006 (MCC commissioning);

c) the full results of the commissioning tests were contained in Attachment 1 to the document JC-19/4/15; and

d) the host MCC, AUMCC, declared the new SIMCC, at IOC on 18 March 2005.

4.3.2 The Joint Committee **RECOMMENDED** that the Council commission the SIMCC into the Cospas-Sarsat System.

Nodal Spanish MCC (SPMCC) Commissioning

4.3.3 The Joint Committee noted from document JC-19/4/23 (France) the report of the commissioning tests undertaken by the SPMCC as the future nodal MCC for the new South Central DDR.

4.3.4 The Joint Committee noted that:

a) the Council at its 33rd Session approved a new South Central DDR, with the SPMCC as the nodal MCC and including the ALMCC and NIMCC;

b) the Central DDR Meeting (22 - 24 February 2005) developed a nodal commissioning plan and agreed that, during the IOC phase, the SPMCC would operate as a sub-nodal MCC of the FMCC, within the Central DDR;

c) the commissioning test was successfully conducted in the period from 5 to 11 April 2005 and the SPMCC was announced at IOC; and

d) FOC status was expected in December 2005, after the 35th Session of the Council.

4.3.5 The Joint Committee **RECOMMENDED** that the Council commission the SPMCC as nodal MCC for the South Central DDR, into the Cospas-Sarsat System.

4.4 LUT Specifications and Commissioning Standards

LEOLUT Specification (C/S T.002)

4.4.1 The Joint Committee noted from document JC-19/4/18 (Australia):

a) that section 5.3.4 of document C/S T.002 included a reference to a non-existent section 5.2.7 of document C/S T.002;

b) that the correct reference should have been to section 4.2.7; and

c) the proposed amendments to document C/S T.002 that corrected this error.

4.4.2 The Joint Committee agreed the amendment to document C/S T.002 (LEOLUT specification) as provided at Annex 10 to the JC-19 Report.

4.4.3 The Joint Committee **RECOMMENDED** that the Council approve the draft amendment to the document "Cospas-Sarsat LEOLUT Performance Specification and Design Guidelines" provided at Annex 10 to the JC-19 Report as C/S T.002, Issue 3 – Draft Revision 4.

MSG GEOLUT Frequency Measurement Performance
During Periods of Eclipse

4.4.4 The Joint Committee noted from document JC-19/4/24 (France) concerning the beacon frequency measurement performance of MSG GEOLUTs during periods of eclipse, that:

a) document C/S T.009 (GEOLUT specification) required GEOLUTs to measure the frequency accuracy of 406 MHz beacons to within 2 Hz;

b) document C/S T.010 (GEOLUT commissioning) required that 95% of the frequency measurements associated with valid beacon messages must be accurate to within 2 Hz;

c) data from the Toulouse GEOLUT indicated that the Cospas-Sarsat commissioning requirement could be satisfied during non-eclipse periods, but could not be met during periods of eclipse; and

d) the non-conformance was caused by the high frequency drift of the MSG onboard oscillator during eclipse periods.

4.4.5 The Joint Committee also noted from document JC-19/4/24 and from discussion:

a) the recommendation by France that this part of commissioning testing should not be performed during eclipse periods, or conversely to relax the frequency measurement accuracy requirement to 5 Hz for eclipse periods;

b) that a frequency measurement accuracy of 2 Hz was required for accurate LEO/GEO Doppler processing of minimum point solutions;

c) that LEO/GEO processing used data points from the GEOLUT that had been calibrated to remove bias errors;

d) that it was unclear whether the frequency fluctuations observed during eclipse periods reported in document JC-19/4/24 came from raw or calibrated data; and

e) that there were currently no LEOLUTs commissioned to perform LEO/GEO processing using data from MSG GEOLUTs.

4.4.6 The Joint Committee agreed:

a) that the frequency measurement accuracy tests for MSG GEOLUT commissioning should not be conducted during periods of eclipse; and

b) to invite MSG GEOLUT operators to conduct tests to evaluate the accuracy of calibrated frequency measurements made by MSG GEOLUTs during eclipse periods, and report the findings to JC-20 (TWG-19/AI.4).

<u>GEOLUT Specification (C/S T.009)</u>

4.4.7 The Joint Committee noted from information provided by the USA that:

a) JC-18 had established an action item (TWG-18/AI.3) to determine the uplink EIRP level associated with the processing requirements specified in the GEOLUT specification (C/S T.009); and

b) analysis conducted by the USA indicated that for GEOLUTs that operated with GOES satellites, an uplink EIRP level of 29 dBm should be specified in document C/S T.009.

4.4.8 The Joint Committee agreed the analysis conducted by the USA and the corresponding amendment to document C/S T.009.

4.4.9 The Joint Committee **RECOMMENDED** that the Council approve the draft amendment to the document “Cospas-Sarsat GEOLUT Performance Specification and Design Guidelines”, provided at Annex 13 to the JC-19 Report as C/S T.009, Issue 1 - Draft Revision 4.

<u>GEOLUT Commissioning</u>

4.4.10 The Joint Committee noted from a review of the GEOLUT commissioning reports submitted to JC-19 for consideration and from discussion that:

a) since JC-16 there had been an outstanding action item to conduct analysis of the high number of bit errors in the unprotected field of short format messages observed during GEOLUT commissioning (TWG-18/AI.5);

b) a review of GEOLUT commissioning reports submitted to JC-18 and JC-19 indicated that the bit error rate currently being observed had decreased significantly and was consistent with the link budget;

c) it was not possible to confirm whether the improvement resulted from changes to the GEOLUT possessing software or whether the bit errors were originally caused by malfunctions in the old beacon simulator used for commissioning testing;

d) in view of the above, the JC-18 action item on the matter should be closed; and

e) in order to conduct a thorough review of GEOLUT commissioning reports, the reports should identify reference beacons used for GEOLUT frequency calibration and the identity of the beacon(s) used for evaluating the frequency measurement accuracy performance.

4.4.11 The Joint Committee agreed to:

a) close JC-18 action item TWG-18/AI.5; and

b) invite Participants to develop amendments to the GEOLUT commissioning standard (C/S T.010) for reporting the identification of the beacon used for GEOLUT calibration and the identification of the beacon(s) used for evaluating the frequency measurement accuracy performance (TWG-19/AI.5).

4.5 MCC Specification and Commissioning Standard

4.5.1 The Joint Committee noted from document JC-19/4/17 (Secretariat) that:

a) the Cospas-Sarsat Council had approved changes to the DDP (C/S A.001) and the SID (C/S A.002) for implementing a 406 MHz Ship Security Alert System (SSAS) in 2004; and

b) the Secretariat proposed corresponding updates to document C/S A.005 the "Cospas-Sarsat Mission Control Centre (MCC) Performance Specification and Design Guidelines" and document C/S A.006 the "Cospas-Sarsat Mission Control Centre Commissioning Standard" to support the Ship Security Alert System (SSAS).

4.5.2 The Joint Committee noted from discussion that in order to have maximum flexibility in recording the disposition of ship security alert messages during MCC commissioning, further changes were required to document C/S A.006 to create a new field in the Alert Data Summary Database to distinguish between distress and ship security alerts.

4.5.3 The Joint Committee agreed to amend the documents C/S A.005, and C/S A.006 to support the Ship Security Alert System (SSAS), as provided at Annexes 7 and 8 to the JC-19 Report, respectively.

4.5.4 The Joint Committee **RECOMMENDED** that the Council approve:

a) the draft amendments to the document "Cospas-Sarsat Mission Control Centre (MCC) Performance Specification and Design Guidelines" provided at Annex 7 to the JC-19 Report as C/S A.005, Issue 3 – Draft Revision 3; and

b) the draft amendment to the document "Cospas-Sarsat Mission Control Centre Commissioning Standard", provided at Annex 8 to the JC-19 Report as C/S A.006, Issue 3 – Draft Revision 1.

4.6 Other Ground Segment Matters

Status of Implementation of Updates Agreed by JC-18

4.6.1 The Joint Committee noted from document JC-19/4/22 (Argentina) and document JC-19/6/14 (Australia):

a) the status in Argentina and Australia of the implementation of Ground Segment equipment changes agreed at JC-18;

b) the items that had been implemented and those which were still being worked;

c) the specific comment of Australia that while the DDP prevented MCCs from performing additional validation that would affect the distribution of data to other MCCs, Australia would on occasion suppress alerts with "old" TCAs and data received from other MCCs from decommissioned or non-functional satellites; and

d) that both Argentina and Australia had reported on the important work being undertaken towards preparing their LUTs for the introduction of SARP-3 processors on Sarsat satellites.

LEOLUT and GEOLUT Frequency Measurements

4.6.2 The Joint Committee noted from document JC-19/Inf.8 (USA) and from information provided by the USA, that:

a) a review of data from USA LEOLUTs and GEOLUTs indicated that LUTs produced a bias frequency measurement error that varied from LUT to LUT;

b) an accurate measurement of the beacon transmit frequency by LUTs was critical for LEO/GEO processing;

c) the GEOLUT commissioning standard (C/S T.010) required the GEOLUT to measure the absolute value of the transmit frequency to within 2 Hz, 95% of the time, but did not provide information on the suitability of using a calibration source to address bias errors; and

d) the USA planned to conduct an exercise using procedures described at Attachment 2 to document JC-19/Inf.8 to calibrate their GEOLUTs and LEOLUTs.

4.6.3 The Joint Committee noted from discussion that an absolute value of the beacon frequency was not required for LEO/GEO processing, rather the critical factor was that the LEO and GEO data should be calibrated using the same uplink calibration signal.

4.6.4 The Joint Committee agreed to invite (TWG-19/AI.6):

a) the USA to report the findings from their planned "LUT calibration exercise" to a future Joint Committee meeting; and

b) Participants to review the GEOLUT commissioning standard (C/S T.010) and propose modifications in respect of the use of a calibration source for achieving the required frequency measurement accuracy for LEO/GEO processing.

AGENDA ITEM 5: BEACONS

5.1 Review of C/S T.001 and C/S G.005

<u>Internal Navigation Device Performance and IEC Standard on Interface for External Navigation Devices</u>

5.1.1 The Joint Committee noted from document JC-19/5/3 (Secretariat), the report of the Task Group Meeting on 406 MHz Beacon Type Approval (TG-1/2005), and from information provided by the Secretariat:

a) the view of the Task Group that the current C/S T.001 encoded location accuracy requirement of 5 km was poorer than the performance supported by current and projected GNSS systems (i.e. GPS, GLONASS, and Galileo), and that from a practical perspective the encoded location accuracy was limited by the resolution of the Cospas-Sarsat beacon message used;

b) the view of the Task Group that modern GNSS receivers provided location information within a few minutes of activation, therefore, the time to acquire position by internal GNSS receivers should be tightened from 30 minutes to 10 minutes; and

c) the draft amendments to document C/S T.001 which:

- modified the encoded location accuracy requirement to 175 metres for Standard and National Location protocols and 5.25 km for the User-location protocol,
- tightened from 30 minutes to 10 minutes the time requirement for internal navigation devices to provide a location,
- updated the IEC standard reference that addressed digital interfaces to external navigation devices.

5.1.2 The Joint Committee noted from discussion that:

a) from a statistical perspective, under some conditions, the first encoded position reported by the navigation receiver would not be within 175 metres of the actual position;

b) this phenomena had been observed by a beacon manufacturer during beacon development, however, in all cases the location accuracy of the first reception was within 500 metres of the actual position;

c) subsequent updates by the navigation receiver improved the location accuracy; and

d) it was preferable that the first encoded location be transmitted by the beacon, since the distress incident might destroy the beacon soon after activation.

5.1.3 The Joint Committee agreed:

a) the amendments to document C/S T.001 (406 MHz beacon specification) provided at Annex 9 to the JC-19 Report, which:

- modified the encoded location accuracy requirement to 500 metres for Standard and National Location protocols and 5.25 km for the User-location protocol;
- tightened the requirement for internal navigation devices to provide a location from 30 to 10 minutes; and
- included the correction to the IEC reference for digital interfaces to external navigation devices; and

b) that any new C/S T.001 requirements approved by the Council at CSC-35 should not become mandatory for beacons submitted for type approval testing prior to 1 March 2006.

<u>Coding the Beacon Activation Indication</u>

5.1.4 The Joint Committee noted from document JC-19/5/2 (Secretariat) that:

a) document C/S T.001 allocated bit 108 of User protocols for identifying whether the beacon was capable of being activated automatically; and

b) it was not clear how bit 108 should be set for:

- EPIRBs that activated on contact with water but were not equipped with an automatic release mechanism,
- survival ELTs and PLBs that were designed to activate automatically when manually removed from their holding cradle.

5.1.5 The Joint Committee noted from document JC-19/5/4 (Australia):

a) the view that:

- knowledge of the beacon switch mechanism was not useful for planning SAR operations,
- however, the manner of deployment (i.e. manual or automatic) was useful intelligence for RCCs,
- bit 108 should be used to identify whether the beacon was capable of automatic deployment rather than automatic activation; and

b) proposed amendments to documents C/S T.001 (406 MHz beacon specification) and C/S A.002 (SID) that reflected the above view.

5.1.6 The Joint Committee noted from discussion, the views of the participants that:

a) knowledge of the activation mechanism was not very important in most distress incidents; however

b) the real benefit to SAR services was knowing with certainty whether the activation could only have occurred if the user physically switched the beacon on.

5.1.7 The Joint Committee agreed:

a) that bit 108 should be used to indicate whether the beacon could only have been switched on manually, or if there was a possibility that the beacon could have been activated without operator involvement; and

b) the corresponding amendments to documents C/S T.001 (406 MHz beacon specification) and C/S A.002 (SID) provided at Annexes 9 and 5 to the JC-19 Report.

5.1.8 The Joint Committee **RECOMMENDED** that:

a) the Council approve the “Specification for Cospas-Sarsat 406 MHz Distress Beacons” provided at Annex 9 to this Report as C/S T.001, Issue 3 - Draft Revision 7; and

b) the new requirements provided in document C/S T.001, Issue 3 – Draft Revision 7 should only become mandatory for beacon models submitted for type approval after 1 March 2006.

GNSS Self-test Mode

5.1.9 The Joint Committee noted from document JC-19/5/28 (RTCM):

a) that TG-1/2005 recognised that a self-test mode that evaluated beacon encoded position acquisition and accuracy performance would be useful for:

- aircraft maintenance facilities that were often required to conduct tests to confirm whether the beacon could acquire and transmit its encoded position in order to satisfy national beacon installation requirements,

- beacon users that wanted to confirm that their location protocol beacons operated as advertised; and

b) draft amendments to documents C/S T.001 and C/S T.007 that proposed specification and type approval requirements for a GNSS self-test mode in 406 MHz beacons.

5.1.10 The Joint Committee also noted the proposed requirements for the GNSS self-test mode provided in document JC-19/5/28, which are summarised below:

a) the GNSS self-test mode should be an optional capability in location protocol beacons;

b) when activated the self-test mode should transmit a single burst that would include the GNSS location when available, and should not cause a transmission on the beacon homer frequencies;

c) if a valid location was not provided within 10 minutes the beacon should indicate a self-test failure and terminate the self-test;

d) for GNSS receivers powered from the beacon battery, the beacon should include features that limited the number of GNSS self-tests to a figure specified by the beacon manufacturer; and

e) for beacons that provided a digital or aural report of its GNSS location, the beacon should report both the GNSS location to the accuracy of the receiver, which should be no worse than one arc second, and the location encoded into the beacon message, which should be no worse than the accuracy required by C/S T.001.

5.1.11 The Joint Committee noted from discussion the views of the participants that:

a) confirming the functionality of the beacon’s navigation receiver was desirable to some user groups;

b) even though the specification and type approval requirements for this capability were not included in documents C/S T.001 and C/S T.007, there were type approved beacons that had this capability;

c) although the type approval tests were not conducted to assess the functionality of this capability, the process did ensure that the expected drain on the battery was taken into account for the operational lifetime at minimum temperature test;

d) it might be preferable for the 121.5 MHz homer to be active for this test, in order for the self-test to evaluate whether the homer generated interference that prevented GNSS receiver acquisition;

e) there might be benefits for Cospas-Sarsat in specifying and assessing the performance of the GNSS self-test mode to ensure that it operated correctly and that it did not adversely affect the 406 MHz function; and

f) more time was required to consider the implications of specifying GNSS self-test requirements.

5.1.12 The Joint Committee agreed to invite Cospas-Sarsat Participants to consider the implications of a self-test mode that transmitted encoded location information, and to develop proposals to amend the beacon specification (C/S T.001) and the beacon type approval standard (C/S T.007) as appropriate (JC-19/AI.2).

5.2 Review of C/S T.007 and C/S T.008

5.2.1 The Joint Committee noted the discussion and agreements pertaining to documents C/S T.007 and C/S T.008 provided in the TG-1/2005 Report of the Task Group on beacon type approval testing and summarised in document JC-19/5/3 (Secretariat), which are covered in detail below.

Laboratory PLB Antenna Testing

5.2.2 The Joint Committee noted from the TG-1/2005 Report and from discussion, that:

a) C/S T.007 procedures for evaluating the PLB equivalent isotropically radiated power (EIRP) were conducted with the beacon operating on a “good” ground plane constructed of either aluminium or copper;

b) beacon radiation performance could be greatly affected by the beacon/ground plane configuration and the ground plane composition;

c) the C/S T.007 PLB antenna test was not representative of many configurations expected during actual PLB deployments; and

d) TG-1/2005 established an action item to conduct tests to evaluate possible laboratory antenna test configurations suitable for simulating PLB operation without a good ground plane.

5.2.3 The Joint Committee noted from the results of tests conducted by a beacon manufacturer in response to the TG-1/2005 action item and from theoretical analysis provided in document JC-19/5/25-Rev.1 (CIRM), that:

a) the following ground plane configurations were evaluated:

Configuration Ref	Description
1	Existing C/S T.007 configuration for PLB antenna testing
2	Beacon raised 0.45 metres above the ground plane
3	Configuration 2, but with RF absorbing material (RAM) between the beacon and the ground plane
4	Configuration 2, but with beacon raised 1.5 metres above the ground plane
5	Configuration 4, but with RAM between the beacon and the ground plane

b) 3 PLBs and 2 EPIRBs were evaluated in each configuration;

c) configuration 3 provided the most reliable results and identified beacons that were poor at dealing with antenna mismatches generated by raising the beacon;

d) in light of the reduction of the EIRP expected when the beacon was operated in configuration 3, Cospas-Sarsat should consider relaxing the minimum EIRP requirement for this test configuration; and

e) the estimated cost for the RF absorbing material (RAM) to support configuration 3 was UK£ 1,120.

5.2.4 The Joint Committee noted from document JC-19/5/30 (France) the results of tests conducted by France in response to the TG-1/2005 action item and from information provided by France, that:

a) France’s testing validated CIRM’s findings that RAM was required to minimise the impact of the ground plane on the beacon performance;

b) a suitable RAM configuration might be difficult to define; and

c) therefore, France recommended, if practical, that a configuration be defined that did not require the use of RAM.

5.2.5 The Joint Committee noted from document JC-19/5/31-Rev.1 (USA) and from information provided by the USA:

a) the results of antenna testing conducted in response to the TG-1/2005 action item;

b) that the USA test programme did not evaluate any configurations that used RAM; and

c) that of the configurations tested, the most suitable option for replacing the interim PLB tests was to elevate the beacon a ½ wavelength above the ground.

5.2.6 The Joint Committee noted from discussion that:

a) in order to simulate PLB operation without a good ground plane, a test configuration using RAM was required;

b) the RAM requirements should be specified in terms of the minimum attenuation provided at 406 MHz; and

c) since this test was intended only to identify a significant problem with the beacon:

- there was no need to measure performance at 30 degree intervals in azimuth,
- the percentage of measurement points that could be eliminated and the minimum EIRP requirements for this test could both be reduced.

5.2.7 The Joint Committee agreed:

a) the laboratory test configuration and procedures for evaluating beacon antenna performance for configurations without a good ground plane, which are included in the draft Issue 4 of document C/S T.007 provided at Annex 11 to this Report;

b) that prior to the Council approving the proposed procedures, additional testing was required to confirm the suitability of the specified RAM and minimum required beacon EIRP level; and

c) to invite CIRM and interested Participants to conduct tests to evaluate the proposed configuration, and report the results to the Secretariat prior to 1 October 2005 (TWG-19/AI.7).

<u>Scope of Type Approval Antenna Testing</u>

5.2.8 The Joint Committee noted from the TG-1/2005 Report and from discussion, that:

a) C/S T.007 tests for evaluating EPIRB and ELT radiation performance were conducted with the beacon in configurations that simulated operation with a good ground plane;

b) experience had confirmed that the availability of a good ground plane in actual operations was uncertain for EPIRBs, survival ELTs and deployable ELTs; and

c) in light of the impact that the ground plane had on beacon EIRP performance, TG-1/2005 agreed that the above-mentioned beacon types should be tested in both their currently specified C/S T.007 configuration and the configuration developed for testing PLBs operating with a poor ground plane.

5.2.9 The Joint Committee agreed that:

a) type approval testing of PLBs, EPIRBs, survival ELTs and deployable ELTs should be conducted in configurations that simulated operation with good and poor ground planes, as described in draft Issue 4 of document C/S T.007 provided at Annex 11 to this Report; and

b) when modified, type approved EPIRBs should only be required to undergo testing in the poor ground plane configuration if the changes could affect the beacon radiation characteristics.

<u>Other Changes to Beacon Type Approval Requirements
Recommended by TG-1/2005</u>

5.2.10 The Joint Committee also noted from the TG-1/2005 Report, proposed changes to the beacon type approval standard document (C/S T.007) in respect of:

a) requirements for retaining type approval after a modification to the beacon design;

b) the procedures for conducting and evaluating the satellite qualitative test;

c) the beacon navigation system test;

d) increasing the number of measurement points that could be excluded for evaluating the polarisation of the beacon antenna; and

e) reporting the results of type approval tests.

5.2.11 The Joint Committee noted from discussion concerning the draft changes to the navigation system test for evaluating position data encoding that:

a) the test was to be conducted using a test script developed at the TG-1/2005 meeting; and

b) the test script had never been independently evaluated and this should be done prior to Council approval.

5.2.12 The Joint Committee also noted the views of the Participants that the number of points that could be excluded for evaluating the polarisation of the beacon antenna should be further relaxed to 20% from the 10% proposed by TG-1/2005.

5.2.13 The Joint Committee agreed:

a) to invite interested beacon manufacturers to conduct a trial of the proposed test script for evaluating position data encoding, with an actual 406 MHz beacon and report the findings to the Secretariat prior to 1 October 2005 (TWG-19/AI.8); and

b) the proposed changes to document C/S T.007 mentioned above, which are included in draft Issue 4 of document C/S T.007 provided at Annex 11 of this Report.

Beacon Quality Assurance Plan and Type Approval Certificate

5.2.14 The Joint Committee noted from document JC-19/5/9 (Secretariat) that:

a) the 406 MHz beacon type approval certificate stated that the manufacturer certified that all production beacons would meet the technical requirements of the unit tested;

b) document C/S T.007 did not require the manufacturer to formally sign a document agreeing to such a commitment;

c) in addition, the existing beacon type approval certificate had insufficient space to adequately list all the beacon features available in some beacon models, and also did not provide a warning that operational and environmental requirements were the responsibility of national administrations; and

d) the Secretariat proposed:

- an amendment to the beacon quality assurance plan that formalised the manufacturer’s commitment to provide users with beacons that satisfied Cospas-Sarsat requirements in a manner similar to the unit that was tested for type approval,
- a modified format for type approval certificates that addressed the space limitations described above.

5.2.15 The Joint Committee agreed the proposed amendments to the beacon quality assurance plan and the beacon type approval certificate proposed in document JC-19/5/9, which are included in draft Issue 4 of document C/S T.007 provided at Annex 11 to this Report.

Maximum Allowable 406 MHz Emissions from Manufacturer Facilities

5.2.16 The Joint Committee noted from document JC-19/5/22 (USA) and from discussion concerning possible interference to the System resulting from beacon development and production testing, that:

a) following analysis developed by the USA, JC-18 agreed that production unit testing of complete beacons should be conducted with the beacon in an RF enclosure that provided at least 80 dB of attenuation;

b) TG-1/2005 agreed that it was preferable to express this requirement in terms of a maximum allowable beacon signal measured at the exterior of the manufacturer's facility, and invited the USA to update the analysis accordingly;

c) the updated analysis indicated that the maximum allowable signal measured at the exterior of the facility should not exceed a power flux density of –37 dB (W/m^2), or an equivalent field strength of –11.6 dB (V/m); and

d) the USA proposed a modification to document C/S T.007 that provided the above guidance.

5.2.17 The Joint Committee agreed the guidance in respect of the maximum allowable 406 MHz signal level measured at the exterior of a manufacturer's facility provided in document JC-19/5/22, which is included in the draft Issue 4 of document C/S T.007 provided at Annex 11 to this Report.

Definition of Beacon Types and Associated Requirements

5.2.18 The Joint Committee noted from the TG-1/2005 Report and from discussion:

a) that recently the term "multi-environment beacon" (MEB) had been used at Cospas-Sarsat meetings;

b) that Cospas-Sarsat had not defined MEBs, furthermore, depending on their design, PLBs, ELTs and EPIRBs might operate in multiple environments; and

c) that to eliminate possible confusion, the term MEB should not be used by Cospas-Sarsat, even if administrations decided to specify a multi-environment application.

5.2.19 The Joint Committee also noted from document JC-19/5/3 that:

a) at previous Cospas-Sarsat meetings, participants had expressed concern that beacons were sometimes coded inappropriately (e.g. PLBs coded as EPIRBs and used in the land environment); and

b) TG-1/2005 had noted that managing beacon coding was a national responsibility that Cospas-Sarsat should not influence through the type approval process.

5.2.20 The Joint Committee agreed that:

a) the term multi-environment beacon should not be used by Cospas-Sarsat; and

b) Cospas-Sarsat should not control the use of beacon message protocols in specific beacon models through the type approval process.

Offsetting 121.5 MHz Homer for Type Approval Testing

5.2.21 The Joint Committee noted from document JC-19/Inf.7 (RTCM) that:

a) TG-1/2005 proposed amendments to document C/S T.007 that required the beacon homer to be tuned to 121.65 MHz or to another frequency closer to 121.5 MHz authorised by the national administration for type approval testing;

b) TG-1/2005 established an action item to verify that a homer tuned to 121.65 MHz adequately simulated the possible adverse impact of a 121.5 MHz homer on the acquisition of GNSS signals; and

c) analysis conducted by RTCM indicated that the homer tuned to 121.65 MHz adequately simulated the impact on GNSS signal acquisition.

5.2.22 The Joint Committee agreed that for type approval testing, the beacon homer should be tuned to the nearest frequency to 121.5 MHz authorised by the responsible national administration, but this frequency should not be greater than 121.65 MHz.

Use of GNSS Simulators

5.2.23 The Joint Committee noted from JC-19/Inf.5-Rev.1 (USA) and from discussion:

a) cost and availability information for GNSS simulators;

b) that RTCM was considering using GNSS simulators for conducting tests that evaluated the beacon navigation receiver performance in marginal conditions; and

c) that TG-1/2005 had considered a similar approach, but had not recommended tests that required a GNSS simulator.

5.2.24 The Joint Committee invited RTCM to report on experiences gained in respect of specifying and using GNSS simulators for beacon testing.

New Draft Issue of Document C/S T.007

5.2.25 The Joint Committee noted from document JC-19/5/8 (Secretariat), draft Issue 4 of document C/S T.007, and from information provided by the Secretariat, that:

a) TG-1/2005 participants requested the Secretariat to develop a new draft issue of document C/S T.007 that:

- captured TG-1/2005 proposed modifications,

- improved the logic and flow of the document,
- removed redundant information,
- uniformly adopted the term "shall" for expressing mandatory requirements;

b) the current type approval test procedure for evaluating the beacon repetition period did not confirm that the beacon repetition period was spread over the available 5 second window as required by the beacon specification (C/S T.001); and

c) the draft Issue 4 proposed a revised test procedure that addressed this deficiency.

5.2.26 The Joint Committee agreed:

a) draft Issue 4 of the 406 MHz beacon type approval standard, C/S T.007, as provided at Annex 11 to this Report; and

b) that Cospas-Sarsat should allow the current type approval requirements to be used for beacons submitted to type approval laboratories prior to 1 March 2006.

5.2.27 The Joint Committee **RECOMMENDED** that:

a) subject to satisfactory findings to TWG-19/AI.7 in respect of the proposed procedures for evaluating beacon antenna performance, the Council approve the "Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard" provided at Annex 11 to this Report as C/S T.007, Draft Issue 4; and

b) manufacturers submitting beacons to test laboratories prior to 1 March 2006 should be given the allowance to have their beacons tested in accordance with current requirements (C/S T.007, Issue 3 - Revision 11).

Interim PLB Test Procedures

5.2.28 The Joint Committee noted from document JC-19/5/3 and from discussion that:

a) in the absence of laboratory test procedures for evaluating PLB antenna performance in poor ground plane configurations, the Council had approved an interim test procedure that evaluated PLB performance using measurements made by Sarsat SARP instruments;

b) TG-1/2005 developed an alternative interim procedure that simplified the previously approved testing and reporting requirements; and

c) with concurrence from the Cospas-Sarsat Parties, the alternative interim procedure developed by TG-1/2005 had been in use since 24 March 2005.

Interim SSAS Beacon Type Approval Guidelines

5.2.29 The Joint Committee noted from the TG-1/2005 Report the proposed modifications to the interim type approval guidelines for 406 MHz SSAS beacons, which:

a) strengthened the pass/fail criteria in respect of beacon power measurements performed using Sarsat SARP instruments; and

b) clarified existing requirements in respect of acquiring the SSAS beacon message via a GEOSAR system.

5.2.30 The Joint Committee agreed the proposed modifications to the "Interim Cospas-Sarsat Type Approval Guidelines for 406 MHz SSAS Beacons" developed by TG-1/2005.

5.2.31 The Joint Committee **RECOMMENDED** that the Council approve the amended "Interim Cospas-Sarsat Type Approval Guidelines for 406 MHz SSAS Beacons", as provided at Annex 5 to the TG-1/2005 Report.

Requirements for Beacon Type Approval Test Facilities (C/S T.008)

5.2.32 The Joint Committee noted from document JC-19/5/3, the TG-1/2005 Report and from discussion concerning requirements for Cospas-Sarsat acceptance of 406 MHz beacon type approval test facilities, that:

a) C/S T.008 required that test facilities be from a country formally associated with the programme and also placed several requirements on that country's Representative for advising Cospas-Sarsat of the facilities' national accreditations;

b) recognising the need for additional test facilities, TG-1/2005 proposed modifications to document C/S T.008 that eliminated the requirement that the facility be from a country associated with the Programme, and allowed the Secretariat to liase directly with the facility to confirm the facility's accreditations; and

c) TG-1/2005 also proposed modifications to document C/S T.008 that updated the facility accreditation requirements to reflect the applicable standard supported by the International Standards Organisation (ISO).

5.2.33 The Joint Committee noted from document JC-19/5/26 (Russia) concerning the "Omega" 406 MHz beacon type approval test facility that:

a) although the facility was in the Ukraine, a country not formally associated with the Programme, the facility was currently conducting beacon type approval testing and planned to continue this service into the future;

b) the Omega facility had implemented a quality management system in accordance with ISO requirements 9001-2000 and ISO 17025 as required by Cospas-Sarsat;

c) Cospas-Sarsat originally accepted this facility in 1994; and

d) Russia recommended that pending a Council decision to remove the requirement that test facilities must be from a country associated with the Programme, Cospas-Sarsat should continue to accept the Omega facility for conducting 406 MHz beacon type approval testing.

5.2.34 The Joint Committee noted from information provided by the USA that the beacon type approval facility at Ft. Huachuca in the USA did not possess the ISO accreditations specified currently by C/S T.008 or the updated accreditation requirement proposed by TG-1/2005.

5.2.35 The Joint Committee agreed:

a) that Cospas-Sarsat should continue to accept the Omega facility for conducting 406 MHz beacon type approval testing;

b) to invite the USA to confirm the status of the Ft. Huachuca test facility and to make recommendations to CSC-35 as appropriate (JC-19/AI.3); and

c) the draft amendments to the Cospas-Sarsat requirements for accepting 406 MHz beacon type approval test facilities (C/S T.008) developed by TG-1/2005, provided at Annex 12 to this Report.

5.2.36 The Joint Committee **RECOMMENDED** that:

a) the Council approve the draft amendments to the document C/S T.008 “Cospas-Sarsat Acceptance of 406 MHz Beacon Type Approval Test Facilities” provided at Annex 12 to the JC-19 Report as C/S T.008, Issue 1 - Draft Revision 3; and

b) C/S T.008, Issue 1 – Draft Revision 3 should come into effect upon approval by the Council, but test laboratories should have a grace period until 1 March 2006 to confirm compliance.

5.3 406 MHz and 121.5 MHz Beacon Problems

5.3.1 The Joint Committee noted from document JC-19/5/19 (Canada) that:

a) Canada had not received information from any other MCCs concerning malfunctioning 406 MHz beacons that continually transmitted in the self-test mode; and

b) Canada no longer had the mechanism for collecting and reporting such malfunctioning beacons, and did not envisage being able to provide this service in the near future.

5.3.2 The Joint Committee noted from discussion, that:

a) monitoring and reporting this type of beacon problem to administrations and the beacon owner was essential for resolving the problem and making individual beacon owners aware of their beacon malfunction; and

b) in view of the above, Cospas-Sarsat provided guidance in section 6 of document C/S A.003 (System monitoring and reporting) that encouraged all Participants to implement beacon monitoring programmes, specifically addressing beacons that transmitted repeatedly in the self-test mode.

5.3.3 The Joint Committee noted from information provided by the USA that:

a) as requested by JC-18/AI.19 the USA had contacted the manufacturer of a beacon model that had apparently demonstrated the above fault;

b) the USA had tested 3 examples of this beacon model, but had been unable to reproduce the fault; and

c) although the JC-18 action item had been closed, the USA would continue to monitor the situation and would report further findings as appropriate.

5.3.4 The Joint Committee agreed that monitoring beacon performance was essential for ensuring the health of the System and encouraged Participants to implement beacon monitoring and reporting programmes in accordance with the guidance provided in document C/S A.003.

5.4 Information for Beacon Users

No documents were submitted for consideration under this agenda item.

5.5 International 406 MHz Beacon Registration Database

Status of the IBRD

5.5.1 The Joint Committee noted from document JC-19/5/6 (Secretariat) and from information provided by the Secretariat, the status of the International Beacon Registration Database (IBRD) including that:

a) the USA had reported during the CSC-34 Session that the IBRD applications software would be ready for installation at the selected Internet host site in May 2005 and that the USA would provide support for its installation;

b) the Council, had endorsed the contract negotiated by the Secretariat with Nexxlink Technologies to host the IBRD on the Internet; and

c) the IBRD software had been successfully installed at Nexxlink facilities in Montreal, Canada during the week of 30 May 2005 with some outstanding technical action items remaining, mostly related to Internet security issues.

5.5.2 The Joint Committee further noted from document JC-19/5/6 that in accordance with the Operations Policy of the IBRD stated in document C/S D.004, the IBRD had been implemented such that:

a) Administrations and beacon owners were exclusively responsible for providing and updating beacon registration information;

b) Cospas-Sarsat would only accept beacon registrations submitted via the online facilities provided by the IBRD, i.e. beacon registrations submitted in paper format or via other communication facilities would not be accepted; and

c) Cospas-Sarsat would not modify beacon registration information, unless absolutely essential to repair a problem that, if not corrected, could damage the system or corrupt the database.

5.5.3 The Joint Committee noted that, as provided for in document C/S D.004, the IBRD had been configured to accept by default beacon registrations from beacon owners unless the Administration associated with the beacon's country code had advised Cospas-Sarsat that:

a) they were operating a national database with a 24-hour point of contact; or

b) they wished to control the registration of beacons with their country code.

5.5.4 The Joint Committee also noted from document JC-19/5/6 and from discussion of the matter that, if an Administration notified Cospas-Sarsat that they did not wish to allow beacons coded with their country code to be registered in the IBRD, the user would be provided with contact information for their national beacon registry, as provided in Annex I/F of the DDP, Points of Contact for National Beacon Registers. Therefore it was critically important that the Secretariat be provided with the most accurate and complete information possible for Annex I/F of the DDP.

5.5.5 The Joint Committee noted from document JC-19/5/6 that:

a) each Administration should provide a National IBRD Point of Contact (POC) to the Secretariat;

b) the National IBRD POC should officially request IBRD user identifications and passwords using the procedure at Annex D to document C/S D.004; and

c) passwords should be requested for:

- National Data Providers for registration of beacons with their country code,
- SAR services for IBRD queries,
- authorised shore based service facilities and inspectors.

5.5.6 The Joint Committee noted from document JC-19/5/6 and from information provided by the USA that:

a) the IBRD had the capability to record whether a beacon had an S-VDR capability;

b) however, that feature had not yet been activated; and

c) activation of that feature was relatively easy and would not significantly delay the implementation of the IBRD.

5.5.7 The Joint Committee further noted from document JC-19/5/6 the recommended time-line for the implementation of the IBRD, with an opening of the IBRD for use by all interested Administrations in September 2005, and the following draft documents:

a) a letter to be sent to each Cospas-Sarsat Representative informing them of the need to declare their intended use of the IBRD and request appropriate passwords;

b) a circular letter to be distributed to the ICAO and IMO representatives of countries not associated with the Cospas-Sarsat Programme; and

c) an announcement concerning the status of the IBRD for the Cospas-Sarsat website.

5.5.8 The Joint Committee noted from discussion that:

a) it would be useful if all MCC operators worked with Administrations within their service areas to facilitate access to the IBRD;

b) Australia was prepared to assist several South Pacific island nations that had expressed interest in using the IBRD;

c) the implementation schedule proposed by the Secretariat was overly ambitious and it would be prudent to allow the initial test phase to extend until the CSC-35 Session in November 2005; and

d) Australia, France, Russia and Spain were invited to participate in the initial test phase of IBRD operations in order to ensure proper operation of the IBRD in all supported languages.

5.5.9 The Joint Committee agreed an amended 2005 IBRD implementation schedule as follows:

30 May	IBRD installation at Nexxlink begins
TBD June	IBRD installation at Nexxlink completed
TBD July	IBRD test operation phase begins - Australia, France, Russia and Spain to participate with support from the Secretariat and the USA - Plan coordinated by correspondence - Testers iteratively provide comments to the Secretariat, any resulting required software changes coordinated with the USA
29 August	Report status and plans at ICAO/IMO Joint Working Group
1 October	Testers provide final comments to the Secretariat on the test operation phase
1 November	All test data purged from IBRD in preparation for operational use
10 November	CSC-35 considers comments on the test operation phase; declares IBRD operational
14 November	Secretariat sends letters to Cospas-Sarsat Representatives and ICAO/IMO announcing IBRD availability; posts announcement on Cospas-Sarsat website
14 November	IBRD initial operations begin – open to use by all interested Administrations.

5.5.10 The Joint Committee noted from discussion that while excellent beacon registry information was available in the Handbook of Beacon Regulations and the DDP, the addition of the following features would be useful enhancements to the IBRD:

a) a function to point SAR services to contact information for beacon registries of Administrations whose beacons were not registered in the IBRD; and

b) an easily accessible list of Administrations that had authorised use of the IBRD.

5.5.11 The Joint Committee agreed (OWG-19/AI.1):

a) that the USA should activate the S-VDR recording feature of the IBRD as soon as possible;

b) to invite the Secretariat, using the drafts provided as attachments to document JC-19/5/6, to:

- send a letter to each Cospas-Sarsat Representative informing them of the need to declare their intended use of the IBRD and request appropriate passwords,
- distribute a circular letter to the ICAO and IMO representatives of countries not associated with the Cospas-Sarsat Programme,
- with appropriate timing, place an announcement concerning the availability of the IBRD on the Cospas-Sarsat website;

c) to invite Participants to review and update as appropriate the information on national beacon registries in Annex I/F, Points of Contact for 406 MHz Beacon Registers, in document C/S A.001 (DDP) and in document C/S S.007 “Handbook of Regulations on 406 MHz and 121.5 MHz Beacons”;

d) to invite Participants to provide the Secretariat with an appropriate National IBRD POC using the procedures described in document C/S D.004 and to assist other Administrations within their service areas to do the same; and

e) to invite Participants, through their National IBRD POCs, to request passwords for appropriate access to the IBRD, following guidelines in section 5 of document C/S D.004, ensuring that, at a minimum, a password is requested for their SAR services and authorised shore based service facilities and inspectors.

Provision of IBRD Documents

5.5.12 The Joint Committee noted from document JC-19/5/1 (Secretariat) proposed “User Instructions for Performing a Batch Upload by a National Data Provider”, i.e. instructions for submitting multiple registrations or updates to the IBRD in a single file for batch processing, to be included as Annex C to document C/S D.004 “Operations Plan for the Cospas-Sarsat International 406 MHz Beacon Registration Database (IBRD)”.

5.5.13 The Joint Committee noted from document JC-19/5/15 (USA) that the USA had:

a) proposed new text to replace the introduction of the “User Instructions for Performing a Batch Upload by a National Data Provider”; and

b) provided the IBRD Software Maintenance Manual (C/S D.002) and the IBRD System Maintenance Manual (C/S D.003) to the Secretariat under separate cover as part of the USA in-kind contribution to the IBRD.

5.5.14 The Joint Committee agreed:

a) the new text to replace the introduction of the proposed new Annex C to document C/S D.004 and that the batch upload instructions could not be technically reviewed until the IBRD was available for testing; and

b) that further review of the IBRD Software Maintenance Manual (C/S D.002) and the IBRD System Maintenance Manual (C/S D.003) by JC-19 participants was not required as these documents were not of general interest.

5.5.15 The Joint Committee **RECOMMENDED** that the Council approve:

a) new Annex C to document C/S D.004 “User Instructions for Performing a Batch Upload by a National Data Provider”, provided at Attachment 1 to document JC-19/5/1 as amended with the new introductory text provided at Attachment 1 to document JC-19/5/15; and

b) document C/S D.002, Issue 1 “IBRD Software Maintenance Manual”, and the document C/S D.003, Issue 1 “IBRD System Maintenance Manual”, as provided by the USA.

<u>Initial Use of the IBRD</u>

5.5.16 The Joint Committee noted from document JC-19/5/10-Rev.1 (Secretariat):

a) the increased interest expressed by Administrations in using the IBRD;

b) the proposal of the Secretariat to develop an information package to include a simple-to-use fact sheet on beacon coding and guidance for accessing the IBRD;

c) that in order to publicise the availability of the IBRD the Secretariat proposed to call beacon manufacturers’ workshops in Spring 2006 in Europe and possibly in the South Pacific region, and to participate in the 2006 NOAA Beacon Manufacturers’ Workshop in the USA; and

d) the proposal of the Secretariat to prepare a new issue of document C/S G.005 “Guidelines on 406 MHZ Beacon Coding, Registration and Type Approval”, with a focus on practical information for Administrations, beacon manufacturers and agents concerning beacon coding and registration using the IBRD.

5.5.17 The Joint Committee noted from discussion that it would be desirable to disseminate the information package developed by the Secretariat:

a) at SAR training workshops sponsored by IMO or ICAO; and

b) to beacon manufacturers for further distribution to their agents worldwide.

5.5.18 The Joint Committee noted from information provided by the ITU that the ITU operated MARS (Maritime mobile Access and Retrieval System) database contained information on EPIRB registrations and that Administrations should populate the MARS database with EPIRB registration data available in their national registration databases or the IBRD.

5.5.19 The Joint Committee agreed that Administrations should update the MARS database with EPIRB registration information, possibly in parallel with uploading such data in the IBRD.

5.5.20 The Joint Committee **RECOMMENDED** that the Council direct the Secretariat as part of its 2006 Workplan to:

a) develop an information package to include a simple-to-use fact sheet on beacon coding and guidance for accessing the IBRD;

b) call beacon manufacturers' workshops in Spring 2006 in Europe and another possibly in the South Pacific region, and participate in the 2006 NOAA Beacon Manufacturers' Workshop in order to publicise the availability of the IBRD in the USA;

c) prepare a new issue of document C/S G.005 "Guidelines on 406 MHz Beacon Coding, Registration and Type Approval", with a focus on practical information for Administrations, beacon manufacturers and agents concerning beacon coding and registration using the IBRD; and

d) coordinate with IMO and ICAO to publicise the availability of the IBRD at ICAO/IMO sponsored SAR seminars or training courses.

5.6 Review of C/S T.012 - 406 MHz Beacon Message Traffic Forecast

Results of 406 MHz Beacon Population Survey

5.6.1 The Joint Committee noted from document JC-19/5/16 (Secretariat) the results of the 2004 survey of 406 MHz beacon manufacturers, and that:

a) 33 current 406 MHz beacon manufacturers responded to the 2004 survey;

b) a total of 54,333 beacons were produced in 2004; and

c) based on the Secretariat's estimation, about 380,000 beacons operating at 406 MHz were in use at the end of 2004.

5.6.2 The Joint Committee also noted from discussion that:

a) the reported number of beacons produced in 2004 was lower than the number of beacons produced in 2003 by 5.3%;

b) EPIRBs, ELTs and PLBs represented respectively 55.1%, 23.4% and 21.5% of the total 2004 production of 406 MHz beacons;

c) the reported number of beacons operating at 406.028 MHz was 64,994 or 16.7% of the total 406 MHz beacon population; and

d) the break down of the beacon population by type of beacon (EPIRB, ELT, and PLB) was also provided for the last 8 years and, by the end of 2004, the population was about 280,000 EPIRBs, 43,000 ELTs, and 57,000 PLBs.

Beacon Population Forecast

5.6.3 The Joint Committee noted from the 406 MHz beacon population forecast provided in document JC-19/5/17 (Secretariat) that the 406 MHz beacon population would reach about 421,000 in the year 2005, 772,000 in the year 2010, and 1,300,000 in the year 2015.

5.6.4 The Joint Committee noted from discussion of the forecast that:

a) the “production growth” model was based on the results of the 2004 beacon population survey and information provided by beacon manufacturers on the anticipated rate of growth of their production;

b) the forecast assumed a 0% rate of growth of EPIRB production, 20% rate of growth of ELT production, and 50% rate of growth of PLB production in 2005;

c) the parameters of the model (i.e. production growth rates) should be adjusted annually on the basis of the actual production reported by manufacturers and any significant evolution in respect of beacon prices, or the regulatory environment;

d) the forecast presented in document JC-19/5/17 indicated a more rapid growth of the beacon population compared with the previous year’s forecast and assumed an average beacon lifetime of 10 years;

e) based upon their experience with beacons that had been returned for maintenance, the beacon manufacturers and a representative from a beacon repair facility recommended that the average lifetime should be extended to 15 years;

f) manufacturers and maintenance facilities might not have the full visibility of beacon replacement figures, therefore, the information provided by manufacturers should be evaluated in conjunction with information provided by national administrations; and

g) the Secretariat would continue to provide beacon population forecasts on an annual basis for consideration at future Joint Committee meetings.

5.6.5 The Joint Committee agreed to invite interested Participants to develop methodologies for estimating the average beacon replacement cycle for consideration at JC-20 (JC-19/AI.4).

Closure Date for the 406.028 MHz Channel

5.6.6 The Joint Committee noted from document JC-19/5/18 (Secretariat) and from information provided by the Secretariat that:

a) document C/S T.012 scheduled the closure of the 406.028 MHz channel for new beacon models from 1 January 2006;

b) based on the Secretariat beacon population forecast, the estimated number of 406.028 MHz beacons at the beginning of 2006 would be about 108,000, which corresponded to only 34% of the 406.028 MHz channel capacity;

c) the procedures defined in the 406 MHz frequency management plan (document C/S T.012) scheduled the closure of 406 MHz channels to correspond with the date that the beacon population would generate a load corresponding to 75% of the channel capacity;

d) the number of 406.028 MHz beacons expected to be in use worldwide would not approach 75% of the channel capacity until 2008; and

e) proposing a conservative approach, the Secretariat recommended that the 406.028 MHz channel closure date should be extended to 1 January 2007.

5.6.7 The Joint Committee also noted:

a) from document JC-19/5/13 (USA) that about 6.2% of the USA alert sites detected in 2004 were generated from beacons operating in the 406.028 MHz channel; and

b) from document JC-19/5/20 (France) that, based on data reported to the FMCC, about 4.2% of the alert sites detected in 2004 were generated from beacons operating in the 406.028 MHz channel.

5.6.8 The Joint Committee agreed:

a) that the closure date for the 406 MHz channel should be extended to 1 January 2007, and that a possible further extension should be considered at JC-20; and

b) the corresponding amendments to the Cospas-Sarsat 406 MHz frequency management plan, document C/S T.012.

5.6.9 The Joint Committee **RECOMMENDED** that the Council approve the draft amendments to the document "Cospas-Sarsat 406 MHz Frequency Management Plan", provided at Annex 14 to this Report as C/S T.012, Issue 1 – Draft Revision 3.

Parameters of the Beacon Message Traffic Forecast

5.6.10 The Joint Committee noted from document JC-19/5/7 (Norway) that:

a) the number of 406 MHz alerts in the NMCC service area had steadily increased from around 380 in 2000 to around 470 in 2004;

b) if the 2005 data were extrapolated to the end of the year, the expected number of alerts would be around 600; and

c) the significant increase predicted for 2005 was related to false alerts caused by ELTs, and this number would increase as more aircraft switched to 406 MHz beacons.

5.6.11 The Joint Committee noted from document JC-19/5/12 (USA):

a) the global geographical distribution of 406 MHz beacon transmissions based on information received at the USMCC during 2004;

b) that the activation rate computed as the ratio of 406 MHz alerts from beacons encoded with the USA country code to the total estimated number of USA coded 406 MHz beacons, excluding single point alerts, was 0.0217 in 2004 compared to 0.0239 in 2003; and

c) that the average beacon activation duration was:

- 233 minutes in 2004 compared to 213 minutes in 2003, when all activations were considered,
- 301 minutes in 2004 compared to 303 minutes in 2003, when single point alerts were excluded.

5.6.12 The Joint Committee noted from document JC-19/5/20 (France) the corresponding data provided by France, including:

a) the global geographical distribution of 406 MHz beacon transmissions based on information received at the FMCC during the period January to December 2004;

b) the activation rate computed as the ratio of 406 MHz alerts from beacons with country codes from the FMCC service area to the total estimated number of 406 MHz beacons with the same country codes, excluding single point alerts, which was 0.0373 in 2004 and 0.0413 in 2003; and

c) the average beacon activation duration, which was:

- 274 minutes in 2004 compared to 250 minutes in 2003, when all activations were considered,
- 363 minutes in 2004 compared to 365 minutes in 2003, when only located alerts were included.

5.6.13 The Joint Committee noted from document JC-19/5/11 (Secretariat) and from information provided by the Secretariat:

a) the procedures approved by Cospas-Sarsat for calculating the beacon message traffic model parameters, which were extracted from Annex G to document C/S T.012;

b) that previous Joint Committee meetings had established an action item to update these procedures to include the use of GEOSAR data;

c) an analysis of options for using LEOSAR and GEOSAR data for calculating the model parameters, and the associated draft procedure; and

d) the Secretariat recommendation that the proposed procedure should not be formally incorporated into document C/S T.012 until experience had been gained it its use.

5.6.14 The Joint Committee noted from discussion that:

a) there was a significant difference in the value of the beacon message traffic model parameters provided by France and the USA;

b) it was not clear whether this difference related to an actual difference in the beacon message traffic or whether different procedures for providing these values were used in France and the USA; and

c) it was important that this matter be addressed, since this information was used for determining when 406 MHz channels should be opened and closed.

5.6.15 The Joint Committee agreed that:

a) a meeting of experts with experience in collecting and reporting the beacon message traffic model parameters should be convened to develop a common procedure for collecting and reporting this information; and

b) in light of the narrow scope of the work involved, the meeting was not expected to exceed two days.

5.6.16 The Joint Committee **RECOMMENDED** that the Council establish a two-day Experts' Working Group on the beacon message traffic model parameters, with the draft terms of reference provided at Annex 20 to this Report.

5.7 Other Beacon Matters

Handbook of Beacon Regulations

5.7.1 The Joint Committee noted from document JC-19/5/27 (Secretariat) that the Secretariat:

a) prepared updates to the document "Handbook of Regulations on 406 MHz and 121.5 MHz Beacons" (C/S S.007) for review by the Joint Committee; and

b) developed a draft new structure of the document C/S S.007.

5.7.2 The Joint Committee noted from document JC-19/5/21 (Argentina) information on the current status of the regulations on 406 MHz and 121.5 MHz beacons in Argentina for inclusion in document C/S S.007.

5.7.3 The Joint Committee noted from document JC-19/5/24 (Brazil) new information on regulations regarding the carriage of 406 MHz and 121.5 MHz beacons, as well as on coding and registration requirements for 406 MHz beacons in Brazil for further inclusion in document C/S S.007.

5.7.4 The Joint Committee noted several additional updates to the Handbook provided by Participants during the meeting and agreed the new structure of document C/S S.007.

5.7.5 The Joint Committee agreed to request (JC-19/AI.5):

a) Participants to review inputs in the draft document C/S S.007 concerning their own national regulatory status and provide additions or corrections to the Secretariat no later than 1 September 2005;

b) the Secretariat to prepare a new issue of the "Handbook of Regulations on 406 MHz and 121.5 MHz Beacons" in accordance with the proposed new structure and include Participants' inputs in the final version of document C/S S.007; and

c) the Secretariat to distribute the new issue of document C/S S.007 to all Cospas-Sarsat Document Holders and place it on the Cospas-Sarsat website for downloading.

List of Aircraft External 406 MHz Antennas

5.7.6 The Joint Committee noted from document JC-19/5/29 (Secretariat) that:

a) the Secretariat maintained on the Cospas-Sarsat website a list of aircraft mounted 406 MHz ELT antennas that had demonstrated conformance to Cospas-Sarsat requirements during beacon type approval testing;

b) C/S T.007 allowed for reduced type approval antenna testing for ELTs that operated with antennas on this list;

c) as of 2001 Cospas-Sarsat changed the requirements for antenna testing and test results reporting;

d) none of the antennas on the list had demonstrated conformance to current requirements; and

e) in view of the above, the Secretariat recommended that all the antennas currently on the list should be removed, and that the list should be repopulated with antennas that demonstrated conformance to current requirements during future type approval testing.

5.7.7 The Joint Committee agreed:

a) to request the Secretariat to remove all the antennas currently on the list, as soon as possible after the conclusion of the JC-19 Meeting (JC-19/AI.6); and

b) that in light of the associated policy implications for ongoing beacon type approval, the Council should be requested to endorse this action at the CSC-35 Session.

5.7.8 The Joint Committee **RECOMMENDED** that the Council endorse the Joint Committee request that the Secretariat remove all antennas from the list of accepted aircraft mounted ELT antennas, until testing demonstrated conformance with existing Cospas-Sarsat requirements.

Live 406 MHz Beacon Testing

5.7.9 The Joint Committee noted from the considerations regarding live 406 MHz beacon testing provided in the TG-1/2005 Report, that:

a) TG-1/2005 established action items for:

- the Secretariat to publish information on the Secretariat website that described the impact of live testing and discouraged the practice of uncontrolled live tests,
- Participants to submit proposals for a comprehensive Cospas-Sarsat policy on live testing;

b) no progress had been made on either of these items prior to the JC-19 Meeting; and

c) the above actions were important and should be carried forward as Joint Committee action items.

5.7.10 The Joint Committee agreed to invite (JC-19/AI.7):

a) the Secretariat to publish information on the Secretariat website that described the impact of live testing and discouraged the practice of uncontrolled live tests; and

b) Participants to submit proposals for a comprehensive Cospas-Sarsat policy on live testing.

Short Format Location Protocols

5.7.11 The Joint Committee noted from discussion concerning the reports of short format location protocols provided in documents JC-19/5/5 (Australia), JC-19/5/14 (USA) and JC-19/5/23 (France) that:

a) beacon models being submitted for type approval would not be given Cospas-Sarsat approval to use short format location protocols;

b) the use of these protocols had been approved in some older beacon models, therefore, care must be exercised prior to removing their description from document C/S T.001; and

c) the operational data collected by Australia, France and the USA indicated that these protocols were not extensively used, except perhaps by India.

5.7.12 The Joint Committee agreed to invite India to report on their current and planned use of short format location protocol beacons (JC-19/AI.8).

AGENDA ITEM 6: OPERATIONAL MATTERS

6.1 Alert Data Distribution (C/S A.001)

Proposed Updates to the DDP

6.1.1 The Joint Committee noted from document JC-19/6/1 (Secretariat) proposed draft amendments to document C/S A.001 (DDP), prepared by the Secretariat on the basis of available information.

6.1.2 The Joint Committee noted:

a) from document JC-19/6/19-Rev.1 (Peru) the status of Cospas-Sarsat ground segment in Peru and the request to amend respective DDP annexes; and

b) from document JC-19/4/10 (Argentina) updated information on the status of the Ground Segment in Argentina and the recommendation that page II/C-AR-1 of document C/S A.001 be amended accordingly.

6.1.3 The Joint Committee noted from document JC-19/6/21 (Turkey) proposed draft updates to document C/S A.001 regarding installation and commissioning of their ground segment into the Cospas-Sarsat System.

6.1.4 The Joint Committee noted from document JC-19/6/17 (France) the draft updated page II/C-FR-3 of document C/S A.001 with new text describing the back-up procedure of the SPMCC.

6.1.5 The Joint Committee noted the request of the Secretariat that MCC operators provide:

a) details of those SPOCs in their MCC service areas for which no information was contained in the DDP;

b) any available information on points of contact for 406 MHz beacon registers for countries that were managing registers not listed in the DDP, for further inclusion in Annex I/F; and

c) a description of the applicable MCC back-up procedures for inclusion at Annex II/C of the DDP, if not previously submitted.

<u>NOCR Routing Distribution Matrix</u>

6.1.6 The Joint Committee noted from document JC-19/6/12 (Spain) that the Central DDR Meeting (February 2005) reviewed the NOCR distribution matrix (DDP, Figure III/B.9) and recommended use of the distress alert and SSAS alert routing principles for the distribution of NOCR messages.

6.1.7 The Joint Committee noted from discussion of alert distribution procedures that:

a) the SSAS alert distribution principle was based on the unlocated alert distribution procedure; and

b) the USA had proposed use of the unlocated distribution procedure for both NOCR and SSAS messages.

6.1.8 The Joint Committee agreed to distribute the NOCR and SSAS messages using the unlocated alert procedure with a 2-year implementation deadline and invited Ground

Segment operators to propose appropriate changes to the System documents (OWG-19/AI.2).

6.1.9 The Joint Committee noted several additional updates to the DDP annexes provided by Participants during the meeting and agreed the draft amendments to the DDP noted above.

Encoded Position Footprint Validation

6.1.10 The Joint Committee noted from document JC-19/6/2 (Australia) that:

a) the AUMCC had implemented an algorithm to validate encoded position data, checking for both LEOSAR and GEOSAR satellite footprints, and alarms were raised when the encoded position was outside the satellite footprint;

b) there was currently no Cospas-Sarsat guidance on what to do with the results of such validation for encoded positions; and

c) Australia had proposed distributing the encoded positions that failed footprint validation to RCCs with an appropriate warning note in paragraph 15 of the SIT 185 message.

6.1.11 The Joint Committee noted from discussion of this matter that:

a) there was a need to perform a footprint check on encoded positions because MCCs did receive alerts that fell outside the satellite footprint;

b) Doppler positions that failed footprint check were discarded and the alert was treated as “unlocated”; and

c) encoded positions that failed footprint validation position should also be discarded.

6.1.12 The Joint Committee agreed to amend the text of Annex III/B of the DDP to require that encoded position data that failed footprint validation be discarded, as provided at Annex 4 to this Report.

Processing of Multi-Invalid Alerts

6.1.13 The Joint Committee noted from document JC-19/6/5 (Australia):

a) that multi-invalid alerts were defined as those that:

- resulted from identical beacon messages received multiple times during a LEOSAR satellite pass,
- decoded to the same 15 Hexadecimal characters (i.e. bits 26-85 with no bits defaulted),

- contained uncorrected BCH errors; and

b) the proposal of Australia that multi-invalid alerts should not be matched with other alerts with the same bits 26-85 that did not contain BCH errors (i.e. valid messages).

6.1.14 The Joint Committee, after discussion of the matter, agreed that a multi-invalid alert containing a beacon message with BCH errors could be considered as coming from the same transmitter as a previously received message if bits 26-85, with no bits defaulted, decoded to the same exact 15 hexadecimal characters.

6.1.15 The Joint Committee agreed additions of text to Table III/B.3 of the DDP to require that multi-invalid alerts be matched with other beacon messages that decoded to the same 15 hexadecimal characters provided the matching process was performed using bits 26-85 with no defaulted bits.

406 MHz Message Validation Flowchart

6.1.16 The Joint Committee noted from document JC-19/6/10 (Spain) possible limitations of the alert message validation processing procedures specified in section III/B.1 of the DDP, and in particular Spain's suggestion that a flowchart be added to the DDP to address:

a) incorrect DDP guidance on the processing of Standard and National location protocol messages that failed the bit shift checks (bits 107-109 or bits 107-110), which, although situated in the second protected field, were defined to identify a beacon message processing problem in the first protected field; and

b) inadequate DDP guidance on the processing of alert messages that were not valid (i.e. failed BCH-1) and/or failed beacon message protocol validation, but included a 15 HEX ID that matched the 15 HEX ID of a valid beacon message.

6.1.17 The Joint Committee noted from document JC-19/6/10 and from discussion of the processing of the contents of PDF-2 that:

a) section III/B.1.1.3 of the DDP, 406 MHz Beacon Message Validation, stated that "If the second protected field (bits 107 - 144) has uncorrected BCH errors, then no processing shall be based on any portion of this field", preventing the MCC from checking the fixed bits (107-110 for Standard Location Protocols or bits 107-109 for National Location Protocols); and

b) a similar case occured if PDF-1 passed BCH checks and protocol checks, but PDF-2 contained a protocol error, because the DDP stated that "If an item in the second protected field (bits 107-144) fails protocol validation, then no processing shall be based on any portion of the second protected field".

6.1.18 The Joint Committee noted from discussion:

a) that the fixed bits (bits 107-110) were originally defined to detect beacon messages with a valid PDF-1 that resulted from a processing anomaly produced by a bit shift during reception at the LUT;

b) an error detected in these fixed bits likely indicated a bit shift and, therefore, errors in PDF-1; and

c) the validation of PFD-2 was irrelevant in this regard and should not impact on the filtering process defined in Table III/B.3 of the DDP.

6.1.19 The Joint Committee further noted from discussion that:

a) the DDP Table III/B.5 stated that alerts with uncorrected protocol errors should be distributed based on Doppler location only; however

b) some MCCs did match and merge valid alerts with alerts that failed validation with BCH or protocol errors, but had the same bits 26-85.

6.1.20 Following discussion of document JC-19/6/5 (Australia) as reported above, the Joint Committee had agreed that multi-invalid alerts should be matched with beacon messages that decoded to the same 15 hexadecimal characters for bits 26-85, and that this principle could logically be extended to the processing of beacon messages with protocol errors.

6.1.21 The Joint Committee agreed to amend the document C/S A.001 (DDP) as provided at Annex 4 to the JC-19 Report to:

a) continue the protocol check of fixed bits as currently provided in Table III/B.4 of the DDP, and move the statements about PDF-2 validations to allow checking of the fixed bits 107 to 110; and

b) allow filtering of invalid beacon messages and those that failed protocol check provided a match could be made with bits 26-85 of any other beacon message, without defaulting any bits.

6.1.22 The Joint Committee agreed (JC-19/AI.9):

a) that whilst the 406 MHz message validation flowchart was a valuable contribution to the DDP, further review was required and the matter should be re-considered at JC-20;

b) to invite Australia to lead a correspondence group for the development of illustrative examples of the DDP alert data validation procedure; and

c) to invite all Ground Segment operators to review the System test script to ensure its alignment with the agreed changes to the DDP and SID.

6.1.23 The Joint Committee **RECOMMENDED** that the Council approve the draft amendments to the document "Cospas-Sarsat Data Distribution Plan" provided at Annex 4 to the JC-19 Report as C/S A.001, Issue 4 - Draft Revision 8.

<u>TRMCC Service Area</u>

6.1.24 The Joint Committee noted from document JC-19/6/18 (Turkey) a definition of the TRMCC service area at IOC.

6.1.25 The Joint Committee further to discussion noted the agreement reached by Turkey, Russia, Italy, Saudi Arabia and France that:

a) the existing relevant Central and Eastern DDR boundaries would constitute the border between the TRMCC and CMC service areas;

b) the existing relevant Central and Southwest Pacific DDR boundaries would constitute the border between the TRMCC and SAMCC service areas;

c) the remaining borders of the TRMCC service area at IOC would be based on the Turkish Search and Rescue region, registered and circulated within IMO (SAR/Circ.5, Annex 6), as reflected in Attachment 2 to document JC-19/6/18;

d) accordingly, necessary arrangements would be made by the Secretariat regarding the Geosort document and tab-delimited files describing the TRMCC service area at IOC;

e) when the TRMCC obtained IOC, Turkey would assume the services currently provided by the ITMCC within the TRMCC service area and, to the extent that such services were required by relevant SPOCs of the ITMCC, they would also be provided via the ITMCC; and

f) the commissioning of the TRMCC would proceed on the above basis, with a view to obtaining IOC in September/October 2005 and FOC by the end of 2005.

<u>VNMCC Service Area</u>

6.1.26 The Joint Committee noted that, in June 2004, JC-18 recommended that the Council commission the VNMCC into the Cospas-Sarsat System, but representatives of the People's Republic of China and Hong Kong could not accept the suggested draft VNMCC service area and the amended HKMCC service areas because the matter had not been reviewed by the appropriate authorities.

6.1.27 The Joint Committee also noted:

a) that the VNMCC was formally commissioned at CSC-33 in October 2004, but it had not reached IOC status at this stage because of the unresolved issues regarding its service area;

b) that on 10 November 2004 the Secretariat had sent a letter to the Representatives of the People's Republic of China, Hong Kong, Japan, Singapore and Vietnam regarding the establishment of Vietnam's Mission Control Centre service area, as requested by the Council; and

c) information by the People's Republic of China that on 26 April 2005, China and Vietnam had a first meeting on delimitation of the VNMCC service area and that an agreement could not be reached at the meeting.

6.1.28 The Joint Committee noted from discussion of service areas within the Cospas-Sarsat System that:

a) the establishment of Cospas-Sarsat service area boundaries did not in any way prejudice the establishment of any boundaries between States as by international agreement the delimitation of Search and Rescue regions was not related to and should not prejudice the delimitation of any boundary between States;

b) Cospas-Sarsat service area boundaries generally follow agreed boundaries of ICAO/IMO SAR regions, but this was not always possible;

c) in accordance with section G.5.2 of document C/S A.006, if common service area boundaries could not be agreed, it was the usual Cospas-Sarsat policy to establish an overlapping service area;

d) as long as the VNMCC was not declared at IOC, the distress alerts received via the Haiphong LUT could not be distributed internationally to SAR services;

e) consequently, useful distress alerts might not be made available to Search and Rescue services, or delivery might be delayed; and

f) from the Cospas-Sarsat System perspective, it was vital that the VNMCC begin operating at IOC as soon as possible and Vietnam and China were encouraged to use the fora of the September 2005 Northwest Pacific DDR meeting to work towards a resolution.

6.1.29 The Joint Committee further noted the views of Participants that:

a) the Vietnam LUT and MCC had been formally commissioned at the CSC-33 Session, therefore, alert data from this LUT could be distributed through the Cospas-Sarsat network; and

b) such distribution could be undertaken on a trial basis without prejudice to a future agreement on the VNMCC service area boundary.

6.1.30 The Joint Committee agreed that:

a) the People's Republic of China and Vietnam should continue their consultations to achieve a final resolution of the boundaries of the VNMCC service area and report at the CSC-35 Session in November 2005; and

b) in the interim, Japan should consult with Vietnam to undertake the distribution of Vietnam's LUT alert data on a trial basis in the Cospas-Sarsat System.

6.2 SID Related Matters (C/S A.002)

Proposed Updates to the SID

6.2.1 The Joint Committee noted:

a) from documents JC-19/6/23 (Secretariat) and JC-19/6/9 (Secretariat) draft amendments to the annexes of document C/S A.002 (SID) prepared by the Secretariat on the basis of available information; and

b**)** from document JC-19/6/21 (Turkey) draft updates to annexes of the SID in respect of the new Turkish ground segment.

6.2.2 The Joint Committee noted several additional updates to the SID provided by Participants during the meeting and agreed the draft amendments to the SID as provided at Annex 5 to this Report.

SIT 185 Alert Formats

6.2.3 The Joint Committee noted from document JC-19/6/3 (Australia) that it was agreed at JC-18 that MCCs should inform SPOCs that a multi-invalid alert might be the result of an SSAS beacon transmission, and Australia's views that:

a) a similar notification was required for those alerts that were not multi-invalid, but failed protocol validation;

b) the notification should be provided in paragraph 15, rather than paragraph 14 of the SIT 185, as suggested by OWG-18/AI.5;

c) an example of a protocol validation failure of SIT 185 alerts should be included in Appendix C.1 to Annex C "Sample Messages", of the document C/S A.002 (SID); and

d) the definition "HEX ID" in multi-invalid and protocol validation failure alerts and the definition of "beacon identification" as provided in the document C/S G.004 "Cospas-Sarsat Glossary", should be appropriately updated.

6.2.4 The Joint Committee noted from discussion under agenda item 6.1 of the JC-19 meeting that:

a) the content of bits 26 to 85 in messages that failed BCH-1 or protocol validation as defined in section III/B.1.1.3 of the DDP could not be trusted to provide a correct beacon identification;

b) the term 15 Hex ID should only be used to designate the 15 hexadecimal characters obtained for bits 26-85 of valid messages, with bits defaulted as necessary to replace encoded location data; and

c) the definition of 15 Hex ID in document C/S G.004 should not be modified at this time.

6.2.5 The Joint Committee agreed to modify the appropriate fields in Appendix B.1 of document C/S A.002 and to add the phrase “Data decoded from the beacon ID is not reliable” to the SIT 185 message for those alerts that failed validation per C/S A.001 section III/B.1.1.3.

6.2.6 The Joint Committee noted documents JC-19/6/2 (Australia), JC-19/6/5 (Australia) and JC-19/6/10 (Spain) and, following discussion of these matters under agenda item 6.1, agreed to update Message Fields 50, 51, 52, 53, 54.d, 55, 57, 58, 59, 60 and 61 at Appendix B.1 to Annex B of the SID document as provided at Annex 5 to this Report.

<u>FTP Issues</u>

6.2.7 The Joint Committee noted from document JC-19/6/9 (Secretariat):

a) that an outstanding action item from the Task Group on Ground Segment Communications (TG-1/2004) required review of the Cospas-Sarsat FTP specification to establish actions to be taken by FTP clients if a connection could not be established or was dropped; and

b) new text specifying that the transmitting MCC should try to resend the message three times and, after three unsuccessful attempts, switch to an alternative communication channel.

6.2.8 The Joint Committee noted from document JC-19/6/13 (USA) the opinion of the USA that the existing Cospas-Sarsat FTP specification in Annex F of document C/S A.002 provided sufficient guidance and that no further action was necessary.

6.2.9 The Joint Committee agreed that no System document changes should be made in respect of this matter, and the pending TG-1/2004 action item was closed.

6.2.10 The Joint Committee **RECOMMENDED** that the Council approve the draft amendments to the document “Cospas-Sarsat Mission Control Centres Standard

Interface Description" provided at Annex 5 of the JC-19 Report as C/S A.002, Issue 4 - Draft Revision 9.

6.3 406 MHz False Alerts

The Joint Committee noted that no documents were submitted under this agenda item, nevertheless, document JC-19/2/1 (Secretariat) provided a summary of 2004 statistics on 406 MHz beacon false alerts, based on the preliminary results of the draft "Cospas-Sarsat Report on System Status and Operations", document C/S R.007, No.21 (January - December 2004), which are reported under agenda item 2.

6.4 MCC Network Structure and Communication Issues

Holding Message Traffic

6.4.1 The Joint Committee noted from document JC-19/6/4 (Australia) that:

a) document C/S A.005, section 5.8.2, allowed MCCs 60 minutes to complete back-up procedures, therefore, supported MCCs might need to hold traffic whilst the back-up MCC re-configured;

b) JC-18 had requested MCCs to confirm their capability to handle outages at other MCCs and advise on the automation of re-routing messages to the back-up MCC;

c) AUMCC, as back-up for the USMCC, could assume the back-up role within a few minutes, but problems had been experienced with other MCCs re-configuring to re-route traffic to the AUMCC within 60 minutes, and with other MCCs' inability to hold traffic whilst the AUMCC was re-configuring; and

d) operator intervention was required if AUMCC was requested to hold traffic while another MCC was undertaking maintenance, but a system upgrade at the end of 2005 should allow automation.

6.4.2 The Joint Committee noted from document JC-19/6/6 (Norway) that NMCC had an automated system that allowed messages to be held indefinitely and that:

a) each MCC or SPOC that NMCC communicated with could be configured with up to seven communication links; and

b) in the event of communications difficulties, an automatic switching mechanism changed from primary to secondary or further communication links.

6.4.3 The Joint Committee noted from document JC-19/6/11 (Spain) that:

a) the SPMCC was capable of assuming back-up of the FMCC in less than 15 minutes and could back-up ALMCC in less than five minutes;

b) SPMCC could hold incoming and outgoing traffic for each MCC separately and could further specify holding by SIT message type;

c) operator intervention was required, but this was not an issue as SPMCC was manned 24/7; and

d) SPMCC could configure up to seven communication links for each destination and would automatically try each link three times before switching to the next one.

6.4.4 The Joint Committee noted from discussion of the matter that:

a) any documented approval of a delay greater than 30 minutes caused by holding message traffic was unacceptable from an RCC perspective;

b) MCCs often could not accomplish a back-up within the allotted 60 minutes; and

c) during the 2005 scheduled AUMCC back-up by USMCC, six MCCs had continued to send alerts to the AUMCC, despite advance warning that the AUMCC would be "shutdown".

6.4.5 The Joint Committee agreed that as holding message traffic for any extended period was not acceptable, MCCs should make best efforts to decrease the time required to assume a back-up configuration in order to meet the time requirements specified in document C/S A.005.

<u>AMHS Standard</u>

6.4.6 The Joint Committee noted from document JC-19/6/7 (Argentina) and from discussion of the implementation of AMHS in the Ground Segment that:

a) the pioneering work towards implementation of AMHS in Argentina was being accomplished, with completion scheduled for August 2005;

b) other MCCs would not be affected as communication gateways would translate between AFTN and AMHS messages to ensure continuity and inter-system connectivity during the migration; and

c) AMHS standards for communication in the Cospas-Sarsat Ground Segment had not yet been developed.

6.4.7 The Joint Committee agreed to invite all MCC operators, particularly those with AMHS experience, to develop proposed AMHS standards for Cospas-Sarsat Ground Segment communications (OWG-19/AI.3).

FTP-VPN Communication Links and Nodal MCC Network

6.4.8 The Joint Committee noted from document JC-19/6/8 (Argentina) a report on the implementation of FTP-VPN between the ARMCC and USMCC, and:

a) that various technical problems had occurred during the establishment of the FTP-VPN connection, but after successful tests, on 21 March 2005, FTP-VPN replaced X.25 as the primary communication link between ARMCC and USMCC; and

b) the conclusion of the ARMCC that the difficulties encountered in implementing FTP-VPN were largely due to security constraints which were not addressed in document C/S A.002, Appendices F and G, and the recommendation that these documents be updated.

6.4.9 The Joint Committee noted from discussion of the matter:

a) the general consensus that the current FTP-VPN standards found in document C/S A.002, Appendices F and G, adequately listed minimum specifications for successful implementation of FTP-VPN and no further changes were required to this Cospas-Sarsat specification at this time;

b) that MCCs could expect that initial set up of FTP-VPN would require close coordination between experts at each MCC; and

c) that it would be useful for MCCs to exchange via informal correspondence any “lessons learned” that might be helpful to other MCCs.

6.4.10 The Joint Committee noted from document JC-19/6/13 (USA) a report on the status of new communication links at the USMCC and in the Western DDR and that:

a) the USA had provided updates to Table I.1 through I.3 of document C/S A.002 reflecting the latest available information on implementation dates for communication links in the Western DDR;

b) experience indicated that whilst FTP-VPN was secure, economical and reliable, overhead was incurred for the management of passwords for FTP-VPN servers; and

c) the recommendation of the USA that the number of external connections to a secure system should be kept to a minimum and to this end it would be beneficial if all message traffic within the Cospas-Sarsat Ground Segment were distributed via the nodal data distribution system.

6.4.11 The Joint Committee further noted from document JC-19/6/13 that at JC-18, 96% of MCC operators reported that they would have implemented either AFTN or FTP-VPN as secure means of communication by December 2005, therefore, the USA recommended that Cospas-Sarsat terminate non-secure FTP as an approved method of communication on 30 June 2006.

6.4.12 The Joint Committee noted from discussion of the matter:

a) the general agreement that security best practices recommended that the number of terminals connected to any system be kept to a minimum;

b) the general support of Participants for distribution of all message types via the nodal data distribution scheme;

c) that although the exchange of passwords was onerous, communications via FTP-VPN remained less costly than X.25; and

d) that use of the nodal data distribution system would facilitate better password management and exchange as each MCC would have to communicate with fewer other MCCs.

6.4.13 The Joint Committee noted the opinion of Japan that the exchange of passwords was unimportant when communicating via FTP-VPN as greater system security was provided with the establishment of the secure communications tunnel.

6.4.14 The Joint Committee noted the suggestion of Spain and Australia that MCCs use the three digit MCC identification code in the network IP address of their MCC, but agreed that it would be impossible to implement for a variety of reasons.

6.4.15 The Joint Committee noted:

a) the concerns of some Participants with the increased reliance on FTP-VPN communications and the associated security issues, particularly in the case of a nodal networks where the nodes would be single failure points;

b) the view of Canada that:

- although the nodal data distribution system was an excellent concept, since several administrations had expressed concerns with their readiness to adopt FTP-VPN protocols, immediate implementation would bring undue risk,
- it was therefore critical to the integrity of Ground Segment communications that a true FTP-VPN nodal system be achieved through a special working group where standard best practices could be shared, and then implemented within a prudent schedule,

- "Communications and Information Technology" should be established as a recurring item on the agenda of the Joint Committee's OWG to ensure a structured and ongoing focus for these issues;

c) the Secretariat comment that the Council had established the Joint Committee with only two working groups, as recorded in the new document C/S P.011 "Cospas-Sarsat Programme Management Policy", and the addition of a third working group would require a large consensus amongst Participants supported by a clear recommendation to Council;

d) the view that a separate forum, scheduled to meet annually, would also require Council approval and might be difficult to establish because of time and travel constraints of the Participants; and

e) the suggestion that a new dedicated agenda item in the agenda of the Joint Committee would be a first step towards increasing Participants' focus on network security and FTP-VPN implementation and management issues.

6.4.16 The Joint Committee noted the request of Participants that the Secretariat collect a list of the proposed termination dates for X.25 at each MCC as this would highlight the urgency of establishing alternative communication means.

6.4.17 The Joint Committee agreed:

a) to establish 30 June 2006 as the termination date for non-secure FTP as an approved method of communication;

b) to include at Annex 16 to this Report a list of the proposed termination date for X.25 at each MCC;

c) that all message traffic within the Cospas-Sarsat Ground Segment should use the nodal data distribution system and all Ground Segment operators should review the related documentation and suggest necessary changes for review at JC-20 (OWG-19/AI.4); and

d) that in order to address the concerns of Participants with communications issues, a new dedicated agenda item should be added to the Joint Committee agenda to address Ground Segment Communications, with sub-items addressing the Status of FTP-VPN Implementation, the Management of the FTP-VPN network, Security Issues and other specific MCC communication issues, as provided at Annex 22 to the JC-19 Report.

6.4.18 The Joint Committee noted from document JC-19/6/22 (Chile) a report on the status of CHMCC communication links, and that:

a) CHMCC had operational X.25 and AFTN communication links and anticipated installation of FTP-VPN by the end of 2005, but Telex was not available;

b) when implementing AFTN, CHMCC had experienced problems related to the acknowledgement of “SS” messages as a result of difficulties with the guidance provided by ICAO in Annex 10 to the Convention on International Civil Aviation “Aeronautical Telecommunications”; and

c) a work-around was currently in place, where the USMCC and the CHMCC agreed sending alert traffic with “DD” priority until a solution could be found.

6.4.19 The Joint Committee noted from discussion:

a) that Australia had experienced similar problems with the transmission of “SS” priority messages via the AFTN;

b) that the USA and Australia had discussed this issue with the ICAO Secretariat and correspondence on the matter could be provided to the Secretariat for information;

c) the view that, as an organisation representing a significant number of countries, Cospas-Sarsat might have greater success than individual Administrations in raising ICAO’s awareness of the issue; and

d) the suggestion that the Secretariat should approach the competent experts in the ICAO Secretariat on behalf of Chile and other Participants, to forward their concern and clarify the requirements of Annex 10.

6.4.20 The Joint Committee agreed to (JC-19/AI.10) request:

a) Australia and the USA to forward to the Secretariat their correspondence with ICAO concerning the problem experienced with the implementation of the “SS” priority in AFTN messages;

b) Chile to prepare a detailed description of the issue with “SS” priority implementation and provide it to the Secretariat; and

c) the Secretariat to approach ICAO experts to:

- present the “SS” priority implementation problems,
- request clarifications of the corresponding Annex 10 requirements,
- explore the means of resolving this issue, and
- report to the JC-20 meeting.

Positive Delivery Notification (PDN)

6.4.21 The Joint Committee noted from document JC-19/6/20-Rev.1 (UK) a proposal for distress alert messaging Positive Delivery Notification (PDN) and that:

a) no universal and reliable system for providing Positive Delivery Notification (PDN) for distress alert messages had been implemented;

b) increased reliance on FTP-VPN, which provided no message confirmation, and the prevention by some administrations of the use of the "SS" priority on AFTN messages had raised some concerns; and

c) the UK had proposed a possible method for achieving a comprehensive PDN service in the Cospas-Sarsat System.

6.4.22 The Joint Committee noted from discussion that:

a) in principle, there was general support for PDN within the Cospas-Sarsat System;

b) implementation of PDN was likely to be costly and would require considerable effort, therefore, it was necessary to assess whether PDN was truly required within the Cospas-Sarsat System;

c) PDN could be implemented on a bi-lateral basis, when required, while further study of the issue was accomplished; and

d) Australia accomplished some message delivery tracking by making use of the fact that messages should be received in sequential order, consequently a request for reissue of any messages that were missing could be sent, but this procedure took a considerable amount of operator time.

6.4.23 The Joint Committee agreed to invite Canada and the UK to conduct trials of the PDN method proposed in document JC-19/6/20-Rev.1 and to report to JC-20 on the success of the testing and the additional workload that might have ensued at each MCC (OWG-19/AI.5).

6.5 Other Operational Matters

Handbook for RCCs

6.5.1 The Joint Committee noted from document JC-19/Inf.2 (Argentina) that Argentina had updated and distributed to National SAR Authorities a handbook for RCCs that contained:

- an introduction to the Cospas-Sarsat Programme,
- information on operational processing of SAR cases,

- data exchange and coordination for live 406 MHz beacon tests,
- a description of SIT message formats, and
- other system diagrams and graphics of use to RCCs.

Satellite Manoeuvres

6.5.2 The Joint Committee noted from document JC-19/6/15 (USA) a proposed test of procedures agreed at CSC-33 for METOP satellite manoeuvres, and that:

a) the first METOP satellite was scheduled for launch in April 2006;

b) the proposed test date of 6 December 2005 was before the launch, therefore, the tests would simulate METOP by using orbital data from an actual satellite (e.g. Sarsat-9), however, it would be difficult to test LEOLUT Doppler processing; and

c) the goal of the test was to ensure that each MCC and LEOLUT was prepared to receive and properly process the SIT 216 message detailing the revised orbital information.

6.5.3 The Joint Committee noted from discussion of the matter that testing of System preparedness for METOP satellite manoeuvres was essential.

6.5.4 The Joint Committee agreed (JC-19/AI.11):

a) to invite all Ground Segment providers to confirm at CSC-35 their readiness to test the planned procedures for METOP satellite manoeuvres;

b) to invite the USA to lead the proposed test described at Annex 17 to the JC-19 Report on 6 December 2005; and

c) to invite all MCC operators to report test results in the format provided at Annex 17 to the JC-19 Report to their nodal MCC, and nodal MCCs to report to the Secretariat.

6.5.5 The Joint Committee noted from document JC-19/6/16 (France) a proposed procedure for advising SPOCs and RCCs of a possible degradation of the Doppler location accuracy following a LEOSAR satellite manoeuvre, and:

a) the opinion of France that it was not appropriate to send a specific narrative message to all SPOCs and RCCs as many would not receive any alerts from the concerned satellite during the manoeuvre period, therefore, the procedure would generate an unnecessary workload;

b) that if the information was contained in the SIT 185 message, only the concerned SPOCs and RCCs would effectively be notified; and

c) the recommendation that a warning statement be added at paragraph 15 of appropriate SIT 185 messages.

6.5.6 The Joint Committee further noted that the satellite manoeuvre warning procedure could be automated at MCCs by flagging the concerned satellite upon receipt of an appropriate SIT 126, which would cause insertion of the technical warning sentence in SIT 185 messages issued during a 24-hour period.

6.5.7 The Joint Committee noted from discussion of the matter that:

a) the insertion of text at paragraph 15 of SIT 185 messages to warn RCCs of possible position degradation due to METOP satellite manoeuvres was appropriate; and

b) the text should read "RELIABILITY OF DOPPLER POSITION DATA – SUSPECT DUE TO SATELLITE MANOEUVRE."

6.5.8 The Joint Committee agreed to (OWG-19/AI.6):

a) invite France to assess the position errors induced by METOP satellite manoeuvres and report as soon as possible;

b) invite Ground Segment Providers when appropriate, to insert a "technical warning" at paragraph 15 of SIT 185 messages, thereby notifying only affected RCCs and SPOCs of possible Doppler position degradation due to LEOSAR satellite manoeuvres;

c) invite Ground Segment Providers to automate the satellite manoeuvre warning procedure at the MCC level by inserting appropriate text in the SIT 185 messages for approximately 24 hours after the satellite manoeuvre, with a required implementation date of December 2005; and

d) record these procedures in document C/S A.002, Issue 4 - Draft Revision 9, as provided at Annex 5 to the JC-19 report.

USMCC – AUMCC Back-Up Tests

6.5.9 The Joint Committee noted from document JC-19/6/24 (Australia):

a) a description and analysis of a back-up test undertaken between the AUMCC and the USMCC during the week of 2 to 5 May 2005;

b) the detailed analysis of the results of the test, including successes, problems and deficiencies; and

c) that USMCC/AUMCC bilateral support generally worked well during the test.

6.5.10 The Joint Committee noted from document JC-19/6/24 that two main issues of concern had arisen during the test regarding:

a) provision of the resolved position using encoded position input; and

b) the possible distribution of multiple unlocated alerts, despite DDP guidance to the contrary, as provision of these multiple alerts from different GEO satellites was found to be useful to the image determination process.

6.5.11 The Joint Committee noted from document JC-19/6/24 that during the USMCC back-up of the AUMCC on 2 May 2005, the AUMCC was well supported by the USMCC, and that:

a) despite ample notice of AUMCC announced shutdown, various alerts from SIMCC, THMCC, IDMCC, CMC and USMCC were received by AUMCC, and IDMCC, SIMCC and THMCC were slow to return to AUMCC service at the end of the test;

b) a request for continued transmission by RCC Australia to the USMCC did not have any positive result; and

c) a SIT 133 (NOCR) was received from the UKMCC whilst the AUMCC was shutdown.

6.5.12 The Joint Committee further noted from document JC-19/6/24 that the AUMCC back-up of the USMCC was prematurely terminated about 10 hours into the test at 22.37 UTC on 4 May 2005, due to problems at CMCC, and that:

a) no alerts were received from PEMCC;

b) when the USMCC advised AUMCC that USMCC was backing up CMCC, but that CMCC would be operational soon, AUMCC began transmitting alerts to CMCC initially via fax and later by FTP and AFTN;

c) some problems were experienced because the AUMCC communication system had not been updated with the new USMCC AFTN address; and

d) only two USMCC SPOC SIT 185 alerts that were generated were not transmitted because of the communication problems experienced.

6.5.13 The Joint Committee noted from discussion that the back-up test once again highlighted that some MCCs could not re-configure their systems in a timely manner when there was a change in the nodal MCC network, despite adequate notice being given, and that MCCs should:

a) put greater effort into developing adequate contingency procedures in order to meet the Cospas-Sarsat mission statement requirement to “reduce, as far as possible, delays in the provision of distress alerts to SAR services”; and

b) fully test their contingency procedures and configuration.

6.5.14 The Joint Committee agreed to review in the context of change management, the cost effectiveness and benefit to the System of (OWG-19/AI.7):

a) harmonizing the procedures at all MCCs for merging encoded and Doppler positions in order to resolve ambiguity; and

b) distributing multiple unlocated alerts from different GEO satellites in order to aid in the image determination process.

AGENDA ITEM 7: SHIP SECURITY ALERT SYSTEM

7.1 The Joint Committee noted from document JC-19/7/1 (Secretariat) that:

a) SSAS beacon specification and type approval requirements were currently defined in documents C/S T.001 (406 MHz beacon specification), C/S T.007 (406 MHz beacon type approval standard), and in the interim type approval guidelines for SSAS beacons;

b) TG-1/2005 agreed (TG-1/2005, section 4.3.3) it would be desirable to establish a new document that would address both SSAS beacon specification and type approval requirements; and

c) TG-1/2005 recommended that the new document should identify requirements by reference to documents C/S T.001 and C/S T.007, and only specify areas where there were differences between distress and SSAS beacon requirements.

7.2 The Joint Committee further noted from the draft new SSAS beacon System document (C/S T.015), prepared by the Secretariat in accordance with the direction proposed by the TG-1/2005, that:

a) the laboratory test configuration for evaluating mast-mounted antennas (Figure B.3 of C/S T.015) had been included in document C/S T.015 as a place holder, and should be updated to reflect the findings of the Joint Committee; and

b) the draft document C/S T.015 assumed that Cospas-Sarsat would specify full hemispherical coverage for SSAS beacon antennas (C/S T.015, section 2.2).

7.3 The Joint Committee noted from document JC-19/7/1 and from discussion of draft document C/S T.015 that:

a) JC-19 had not progressed on SSAS antenna specification requirements or testing requirements for mast-mounted SSAS beacon antennas;

b) the currently approved interim type approval guidelines for SSAS beacons did not impose a thermal shock test, and this specification allowance should also be included in document C/S T.015; and

c) from a programmatic perspective, if SSAS beacons were removed from documents C/S T.001 and C/S T.007, there would be a requirement to confirm whether this affected 406 MHz beacon requirements specified in any IMO or ITU documents.

7.4 The Joint Committee agreed:

a) that for the next year, SSAS specification and type approval requirements should continue to be addressed in C/S T.001, C/S T.007 and the applicable interim guidelines; and

b) to invite Participants to consider the programmatic and technical issues associated with identifying SSAS beacon requirements in a dedicated new System document, and report their findings and recommendations to JC-20 (JC-19/AI.12).

7.5 The Joint Committee noted from document JC-19/7/2 (Brazil) the designation of MRCC-Brazil, with all applicable contact details, as the competent Brazilian authority for the distribution of ship security alerts. The Joint Committee thanked Brazil for the provision of this information and noted that:

a) all Administrations were encouraged to also provide this information; and

b) as Brazil had registered this information with IMO, there was no need to record it in any Cospas-Sarsat System document.

7.6 The Joint Committee noted from document JC-19/7/3-Rev.1 (USA) an approach to SSAS testing and that:

a) in May and September 2004, the USA had coordinated Cospas-Sarsat System-wide testing of the SSAS capability;

b) for each test, individual beacon IDs were uplinked with country codes for all MCCs that were prepared to process SSAS beacons; and

c) the tests were considered successful if each MCC processed and distributed these SSAS alerts in appropriate SIT message formats based on country code, rather than the Doppler or encoded position.

7.7 The Joint Committee further noted from document JC-19/7/3 recommended modifications to the annual System test script provided in C/S A.003 to add a test modelled after the 2004 SSAS tests and proposed:

a) the addition to the test script of six new beacon IDs, formatted as SSAS beacons, using country codes associated with each of the six Data Distribution Regions; and

b) that the test would be considered successful if:

- each of the six SSAS alerts was sent to the MCC associated with the embedded beacon country code using the correct SIT message formats,
- no SSAS alert was distributed based on Doppler or encoded location.

7.8 The Joint Committee noted from discussion:

a) the general agreement that the six SSAS beacon country codes incorporated in the annual System test could be changed every year and all MCCs could, therefore, be tested every five years;

b) that it would be helpful if the country codes of some non-nodal MCCs could be included; and

c) that small editorial changes would be required before final approval by the Council of the revised test description for inclusion into the document C/S A.003.

7.9 The Joint Committee agreed the proposed changes to the System test script in document C/S A.003 provided at Annex 6 to this Report, to add SSAS testing to the annual Cospas-Sarsat System test.

7.10 The Joint Committee noted from document JC-19/Inf.6 (USA) a description of the prescribed response by USA RCCs to 406 MHz alerts from beacons with an invalid message and that:

a) with the introduction of SSAS beacons, the USCG recognised that there was no longer a guarantee that a 406 MHz beacon alert was a SAR distress alert; and

b) the USCG had since modified its policy directing RCCs to treat this type of alert as a distress alert, but instead requested RCCs to:

- inform SAR forces of the uncertainty of the situation,
- direct them to use appropriate caution when approaching vessels,
- assess the risk once on scene.

7.11 The Joint Committee agreed that it was appropriate to address the issue of 406 MHz alerts from beacons with an invalid message at a National level, and that administrations should take appropriate action concerning the required warnings to RCCs.

AGENDA ITEM 8: INTERFERENCE MONITORING

Cospas-Sarsat Statistics

8.1 The Joint Committee noted from the draft Report on System Status and Operations No. 21 (January - December 2004) that the number of persistent sources of interference detected by Cospas-Sarsat Participants in the 406.0 - 406.1 MHz band reduced from 28 in 2002 and 27 in 2003 to 14 in 2004.

8.2 The Joint Committee also noted that, although a number of interference problems had been successfully resolved through cooperation with the responsible Administrations, seven new sources of interference were detected in 2004 and this clearly showed that the monitoring programme should be continued, as well as actions by national authorities to eliminate harmful interference in the 406.0 - 406.1 MHz frequency band.

8.3 The Joint Committee invited all Ground Segment operators that had the capability of performing routine interference monitoring to provide monthly interference reports on persistent interferers to the Cospas-Sarsat Secretariat, using the reporting format presented in document C/S A.003, Annex C, Table C.1, and to the ITU in accordance with their national procedures.

ITU Actions

8.4 The Joint Committee noted from a presentation made by the ITU representative concerning 406 MHz interference monitoring, that:

a) the ITU had set up a framework for protecting the 406.0 MHz band as described in Recommendation ITU-R SM.1051-2 “Priority of Identifying and Eliminating Harmful Interference in the Band 406.0-406.1 MHz”;

b) the ITU had developed forms for the “Information report concerning interference” and the “Feedback report concerning the interference source”;

c) the interference monitoring programme had been successful in eliminating a number of interferers in many parts of the world;

d) the ITU Radiocommunication Bureau (BR) treated all reports of interference in the frequency bands used for distress and safety as an urgent matter, meaning that correspondence was sent within 24 hours to the responsible administration requesting that appropriate measures be taken to end the interference;

e) in the first quarter of 2005 the BR had received seven 406 MHz interference reports (10 administrations involved) and in the second quarter of 2005 the BR had received four 406 MHz interference reports (5 administrations involved);

f) France, Hong Kong, Spain and the USA regularly provided 406 MHz interference reports on harmful 406 MHz interference to the BR; and

g) the ITU Representative encouraged Australia, India and Indonesia, who provided 406 MHz interference reports to the Cospas-Sarsat Secretariat in 2004, as well as other Cospas-Sarsat Participants, to report cases of 406 MHz interference to the ITU on a monthly basis in accordance with the agreed ITU form (see document C/S A.003, page C-4).

AGENDA ITEM 9: SYSTEM ASSESSMENT

9.1 System Monitoring and Reporting (C/S A.003)

9.1.1 The Joint Committee noted from document JC-19/9/7 (Secretariat) draft amendments to document C/S A.003 prepared by the Secretariat on the basis of available information.

9.1.2 The Joint Committee noted that further to the Secretariat's request, Cospas-Sarsat Participants from South Africa, Turkey and the USA had provided information on periodic or routine interference monitoring capabilities at their new LEOLUTs.

9.1.3 The Joint Committee noted from document JC-19/7/3-Rev.1 (USA) draft amendments to document C/S A.003 prepared by the USA to add SSAS testing to the annual Cospas-Sarsat System test script.

9.1.4 The Joint Committee noted from document JC-19/9/1 (Secretariat) draft amendments prepared by the Secretariat on the guidelines for detecting and reporting on large location errors (Doppler processing anomalies) found in Annex G to document C/S A.003.

9.1.5 The Joint Committee agreed the draft amendments to document C/S A.003 proposed in documents JC-19/9/7, JC-19/7/3-Rev.1, JC-19/9/1, the draft amendments mentioned in section 9.1.2 and the draft updates to describe the large location error database discussed in section 9.3, as provided at Annex 6 to this Report.

9.1.6 The Joint Committee **RECOMMENDED** that the Council approve the draft amendments to the document "Cospas-Sarsat System Monitoring and Reporting" provided at Annex 6 to the JC-19 Report as C/S A.003, Issue 1 - Draft Revision 12.

9.2 Results of Annual System Test

9.2.1 The Joint Committee noted the results of the annual System test undertaken on 11-12 January 2005 in the Northwest Pacific DDR, as provided in document JC-19/9/3 (Japan).

9.2.2 The Joint Committee further noted that:

a) a consolidated report of the results of the test was prepared during the Joint Committee meeting and included at Annex 18 to this Report; and

b) not all Ground Segment Operators had fully reported their results in accordance with the requirements of document C/S A.003.

9.3 Analysis of 406 MHz Large Location Errors

9.3.1 The Joint Committee noted from document JC-19/9/2 (Secretariat) an analysis of large location errors and from the Secretariat presentation that:

a) during the period 1 May 2004 to 30 April 2005, there were a total of 2,165 reports of 406 MHz large location error (LLE) incidents submitted to the Secretariat by the USMCC, SPMCC and JAMCC operators;

b) the 2,165 LLE events were generated from 674 different beacon events;

c) of the 674 large location error beacon events, 19 events were associated with 24-hour processing problems, which was 28 less than reported to JC-18;

d) about 56% of the LLEs were from solutions with less than 5 bursts, which was 12% lower than the previous year;

e) some LLEs might be the result of beacon errors, as many LLEs reported for periods of several hours with the same beacon ID and were detected by several satellites and LUTs; and

f) the submission of the 2004-2005 LLE reports using a Microsoft Access format had been very successful.

9.3.2 The Joint Committee noted from discussion that reporting of LLEs remained an important system-monitoring tool and encouraged all Ground Segment operators to take appropriate action to find the causes of these LLEs.

9.3.3 The Joint Committee agreed to invite Ground Segment Providers to (OWG-19/AI.8):

a) investigate problems that result in LLEs, to include improvements to time calibration, orbit vector updates and beacons; and

b) provide digital quarterly reports of LLEs to the Secretariat using the MS Access reporting format available from the Secretariat.

9.3.4 The Joint Committee noted from document JC-19/9/1 (Secretariat) information on the development of the large location error MS Access database and that:

a) the current LLE MS Access database was based on a format provided by the USMCC, as modified by the Secretariat with the assistance of the SPMCC to include all fields required by document C/S A.003, Annex G;

b) a data entry form had been developed for ease of use; and

c) the Secretariat had proposed draft updates to document C/S A.003 to describe the large location error MS Access database.

9.3.5 The Joint Committee noted from discussion that MCCs were encouraged to make every effort to determine the true location of the source and not rely on the MCC merged positions, and that the requirement for true location data might result in each MCC only reporting large location errors in which the actual location was confirmed, likely in their own service areas.

9.3.6 The Joint Committee agreed draft updates to document C/S A.003, that described the large location error MS Access database, as presented at Annex 6 to this Report in the amended pages of document C/S A.003, Issue 1 – Draft Revision 12.

9.4 Other System Assessment Matters

<u>Change Management</u>

9.4.1 The Joint Committee noted from document JC-19/9/5 (USA) further development of the change management process for the Cospas-Sarsat Space Segment, Ground Segment, beacon specification and type approval standard, as agreed at JC-18 and endorsed at CSC-33, and:

a) the assessment of the USA that Cospas-Sarsat already followed many of the "best practices" recommended by the Capability Maturity Model;

b) that other goals of the Capability Maturity Model included tracking and controlling changes and institutionalising a managed process; and

c) that the major elements of the proposed change management system for Cospas-Sarsat should include:

- describing in detail the change proposed,
- using agreed evaluation criteria to determine the necessity of making a change, and
- tracking the implementation of the agreed changes.

9.4.2 The Joint Committee noted from discussion of the matter that:

a) there was general support for a change management process as it would provide clear accountability and increase the credibility of the System within some Administrations;

b) the value in a change management process was that it allowed changes to be assessed in light of their benefits to the System, e.g. improving timely delivery of accurate distress alert and position information;

c) the policy needed further work in respect of the management of changes to beacon specifications and the type approval standard;

d) reservations existed concerning the value and utility of collecting information on the cost of changes to the various components of the System;

e) the change management process should only apply to important and mandatory changes to the System;

f) the Secretariat should include change management criteria in the template for JC-20 documents;

g) papers submitted to JC-20 should be used to test the new change management procedure, but should not be rejected if the requested information was not fully provided; and

h) the change management process description should be contained in the new document C/S P.011 “Cospas-Sarsat Programme Management Policy”.

9.4.3 The Joint Committee agreed the proposed amendments to the change management process agreed at CSC-33, which are provided at Annex 19 to this Report and requested the Secretariat (JC-19/AI.13) to include this draft policy on change management in the new document C/S P.011 for submission to Council for approval.

<u>Analysis of MSG Performance</u>

9.4.4 The Joint Committee noted from document JC-19/9/6-Rev.1 (France) an analysis of MSG-1 and GOES-12 GEOSAR operational results, based on data collected by the SPMCC and FMCC between February 2004 and April 2005 using the procedure defined for the GEOSAR Demonstration & Evaluation phase and that:

a) 8 months of operational data, from September 2004 to April 2005, had shown the following GEOSAR effectiveness results:

- MSG-1: 83% (SPMCC data) and 78% (FMCC data)
- GOES-12: 84% (SPMCC data) and 82% (FMCC data)

with similar results for an 11-month period; and

b) MSG-1 effectiveness measurements were generally a little lower than the GOES-12 results, with a maximum difference between the MSG-1 and the GOES-12 results of less than 5%.

AGENDA ITEM 10: SYSTEM EVOLUTION

10.1 Phase-out of 121.5/243 MHz Satellite Processing

No documents were submitted for consideration under this agenda item.

10.2 MEOSAR Systems

MEOSAR Work Plan

10.2.1 The Joint Committee noted from document JC-19/10/1 (Secretariat) a draft work plan for the development of the Cospas-Sarsat MEOSAR System presented as a draft new annex to document C/S R.012, the MEOSAR Implementation Plan.

10.2.2 The Joint Committee also noted from document JC-19/10/1 that the work plan:

a) organised the work according to the generalised flow of data in the System (e.g. beacon-to-satellite interface, satellite-to-MEOLUT interface, MEOLUT processing, etc.);

b) identified the Cospas-Sarsat meetings where the work could be performed (e.g. Task Group, Joint Committee or Council meeting); and

c) identified the System documents that would be affected by each specific work element.

10.2.3 The Joint Committee agreed the proposed MEOSAR work plan as documented at Annex 15 to this Report.

MEOSAR Ground Segment Interoperability Parameters

10.2.4 The Joint Committee noted from document JC-19/10/2 (France):

a) a list of MEOSAR Ground Segment interoperability parameters developed during the informal experts' meeting held in Paris in 2004; and

b) the proposal by France to include this list of MEOLUT parameters in the document C/S R.012 to serve as guidance for the development of MEOLUTs.

10.2.5 The Joint Committee noted from discussion:

a) the view that it was premature to attempt to finalise the definition of MEOLUT interoperability parameters as many uncertainties remained and the parameters listed in the document JC-19/10/2 were subject to change;

b) the proposal by Russia to augment the proposed list with additional MEOLUT performance objectives; and

c) the view of France that, despite its preliminary nature, the proposed list was useful and should be recorded in the MEOSAR Implementation Plan.

10.2.6 The Joint Committee agreed that the proposed list of preliminary MEOLUT interoperability parameters could be included in the document C/S R.012, as provided at Annex 15 to this Report, with the understanding that the parameter values could not be finalised at this stage of the MEOLUT development.

10.2.7 The Joint Committee **RECOMMENDED** the Council approve the draft amendments to the Cospas-Sarsat MEOSAR Implementation Plan, provided at Annex 15 to this Report as C/S R.012, Issue 1 – Draft Revision 1.

Prototype MEOLUTs

10.2.8 The Joint Committee noted from document JC-19/10/3 (Canada) and a presentation by Canada a description of the Canadian prototype ground station that would be implemented using 2 tracking antennae, switchable to receive downlink frequencies at S-band or L-band.

10.2.9 The Joint Committee noted a presentation by the USA on the status of the USA prototype MEOLUT, which was currently under development, and that:

a) system delivery was expected by the end of 2005 and would include 4 antennae capable of tracking both S- and L-band downlinks;

b) that 5 DASS proof-of-concept satellites were currently in orbit with a sixth scheduled for launch in July 2005; and

c) the DASS proof-of-concept satellite constellation with S-band downlink was expected to include additional satellites.

10.2.10 The Joint Committee noted from discussion that although the MEOSAR ground segment could provide complete global coverage with a small number of MEOLUTs, a larger number would be desirable to provide for redundancy.

MEOSAR Return Link Service

10.2.11 The Joint Committee noted from document JC-19/Inf.10 (France) a description of the MEOSAR Return Link Service (RLS) wherein a properly equipped user in distress could request an acknowledgement message (RLM) through the Cospas-Sarsat System and that:

a) upon detection of the RLM request, the MCC would send an automatic reply to the user;

b) the RLM would be implemented at the beacon level in the form of a flashing light;

c) the MCC could initiate an optional secondary RLM from the RCC to the beacon user, should the RCC provide the appropriate response to the MCC; and

d) as Galileo would have an RLS capability, it would be useful to discuss further how this new capability could be integrated into the Cospas-Sarsat System as changes to the beacon message structure and operational implementation schemes would need to be agreed.

10.2.12 The Joint Committee noted from discussion of the RLS concept that:

a) IMO and ICAO were unlikely to express a clear requirement for an RLS capability until appropriate operational experience had been gained with the RLS;

b) there was some concern with the plan for automatic acknowledgement of the RLM request by MCCs;

c) liaison with beacon users had highlighted confusion regarding the return link functions, which could lead to improper beacon usage; and

d) the opinion of France that the only means to provide consistent meaning for an acknowledgement message was to generate this message at the MCC level.

10.2.13 The Joint Committee invited interested Participants to review the RLS operation concept outlined by France in document JC-19/Inf.10 and to submit their views and comments on the matter to future Joint Committee meetings (JC-19/AI.14).

10.3 Other System Enhancements

No documents were submitted for consideration under this agenda item.

AGENDA ITEM 11: LIAISON WITH INTERNATIONAL ORGANISATIONS

11.1 ICAO

No documents were submitted for consideration under this agenda item.

11.2 IMO

<u>MSC 79</u>

11.2.1 The Joint Committee noted from document JC-19/11/1 (Secretariat) information of interest to Cospas-Sarsat arising from the 79th Session of the Maritime Safety Committee (MSC 79) held from 1 to 10 December 2004.

11.2.2 The Joint Committee noted in particular that:

a) the IMSO Assembly had agreed that IMSO could carry out the oversight of future providers of mobile satellite communication services for the GMDSS; and

b) Inmarsat Ltd.'s decision to terminate the Inmarsat-E service on 1 December 2006 and the commitment given by the company to replace all Inmarsat-E beacons with Cospas-Sarsat 406 MHz beacons.

<u>COMSAR 9</u>

11.2.3 The Joint Committee noted from document JC-19/11/1 information of interest to Cospas-Sarsat arising from the 9th Session of the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR 9) held from 7 to 11 February 2005, and in particular that the Sub-Committee had:

a) noted with appreciation document COMSAR 9/5 (Cospas-Sarsat) on the status of the Cospas-Sarsat Programme, including information in respect of System operations, space and ground segments status, beacon population, false alert statistics, interference in the 406.0 - 406.1 MHz frequency band and MEOSAR systems;

b) instructed the IMO Secretariat to invite Cospas-Sarsat to publish details of beacon models which were found to be causing false alerts;

c) endorsed the draft amendments to SOLAS regulations IV/7, IV/9 and IV/10 to remove reference to Inmarsat-E services for submission to the MSC for approval and adoption, as appropriate;

d) noted that the definition and reference to polar-orbiting satellites in the SOLAS regulations no longer accurately reflected the services offered by Cospas-Sarsat and that the corresponding regulations should be amended;

e) agreed, when considering recommendations of the 11th Session of ICAO/IMO JWG, that there may be potential confusion between maritime security alerts and SAR alerts and decided that the situation should be monitored so that ongoing solutions could be found in the light of experience; and

f) deleted from the COMSAR 10 work programme the agenda item on false alerts in the GMDSS.

11.2.4 In respect of the invitation to Cospas-Sarsat to publish details of those beacon models and manufacturers which were found to be causing false alerts, the Joint Committee noted the view that this responsibility should be left with individual Administrations.

Future IMO Meetings

11.2.5 The Joint Committee noted that:

a) the 12th Session of the ICAO/IMO JWG was scheduled to be held from 29 August to 2 September 2005 in Stockholm, Sweden; and

b) the 10th COMSAR Session (COMSAR 10) was tentatively scheduled for 6 to 10 March 2006 in London, UK.

11.3 ITU

11.3.1 The Joint Committee noted from document JC-19/Inf.4 (USA) and from information provided by the USA that:

a) at the request of the Cospas-Sarsat Council, in 2003 the USA had developed a draft new recommendation for the protection of Cospas-Sarsat L-band downlinks and submitted the draft recommendation to the ITU; and

b) after consideration by ITU Working Party 8D during the 2003 and 2004 study sessions, the draft recommendation was adopted by ITU Study Group 8 in December 2004 and was distributed for “Approval by Consultation” with the consultation period ending 15 June 2005.

11.3.2 The Joint Committee noted the appreciation expressed by the meeting participants for the USA’s considerable efforts in developing the ITU recommendation and defending it through the two-year ITU adoption process.

11.4 Other International Organisations

11.4.1 The Joint Committee noted from document JC-19/11/2 (Australia) a report on the successful conduct of an Australia-United Nations sponsored Cospas-Sarsat training course held in Canberra, Australia from 14 to 18 March, 2005 and that:

a) the course was attended by over 35 individuals representing 17 nations and several organisations, including the Cospas-Sarsat Secretariat;

b) the training course had provided an overview and some details of the Cospas-Sarsat System; and

c) a practical demonstration was held on the use of DF equipment to home on 121.5 MHz transmissions, a sea exercise showcased AUSSAR techniques and a tour of the Australian RCC/AUMCC had been provided for all participants.

11.4.2 The Joint Committee further noted from document JC-19/11/2 that negotiations between the United Nations and Australia for the training course had proven to be lengthy and complex and the recommendation of Australia that the next Cospas-Sarsat Participant to host a UN co-sponsored workshop should:

a) allow ample time for the required negotiations with the United Nations;

b) put considerable effort into ensuring the correct people were identified to participate in the workshop; and

c) issue invitations well in advance in order to allow travel arrangements to be booked with advantageous airfares.

11.4.3 The Joint Committee noted from document JC-19/11/3 (India) a report on a SAR seminar and SAR Exercise (SAREX) sponsored by the Airports Authority of India in association with ICAO for Asia Pacific countries, held from 7 to 11 March 2005 in Chennai, India and that:

a) a representative from the Secretariat had presented technical papers on the Cospas-Sarsat System and INMCC had presented information on the development of an Indian low-cost beacon;

b) during the SAREX, the Cospas-Sarsat ELT and PLB used as the initial alerting system and the Indian LUTs and INMCC had performed well and had provided beacon detection and Doppler location information to SAR authorities in good time; and

c) the seminar report had highlighted the importance of the Cospas-Sarsat System in successful SAR missions and encouraged non-participating countries to become associated with the Programme.

AGENDA ITEM 12: ADMINISTRATIVE ISSUES

12.1 Review of Action Items

12.1.1 The Joint Committee reviewed the list of action items from the Eighteenth Meeting of the Joint Committee as provided in document JC-19/12/1 (Secretariat) and noted that all action items had been closed, or continued as new JC-19 action items.

12.1.2 The Joint Committee agreed the list of action items from the JC-19 Meeting as provided at Annex 21 to the JC-19 Report.

12.2 Other Administrative Issues

<u>New Document C/S P.011, the Cospas-Sarsat Programme Management Policy</u>

12.2.1 The Joint Committee noted from document JC-19/12/4 (Secretariat) a draft new document on Cospas-Sarsat Programme Management Policy, referenced as C/S P.011, and that:

a) the document was developed by the Secretariat to address Programme management policy issues, as requested by the Council;

b) the draft table of contents covered such items as long-term planning, management structure, Participant’s association with the Programme and common costs, system components and documentation;

c) section 5 of the draft document, which described various components of the System, was still to be completed;

d) annexes to document C/S P.011 included the Rules of Procedure for Cospas-Sarsat Council and Joint Committee meetings, a description of the duties of chairpersons, and a list of organisations with observer status at Joint Committee meetings; and

e) the Secretariat would continue to develop the document C/S P.011 for submission to the CSC-35 Session of the Council in November 2005.

12.2.2 The Joint Committee noted from document JC-19/12/2 (Secretariat):

a) revised draft rules of procedure for the meetings of the Joint Committee;

b) that the revised rules of procedure included:

- amendments concerning the participation of observers at Joint Committee meetings already adopted at the CSC-33 Session,
- amendments reflecting new guidelines for submission of documents to Cospas-Sarsat meetings also adopted at the CSC-33 Session,

- an update outlining the duties of chairpersons,
- additional changes to clarify existing text or reflect the current practices at Joint Committee meetings;

c) that these rules of procedure would be included as an annex to the new policy document C/S P.011, to be submitted to the Open Meeting of the CSC-35 Session for approval; and

d) a revised list of Programme (P Series) documents approved at the CSC-34 Session of the Council.

12.2.3 The Joint Committee noted from discussion:

a) that the draft policy on change management agreed by the Joint Committee, as provided at Annex 19 to the JC-19 Report, should be included in the next draft of document C/S P.011 for submission to the Council;

b) proposed additions to the revised Rules of Procedure of the Joint Committee (Annex C to C/S P.011) concerning:

- the publication on the web of Joint Committee action items and Council decisions of interest to the Joint Committee at least 6 weeks prior to the date of the meeting,
- the review of late submissions by the Chair of the Joint Committee and the Secretariat prior to their publication on the Cospas-Sarsat website;

c) a proposed addition to the duties of chairpersons (Annex D to C/S P.011) to request that the Chair summarise the discussion and state the agreed conclusion before terminating the review of an item; and

d) the invitation to Participants to forward to the Secretariat their comments or proposed additions to the draft new document C/S P.011.

12.2.4 The Joint Committee agreed to request (JC-19/AI.15):

a) the Secretariat to complete a new draft of document C/S P.011, including the additions proposed above in respect of Annexes C (rules of procedure of the JC) and D (duties of the chairpersons) and the agreed draft policy on change management; and

b) Participants to provide comments to the Secretariat or submit additional text to the Council for approval at the CSC-35 Session in November 2005.

Secretariat Relocation

12.2.5 The Joint Committee noted from document JC-19/12/3 (Secretariat) information on the planned relocation of the Cospas-Sarsat Secretariat to Montreal, Canada and that:

a) the Arrangement between Canada, France, the Russian Federation and the United States of America concerning the Headquarters of the Cospas-Sarsat Programme was signed in Montreal on 5 April 2005 and the Canadian Government Order in Council establishing the Cospas-Sarsat Programme as a legal entity in Canada was published on 22 April 2005;

b) the Cospas-Sarsat Secretariat would relocate to Montreal between 4 July and 6 September 2005, however, continuity of service would be provided with a reduced team during the move, working within the constraints of the detailed move schedule provided;

c) Secretariat operation in Montreal would commence on 1 August 2005 and operation in London would cease on 5 August 2005;

d) new email addresses and telephone numbers would be provided as soon as possible, however, the current Secretariat email addresses would continue to be usable in September 2005 allowing for a continuity of communications; and

e) from 1 August 2005, all correspondence should be addressed to:

Cospas-Sarsat Programme
700 de la Gauchetière Street West
Suite 2450
Montréal, QC
H3B 5M2
Canada.

AGENDA ITEM 13: OTHER BUSINESS

Website Security

13.1 The Joint Committee noted from document JC-19/13/1 (Canada) a proposal to improve the security of the Cospas-Sarsat website and that:

a) the current non-password-protected area of the website contained information that could potentially be used maliciously to disrupt Cospas-Sarsat System operations;

b) the password protected area contained sensitive information and the passwords and logins used were not to industry standard and could be easily compromised; and

c) as the System expanded, particularly with the increased reliance on FTP-VPN, the possibility for malicious attack might increase.

13.2 The Joint Committee noted from document JC-19/13/1 and from discussion:

a) that information on the Cospas-Sarsat website could be protected by giving different levels of access to the general public, member countries and industry; and

b) the recommendation that the current security protocol be reviewed by system experts.

13.3 The Joint Committee agreed that Cospas-Sarsat website security issues should be addressed and invited Canada to organise an informal meeting (JC-19/AI.16) with a view to reporting at JC-20 on:

- varying levels of access to information on the website,
- identifying specifically what information should be restricted to each user category,
- evaluating and identifying an industry standard protection scheme, and
- developing guidelines to ensure that sensitive data is protected in the future.

Northwest Pacific DDR Meeting

13.4 The Joint Committee noted from document JC-19/Inf.1 (Japan) information on a regional meeting scheduled for 14 to 16 September 2005 in Tokyo for Northwest Pacific DDR Participants and Japan's invitation addressed to observers from other regions and the Secretariat.

Beacon Installed on Nanosatellite

13.5 The Joint Committee noted from document JC-19/13/2 (Russia) a report on the results of installation of a radiobeacon on a technological nanosatellite and that:

a) the spacecraft TNS-0 was launched 28 April 2005 into circular orbit at 400 km altitude with a 51.6° inclination;

b) a 406 MHz beacon was aboard the nanosatellite to experiment with the reception of 406 MHz beacon messages by the Cospas-Sarsat System; and

c) the Russian Technical Evaluation Centre (RTEC) in Moscow and the French LEOLUT in Toulouse had participated in the experiment.

13.6 The Joint Committee noted from document JC-19/13/2 that the experiment had successfully concluded with the reception of the nanosatellite beacon messages by the LEOSAR satellites Sarsat-6, -7, -8, -9 and Cospas-4 and by MSG.

AGENDA ITEM 14: FUTURE MEETINGS

14.1 The Joint Committee noted from document JC-19/14/1 (Secretariat):

a) the proposed tentative dates for Cospas-Sarsat meetings in 2006; and

b) that these meetings included the usual Council sessions, the Joint Committee meeting, and allowed for one Task Group meeting in February 2006.

14.2 The Joint Committee also noted that although no Task Group was anticipated during 2006 an Expert’s Working Group would be required.

14.3 The Joint Committee **RECOMMENDED** that the Council establish an Experts’ Working Group on the Beacon Message Traffic Forecast Model (EWG-1/2006) to meet in February 2006, with the terms of reference provided at Annex 20 to the JC-19 Report.

14.4 The Joint Committee agreed the provisional agenda for the JC-20 Meeting as provided at Annex 22 to the JC-19 Report.

AGENDA ITEM 15: APPROVAL OF REPORT TO COUNCIL

The Joint Committee approved the JC-19 Report on Tuesday 14 June 2005 for submission to the Cospas-Sarsat Council.

The Chairman noted that JC-19 was to be last Cospas-Sarsat meeting for Sgt. Walter Barra (Chile) and Major Roger Smith (Canada). Their contribution to the Cospas-Sarsat Programme was noted and the participants wished them well in their retirement from the Programme.

The USA noted that JC-19 was also to be Mr. Bart Sessions' last Cospas-Sarsat meeting and that he was retiring after a long and distinguished career. Mr. Sessions' work with Cospas-Sarsat started in 1979 and he had been actively involved since. The USA further noted that over the years Mr. Sessions had played a key role in the development of the Cospas-Sarsat Space and Ground Segments as well as 406 MHz emergency beacons. His contributions to the program would be sorely missed. The Joint Committee expressed its gratitude to Mr. Sessions and wished him well in his retirement.

The Chairman thanked Mr. Michel Sarthou and Mr. Steve Huxley for their excellent work in chairing the Technical and Operations Working Groups. The participants expressed their appreciation to the Chairman, Mr. Rick Vizbulis, for his efficient conduct of the meeting. The participants also thanked the Secretariat for their support.

Finally, the Chairman remarked that the presence of Mr. Peter Howe (Canada) at the meeting was sorely missed and requested that the Canadian delegation convey to Peter the well wishes of all participants.

ANNEX 1

LIST OF PARTICIPANTS
Nineteenth Meeting of the Cospas-Sarsat Joint Committee
7 – 14 June 2005

Algeria		
Col. Menouar Fellague	Head of Delegation	Head of Algerian SAR Service
Lt. Col. Mustapha Belounis		ALMCC
Mr. Abdelkader Hallal		ENNA/Ministry of Transport
Mr. Jeff Khorrami		TSI
Argentina		
Lt. Col. Alejandro Iazzolino	Head of Delegation	ARMCC
Lt. Cmdr. (Navy) Oscar Domingo Castro		ARMCC
Capt. Hector Abalos		Air Force
Mr. Carlos Belaustegui Gotia		EMS Technologies
Mr. Richard Woodend		EMS Technologies
Australia		
Mr. Chris Payne		AusSAR, AMSA
Mr. Rich Renner		EMS Technologies
Brazil		
Lt. Col. Paulo Roberto Sigaud Ferraz	Head of Delegation	DECEA
Maj. Flávio Raimundo Feres		BRMCC
Capt. Athayde Frauche		DECEA
Cmdr. Júlio Cesar Barcellos Guimarães		Brazilian Navy
Mr. Rick L'Ecuyer		EMS Technologies
Canada		
Ms. Carole Smith	Head of Delegation	NSS
Mr. Ed Hitchcock		NSS
Capt. Jennifer Kennedy		CMCC Trenton
Capt. Bernie Leclair		CMCC Trenton
Maj. Alain Tanquay		CMCC Trenton
Maj. Roger Smith		CMCC Trenton
Mr. Rick Corrigan		DND LCMM-DTSES 3-2
Mr. Jim King		CRC
Mr. Eric Harpell		EMS Technologies
Chile		
Cmdr. René Igor Viovy Alarcón	Head of Delegation	CHMCC
Sgt. Walter Barra Medina		CHMCC
Lt. Cmdr. Carlos Salgado		DIRECTEMAR
China		
Mr. Zheng Huaiyu	Head of Delegation	China Maritime Safety Administration
Mr. Kang Wei		China Mission Control Centre
Mr. Xie Hui		Embassy of China

Denmark			
Mr. Knud Rosing	Head of Delegation	Civil Aviation Administration	
Maj. Ove Urup-Madsen		RCC	
France			
Mr. Mario Hucteau	Head of Delegation	CNES	
Mr. Michel Sarthou		CNES	**Chairman**
Mr. Emmanuel Bouisson		CNES	
Mr. Alain Barumchercyk		CNES	
Mr. Philippe Hazane		CNES-FMCC	
Mr. Jean-Pierre Floch		CNES-FMCC	
Mr. Christophe Lutz		DAMGM-FMCC	
Mr. Denis Hill		EMS	
Hong Kong			
Mr. K.W. Chan	Head of Delegation	Hong Kong Marine Department	
Mr. K.F. So		PCCW	
Mr. P.S. Chiu		EMS	
Mr. Minh Nguyen		EMS	
Indonesia			
Rear Admiral Yayun Riyanto	Head of Delegation	SAR Agency of Indonesia	
Mr. Sutono		SAR Agency of Indonesia	
Mr. Heru Prasetyo		Indonesian Embassy in London	
Italy			
Capt. Michele Dammicco		Italian MCC	
ITDC			
Mr. Yung-Chieh Shen		Chunghwa Telecom Co. Ltd.	
Japan			
Mr. Sadatoshi Koike	Head of Delegation	Japan Coast Guard	
Mr. Teruo Fukagawa		Japan Coast Guard	
Korea			
Mr. Shin Mun		KOMCC	
Netherlands			
Mr. Kees Koning		Netherlands Coastguard	
Nigeria			
Mr. Shaibu S. Makarfi	Head of Delegation	National Emergency Management Agency	
Group Captain Nehemiah Shaks Kanwai		National Emergency Management Agency	
Mr. Kayode Fagbemi		Nigeria MCC	
Mr. Cyril Nsor		Nigeria MCC	
Mr. M. E. Nwafor		Nigerian Civil Aviation Authority	
Mr. J. E. Obeahon		Nigerian Airspace Management Agency	
Mr. E.T. Bako		National Maritime Authority	

Norway		
Mr. Tore Wangsfjord	Head of Delegation	NMCC
Mr. Frode Iversen		NMCC
Mr. Einar Ellingsen		Ministry of Justice and Police
Mr. Jens Skoglund		Kongsberg Satellite Services
Mr. John Johannessen		Telenor Networks, Maritime Radio
Ms. Inger-Lise Walter		Norwegian Post & Telecommunication Authority
Pakistan		
Mr. Imran Iqbal		Pakistan Space & Upper Atmosphere Research Commission (SUPARCO)
Peru		
Mr. Ivan Eduardo Carrillo		Peru Attaché
Poland		
Mr. Andrzej Gieroczynski	Head of Delegation	Civil Aviation Office SAR Division
Mr. Zygmunt Cal		Civil Aviation Office
Ms. Edyta Porzozynska		Civil Aviation Office
Mr. Adam Grzybowski		Polish Air Force Technology Institute
Russia		
Mr. Andrey Kushev	Head of Delegation	Morsviazsputnik
Mr. Vladislav Rogalskiy		FSUE “RISDE”
Mr. Ilya Spazhakin		FSUE “RISDE”
Mr. Gennady Dmitriev		ROSCOSMOS
Mr. Evgeny Nesterov		ROSCOSMOS
Mr. Victor Kosenko		NPO PM
Saudi Arabia		
Mr. Jameel Metwalli	Head of Delegation	Presidency of Civil Aviation
Mr. Steve Edgett		EMS Technologies
Singapore		
Mr. Raymond Seah	Head of Delegation	Civil Aviation Authority of Singapore
Dr. Gilmer Blankenship		TSI
South Africa		
Mr. Pat Modiba	Head of Delegation	Department of Transport
Col. Andre Botes		South African Maritime Safety Authority
Mr. Cornelius De Beste		Telkom SA
Mr. Derek Cooper		Telkom SA
Dr. Neil Mackay		EMS Technologies
Spain		
Mr. Jose Vazquez Bermudez	Head of Delegation	INTA
Ms. Emilia Melian Martinez		INTA
Mr. Esteban Holgado		INTA
Mr. Gustavo Marrero		University of Las Palmas de Gran Canaria
Mr. Jerry Nardi		TSI

Switzerland

Mr. Jorg Thurnheer	Head of Delegation	Federal Office for Civil Aviation	
Mr. Mark Dennler		REGA - RCC Zürich	

Thailand

Mr. Punlop Sungsillert	Head of Delegation	Flight Standards Bureau	
Ms. Supanwadee Chanthopas		Flight Standards Bureau	
Ms. Orakanit Chanplang		Flight Standards Bureau	

Tunisia

Col. Hedfi Abdessamad		Air Force	

Turkey

Mr. Basat Ozturk	Head of Delegation	Ministry of Foreign Affairs	
Mr. Fikret Hakguden		Turkish Embassy	
Mr. Murat Ugurluoglu		Ministry of Foreign Affairs	
Capt. Hakan Durmaz		TRMCC	
Capt. Mehmet Hanifi Guler		TRMCC	
Mr. Ali Solak		Undersecretariat for Maritime Affairs	
Mr. Azim Bul		State Airport Authority	
Mr. Haluk Ozgok		State Airport Authority	
Mr. Danis Unverdi		EMS/Turasoft	
Lt. Cmdr. Vedat Demirkan		Turkish Naval Forces	
Capt. Ramazan Toper		Turkish Air Forces	

United Kingdom

Mr. Peter Dymond	Head of Delegation	UK Maritime & Coastguard Agency	
Mr. Steve Huxley		UK Maritime & Coastguard Agency	**Chairman**
Flt. Lt. Roy Crane		UKMCC	
Mr. Dave Douglas		EMS	
Mr. Neil Musgrave		EMS	
Mr. Gary Sims		UK Ministry of Defence Logistics	
Ms. Alison Slater		IBM (UK)	

USA

Mr. Ajay Mehta	Head of Delegation	NOAA/NESDIS	
Mr. William Burkhart		NOAA/NESDIS	
Mr. Rick Vizbulis		NOAA/NESDIS	**Chairman**
Mr. Tom Button		NOAA/NESDIS	
Lcdr. Jay Dell		USCG/OPR	
Lt. Col. Ben Wash		USAF/AFRCC	
Maj. Dennis Campbell		USAF/AFRCC	
Maj. Al Knox		USAF/AFRCC	
Ms. Alyssa Duble		USAF/SAF/IA	
Mr. David Affens		NASA/GSFC	
Mr. Jim Christo		NASA/GSFC	
Mr. Joe Wagenhofer		SSAI	
Mr. Sam Baker		SSAI	
Mr. Tom Griffin		SSAI	
Mr. William Ruark		NOAA/SSAI	
Ms. Nancy Linton		CSC	
Mr. Fred Kissel		CSC	
Mr. Bart Sessions		CSC	

CIRM		
Mr. Peter Forey	Head of Delegation	Sartech Engineering Ltd.
Mr. John Norrish		McMurdo Ltd.
ESA		
Mr. Igor Stojkovic		
EUMETSAT		
Mr. Denis Fayard		
GJU		
Mr. Luis Ruiz		
IMSO		
Mr. Andy Fuller		
ITU		
Mr. Alberto Mendez		
RTCM		
Mr. John Flood		ACR Electronics
Mr. Doug Ritter		Equipped to Survive Foundation
Mr. Chris Hoffman		McMurdo Ltd.
Mr. Duane Quiring		Artex Aircraft Supplies, Inc.
Cospas-Sarsat Secretariat		
Mr. Daniel Levesque		
Ms. Cheryl Bertoia		
Mr. Vladislav Studenov		
Mr. Wayne Carney		
Mr. Andryey Zhitenev		
Ms. Diane Hacker		
Ms. Hannah Bermudez		

ANNEX 2

LIST OF JC-19 DOCUMENTS

Late Submissions fall below line in each section

JC-19 Ref N°	Title	Agenda Item	Origin
Agenda Item 1	**Approval of Agenda**		
JC-19/1/1	Provisional Agenda for the Nineteenth Meeting of the Joint Committee (JC-19)	1	CSC-33/OPN
JC-19/1/2-Rev.1	Council Decisions of Interest to the Joint Committee	1	Secretariat
JC-19/1/3	Work Plan for JC-19	1	Chairman
Agenda Item 2	**System Status and Operations Reports**		
JC-19/2/1	Draft Cospas-Sarsat Report on System Status and Operations No.21 (January - December 2004)	2	Secretariat
JC-19/2/2	Report on System Status and Operations	2	Australia
JC-19/2/3- Rev.1	Report on System Status and Operations	2	Indonesia
JC-19/2/4	Report on System Status and Operations	2	Algeria
JC-19/2/5	Report on System Status and Operations	2	Greece
JC-19/2/6 – Rev.1	Report on System Status and Operations	2	The Netherlands
JC-19/2/7	Report on System Status and Operations	2	Germany
JC-19/2/8	Report on System Status and Operations	2	UK
JC-19/2/9	Report on System Status and Operations	2	Thailand
JC-19/2/10	Report on System Status and Operations	2	Russia
JC-19/2/10–Add.1	Report on the Results of the FSUE “RISDE” Russian Technical Evaluation Centre (RTEC) Trials During 11-12 January 2005 Cospas-Sarsat System Test	2	Russia
JC-19/2/11	Report on System Status and Operations	2	Singapore
JC-19/2/12	Report on System Status and Operations	2	ITDC
JC-19/2/13 – Rev.1	Report on System Status and Operations	2	Spain
JC-19/2/14	Report on System Status and Operations	2	France
JC-19/2/15	Report on System Status and Operations	2	Norway
JC-19/2/16	Report on System Status and Operations	2	Italy
JC-19/2/17	Report on System Status and Operations	2	Hong Kong
JC-19/2/18	Report on System Status and Operations	2	Argentina
JC-19/2/19	Report on System Status and Operations	2	Nigeria
JC-19/2/20	Report on System Status and Operations	2	Peru
JC-19/2/21	Report on System Status and Operations	2	Chile
JC-19/2/22	Report on System Status and Operations	2	Japan
JC-19/2/23	Report on System Status and Operations	2	South Africa
JC-19/2/24	Report on System Status and Operations	2	USA
JC-19/2/24-Add.1	Report on System Status and Operations	2	USA
JC-19/2/25-Rev.1	Report on System Status and Operations	2	Canada
JC-19/2/26	Report on System Status and Operations	2	India
JC-19/2/27	Report on System Status and Operations	2	Korea
JC-19/2/28	Report on System Status and Operations	2	Brazil
JC-19/2/29	Report on System Status and Operations	2	Switzerland
JC-19/2/30	Paper re-assigned as JC-19/2/3 – Rev.1		

JC-19 Ref N°	Title	Agenda Item	Origin
JC-19/2/31	Report on System Status and Operations	2	Denmark
JC-19/2/32	Report on System Status and Operations	2	Turkey
JC-19/2/33	Report on System Status and Operations	2	Saudi Arabia
JC-19/2/34	Report on System Status and Operations	2	China
Agenda Item 3	**Space Segment Matters**		
JC-19/3/1	Status of Cospas-Sarsat Space Segment	3.1	Secretariat
Agenda Item 4	**Ground Segment Matters**		
JC-19/4/1	Canadian (CTEC) LEOLUT Commissioning Report	4.2	Canada
JC-19/4/2	Maryland GEOLUT Commissioning Reports	4.2	USA
JC-19/4/3	California LEOLUT Commissioning Report	4.2	USA
JC-19/4/4	Algiers GEOLUT Commissioning Report	4.2	Algeria
JC-19/4/5	Algiers LEOLUT Commissioning Report	4.2	Algeria
JC-19/4/6	Singapore LEOLUT Commissioning Report	4.2	Singapore
JC-19/4/7	Norway GEOLUT Commissioning Report	4.2	Norway
JC-19/4/8	United Kingdom GEOLUT Commissioning Report	4.2	United Kingdom
JC-19/4/8-Add.1	UK GEOLUT Commissioning Report Errors and Corrections	4.2	United Kingdom
JC-19/4/9	Status of Cospas-Sarsat Ground Segment	4.1	Secretariat
JC-19/4/10	Status of Cospas-Sarsat Ground Segment in Argentina	4.1	Argentina
JC-19/4/11	Brasilia LEOLUT Combined LEO-GEO Processing Commissioning Report	4.2	Brazil
JC-19/4/12	Brazil LEOLUT Commissioning Report	4.2	Brazil
JC-19/4/13	Turkey GEOLUT Commissioning Report	4.2	Turkey
JC-19/4/14	Albany LEOLUT Commissioning Report	4.2	Australia
JC-19/4/15	New Singapore MCC (SIMCC) Commissioning Report	4.3	Australia - Singapore
JC-19/4/16	New Zealand LEOLUT Commissioning Report	4.2	New Zealand
JC-19/4/17	Draft Updates to A.005 (MCC Specification) and A.006 (MCC Commissioning Standard) to Support Ship Security Alerting	4.5	Secretariat
JC-19/4/18	LEOLUT Performance Specification and Design Guidelines C/S T.002 Issue 3 – Revision 3 October 2004 Reference Correction	4.4	Australia
JC-19/4/19-Rev.1	Turkey LEOLUT Commissioning Report	4.2	Turkey
JC-19/4/20-Rev.1	Turkey LEOLUT Commissioning Report	4.2	Turkey
JC-19/4/21	Spain MSG GEOLUT Commissioning Report	4.2	Spain
JC-19/4/22	Compliance of ARMCC with Latest Recommendations of the Cospas-Sarsat Joint Committee	4.6	Argentina
JC-19/4/23	Nodal SPMCC Commissioning Report	4.3	France
JC-19/4/24	MSG GEOLUT Performance Frequency Measurement Accuracy During Eclipse	4.4	France
JC-19/4/25	Recife LEOLUT Combined LEO-GEO Processing Commissioning Report	4.2	Brazil
Agenda Item 5	**Beacons**		
JC-19/5/1	International Beacon Registration Database Batch Upload by a National Data Provider	5.5	Secretariat
JC-19/5/2	Guidance for Classifying Beacon Activation Mechanism	5.1	Secretariat

JC-19 Ref N°	Title	Agenda Item	Origin
JC-19/5/3	Report on the Task Group Meeting on 406 MHz Beacon Type Approval Testing (TG-1/2005)	5.1 and 5.2	Secretariat
JC-19/5/4	Beacon Activation Indicator – BIT 108	5.1 and 6.2	Australia
JC-19/5/5	Short Format National and Standard Location Protocols	5.7	Australia
JC-19/5/6	Status of the International Beacon Registration Database	5.5	Secretariat
JC-19/5/7	406 MHz Message Traffic Forecast – NMCC	5.6	Norway
JC-19/5/8	Proposed New Draft Issue of the Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard (C/S T.007)	5.2	Secretariat
JC-19/5/9	Cospas-Sarsat 406 MHz Beacon Type Approval Certificate and Quality Assurance Plan	5.2	Secretariat
JC-19/5/10 – Rev.1	Proposed Actions to Accommodate Initial use of the International Beacon Registration Database	5.5	Secretariat
JC-19/5/11	Beacon Message Traffic Model Parameters	5.6	Secretariat
JC-19/5/12	Geographic Distribution of 406 MHz Alerts	5.6	USA
JC-19/5/13	Message Traffic in the 406.028 MHz Channel	5.6	USA
JC-19/5/14	Short Format Location Protocol Beacons	5.7	USA
JC-19/5/15	International Beacon Registration Database (IBRD) Provision of Documents	5.5	USA
JC-19/5/16	Results of 406 MHz Beacon Population Survey for 2004	5.6	Secretariat
JC-19/5/17	406 MHz Beacon Population Forecast to Year 2015	5.6	Secretariat
JC-19/5/18	Closure Date for the 406.028 MHz Channel	5.6	Secretariat
JC-19/5/19	Malfunctioning 406 MHz Beacons – Continuous Transmission of Inverted Frame Sync Patterns	5.3	Canada
JC-19/5/20	Estimation of the Message Traffic Model Parameters Year 2004 – FMCC Data	5.6	France
JC-19/5/21	Draft Updates to Document C/S S.007	5.7	Argentina
JC-19/5/22	Maximum Allowed 406 MHz Emissions from Beacon Manufacturing Facilities	5.2	USA
JC-19/5/23	Short Format Location Protocols	5.7	France
JC-19/5/24	Update of Cospas-Sarsat Handbook of 406 MHz and 121.5 MHz Beacon Regulations (C/S S.007)	5.7	Brazil
JC-19/5/25-Rev.1	406 MHz Beacon Antenna Test Configurations	5.2	CIRM
JC-19/5/26	Information on Omega Test Laboratory	5.7	Russia
JC-19/5/27	Handbook of Beacon Regulations - Draft New Issue	5.7	Secretariat
JC-19/5/28	Transmission of Encoded GNSS Location in an Optional Self-Test Mode	5.1 & 5.2	RTCM
JC-19/5/29	List of Aircraft External 406 MHz Antennas Tested to Cospas-Sarsat Requirements	5.7	Secretariat
JC-19/5/30	PLB Test Issues	5.2	France
JC-19/5/31-Rev.1	Laboratory PLB Antenna Tests	5.2	USA
Agenda Item 6	**Operational Matters**		
JC-19/6/1	Draft Updates to Document C/S A.001 (DDP)	6.1	Secretariat
JC-19/6/2	Encoded Position Footprint Validation	6.1	Australia
JC-19/6/3	Multi-Invalid & Protocol Validation Failure SIT 185 Alert Formats	6.2	Australia
JC-19/6/4	Holding Message Traffic at AUMCC	6.4	Australia
JC-19/6/5	MCC Clarification on the Processing of Multi-Invalid Alerts	6.1	Australia
JC-19/6/6	Holding Message Traffic at NMCC	6.4	Norway
JC-19/6/7	Implementation of AMHS in ARMCC	6.4	Argentina
JC-19/6/8	Implementation of FTPV in ARMCC	6.4	Argentina

JC-19 Ref N°	Title	Agenda Item	Origin
JC-19/6/9	Draft Updates to Annex F of Document C/S A.002 (SID) to Address FTP Connection Issues	6.2	Secretariat
JC-19/6/10	406 MHz Message Validation Flowchart	6.1	Spain
JC-19/6/11	Holding Message Traffic at SPMCC	6.4	Spain
JC-19/6/12	NOCR Routing Distribution Matrix	6.1	Spain
JC-19/6/13	MCC Communication Links	6.4	USA
JC-19/6/14	Australian Status of JC-18 & CSC-33 Ground Segment Software Upgrade Requirements	6.5	Australia
JC-19/6/15	Testing Procedures for Handling Planned METOP Satellite Manoeuvres	6.5	USA
JC-19/6/16	Procedure for Advising SPOC/RCC of a Possible Degradation of the Doppler Location Accuracy Following a LEOSAR Satellite Manoeuvre	6.5	France
JC-19/6/17	Back-up Procedure of SPMCC	6.1	France
JC-19/6/18	Draft TRMCC Service Area at IOC	6.1	Turkey
JC-19/6/19-Rev.1	Status of Cospas-Sarsat Ground Segment in Peru	6.1	Peru
JC-19/6/20-Rev.1	Proposal for Distress Alert Messaging Positive Delivery Notification (PDN)	6.4	UK
JC-19/6/21	Proposed updates to Documents C/S A.001 and C/S A.002	6.1 & 6.2	Turkey
JC-19/6/22	CHMCC Communications Status	6.4	Chile
JC-19/6/23	Draft Updates to Document C/S A.002 (SID)	6.2	Secretariat
JC-19/6/24	AUMCC – USMCC Backup Test	6.5	Australia
Agenda Item 7	**Ship Security Alert System**		
JC-19/7/1	Proposed New Draft Document for SSAS Beacon Specification and Type Approval Requirements	7	Secretariat
JC-19/7/2	Identification of Competent Authority for Distribution of SSAS Alerts	7	Brazil
JC-19/7/3 – Rev.1	Modifications to the 2006 System Test Script to Include Ship Security Alert System (SSAS) Tests	7	USA
Agenda Item 8	**Interference Monitoring**		
Agenda Item 9	**System Assessment**		
JC-19/9/1	Draft Updates to Document C/S A.003, Annex G, to Describe the Large Location Error (LLE) MS Access Database	9.3	Secretariat
JC-19/9/2	Analysis of 406 MHz Large Location Errors	9.3	Secretariat
JC-19/9/3	Results of the Annual Cospas-Sarsat System Test in the Northwest Pacific DDR (11 - 12 January 2005)	9.2	Japan
JC-19/9/4	Paper re-assigned as JC-19/6/15		
JC-19/9/5	Cospas-Sarsat Change Management Process	9.4	USA
JC-19/9/6 – Rev.1	MSG-1 GEOSAR Operational Results	9.4	France
JC-19/9/7	Draft Updates to Document C/S A.003	9.1	Secretariat
Agenda Item 10	**System Evolution**		
JC-19/10/1	Work Plan for the Development of a Cospas-Sarsat MEOSAR System	10.2	Secretariat

JC-19 Ref N°	Title	Agenda Item	Origin
JC-19/10/2	Proposition for Endorsement of Ground Segment Interoperability Parameters	10.2	France
JC-19/10/3	Canadian Prototype MEOLUT	10.2	Canada
Agenda Item 11	**Liaison with International Organisations**		
JC-19/11/1	Report on IMO Matters	11.2	Secretariat
JC-19/11/2	Australia – UN Sponsored Cospas-Sarsat Training Course	11.4	Australia
JC-19/11/3	Report on the Airports Authority of India and ICAO Seminar on Search And Rescue	11.4	India
Agenda Item 12	**Administrative Issues**		
JC-19/12/1	Provisional Status of Action Items from the JC-18 Meeting	12.1	Secretariat
JC-19/12/2	Draft Revision of the Rules of Procedure for Joint Committee Meetings	12	Secretariat
JC-19/12/3	Relocation of the Cospas-Sarsat Secretariat to Montreal	12	Secretariat
JC-19/12/4	Cospas-Sarsat Programme Management Policy	12.2	Secretariat
Agenda Item 13	**Other Business**		
JC-19/13/1	Proposal to Improve Security Protocols of the Cospas-Sarsat Web Site	13	Canada
JC-19/13/2	Report about the Results of Cosmic Radiobeacon ELT-406C Tests, Installed on Technological Nanosatellite TNS-0	13	Russia
Agenda Item 14	**Future Meetings**		
JC-19/14/1	Tentative Schedule of Cospas-Sarsat Meetings in 2006	14	Secretariat
Agenda Item 15	**Approval of Report to Council**		

INFORMATION PAPERS			
Ref N°	**Title**	**Agenda Item**	**Origin**
Inf.1	Northwest Pacific (NWP) DDR Meeting (14 to 16 September 2005, Tokyo)	13	Japan
Inf.2	Handbook for RCCs of the ARMCC	6.5	Argentina
Inf.3	SARP-3: New Generation SARP Instrument	3	France
Inf.4	Report on ITU Matters	11.3	USA
Inf.5 – Rev.1	GNSS Simulator Information	5.2	USA
Inf.6	SAR Response to 406 MHz Alerts from Beacons with an Invalid Beacon Message	7	USA
Inf.7	Possible Impact of the Use of a 121.65 MHz Offset Homer	5.2	RTCM
Inf.8	LEOLUT and GEOLUT Frequency Measurements	4.6	USA
Inf.9	Eumetsat Plans for the MSG-2 Satellite	3.3	Secretariat
Inf.10	Proposition for MEOSAR Return Link Service	10.2	France

OTHER DOCUMENTS			
Ref N°	**Title**	**Agenda Item**	**Origin**
TG-1/2005/Report	Report of the Task Group Meeting on 406 MHz Beacon Type Approval Testing	5.1 & 5.2	TG-1/2005
C/S T.007	Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard (C/S T.007, Draft Issue 4)	5.2	Secretariat
C/S T.015	Cospas-Sarsat Specification and Type Approval Standard for 406 MHz Ship Security Alert (SSAS) Beacons (C/S T.015, Draft Issue 1)	7	Secretariat
C/S P.011	Cospas-Sarsat Programme Management Policy – Draft Issue 1	12.2	Secretariat
JC-19/5/27-Attachment 1	Draft Amendments to Document C/S S.007	5.7	Secretariat
JC-19/5/27-Attachment 2	New Draft Structure of Document C/S S.007	5.7	Secretariat
JC-19/6/1-Attachment 1	Draft Updates to Document C/S A.001 (DDP)	6.1	Secretariat

ANNEX 3

AGENDA FOR THE NINETEENTH MEETING OF THE JOINT COMMITTEE (JC-19)

1. Approval of Agenda

2. System Status and Operations Reports

3. Space Segment Matters

3.1 Space Segment Status
3.2 Space Segment Frequency Matters
3.3 Other Space Segment Matters

4. Ground Segment Matters

4.1 Ground Segment Status
4.2 Review of LUT Commissioning Reports
4.3 Review of MCC Commissioning Reports
4.4 LUT Specifications and Commissioning Standards
4.5 MCC Specification and Commissioning Standard
4.6 Other Ground Segment Matters

5. Beacons

5.1 Review of C/S T.001 and C/S G.005
5.2 Review of C/S T.007 and C/S T.008
5.3 406 MHz and 121.5 MHz Beacon Problems
5.4 Information for Beacon Users
5.5 International 406 MHz Beacon Registration Database
5.6 Review of C/S T.012 - 406 MHz Beacon Message Traffic Forecast
5.7 Other Beacon Matters

6. Operational Matters

6.1 Alert Data Distribution (C/S A.001)
6.2 SID Related Matters (C/S A.002)
6.3 406 MHz False Alerts
6.4 MCC Network Structure and Communication Issues
6.5 Other Operational Matters

7. Ship Security Alert System

8. Interference Monitoring

9. System Assessment

9.1 System Monitoring and Reporting (C/S A.003)
9.2 Results of Annual System Test
9.3 Analysis of 406 MHz Large Location Errors
9.4 Other System Assessment Matters

10. System Evolution

10.1 Phase-out of 121.5/243 MHz Satellite Processing
10.2 MEOSAR Systems
10.3 Other System Enhancements

11. Liaison with International Organisations

11.1 ICAO
11.2 IMO
11.3 ITU
11.4 Other International Organisations

12. Administrative Issues

12.1 Review of Action Items
12.2 Other Administrative Issues

13. Other Business

14. Future Meetings

15. Approval of Report to Council

ANNEX 4

DRAFT AMENDMENTS TO DOCUMENT

**"COSPAS-SARSAT
DATA DISTRIBUTION PLAN"**

**C/S A.001
Issue 4 - Draft Revision 8**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S A.001 for submission to Council for approval.

c) 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 ambiguity resolution, 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 (SID), Appendix B.*2* ~~3~~ to Annex B).

Alert data produced by GEOLUTs for the same beacon 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, using the distance matching criterion defined at Annex III / B of this DDP.

To minimize redundant message traffic in the Ground Segment, MCCs must not distribute alert data which have been determined as redundant in accordance with the procedure described at Annex III / B of this DDP.

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 ID, without respect to whether the new 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). However, the matching test for a coarse encoded position shall also be performed with the position derived from the first protected field of previous non-redundant messages: a coarse encoded position will be deemed redundant if it matches the position encoded in the first protected field of a previous beacon message.

Data deemed to be redundant shall not be used to determine whether subsequent data is redundant.

~~To minimize redundant message traffic in the Ground Segment, MCCs must not distribute alert data which have been determined as redundant in accordance with the procedure described at Annex III / B of this DDP.~~

3.2.4 Ambiguity Resolution of 406 MHz Positions

The objective of the ambiguity resolution 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, in the 406 MHz system, 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 two

GRMCC	Greece MCC
HKMCC	Hong Kong MCC
IDMCC	Indonesia MCC
INMCC	Indian MCC
ITMCC	Italian MCC
JAMCC	Japan MCC
KOMCC	Korea MCC
NIMCC	Nigeria MCC
NMCC	Norwegian MCC
PAMCC	Pakistan MCC
PEMCC	Peruvian MCC
SAMCC	Saudi Arabia MCC
SIMCC	Singapore MCC
SPMCC	Spanish MCC
TAMCC	ITDC / Taipei MCC
TRMCC	*Turkey MCC*
THMCC	Thailand MCC
UKMCC	United Kingdom MCC
USMCC	United States MCC
VNMCC	Vietnam MCC

MID	maritime identification digits
MHz	megahertz
MRCC	maritime RCC
NOCR	notification of country of beacon registration
RCC	rescue co-ordination centre
RSC	rescue subcentre
SAR	search and rescue
SARP	SAR processor
SARR	SAR repeater
Sarsat	Search and Rescue Satellite-Aided Tracking
SID	Cospas-Sarsat Mission Control Centres Standard Interface Description (C/S A.002)
SIT	subject indicator type
SOLAS	Safety of Life at Sea (Convention)
SPOC	SAR point of contact
SRR	search and rescue region
SSAS	ship security alert system
TCA	time of closest approach
UTC	coordinated universal time

- END OF ANNEX I / A -

ANNEX I / C

LIST OF COUNTRY CODES (1)

COUNTRY CODE	ALLOCATED TO	ABBREVIATIONS 3 LTRS	10 LETTERS	LATEST REVISION
100-200	**			
201	Albania (Republic of)	ALB	ALBANIA	
202	Andorra (Principality of)	AND	ANDORRA	
203	Austria	AUA	AUSTRIA	
204	Azores	AZC	AZORES	
205	Belgium	BEL	BELGIUM	
206	Belarus (Republic of)	BLR	BELARUS	
207	Bulgaria (Republic of)	BUL	BULGARIA	
208	Vatican City State	VAT	VATICAN	
209	Cyprus (Republic of)	CYP	CYPRUS	
210	Cyprus (Republic of)	CYP	CYPRUS	
211	Germany (Federal Republic of)	GER	GERMANY	
212	Cyprus (Republic of)	CYP	CYPRUS	
213	Georgia (Republic of)	GOG	GEORGIA	
214	Moldova (Republic of)	MOL	MOLDOVA	
215	Malta	MAL	MALTA	
216	*Armenia (Republic of)*	*ARM*	*ARMENIA*	*2005*
217	*			
218	Germany (Federal Republic of)	GER	GERMANY	
219	Denmark	DEN	DENMARK	
220	Denmark	DEN	DENMARK	
221-223	*			
224	Spain	SPA	SPAIN	
225	Spain	SPA	SPAIN	
226	France	FRA	FRANCE	
227	France	FRA	FRANCE	
228	France	FRA	FRANCE	
229	*			
230	Finland	FIN	FINLAND	
231	Faroe Islands	FAR	FAROE ISLE	
232	United Kingdom of Great Britain and Northern Ireland	UKM	G BRITAIN	
233	United Kingdom of Great Britain and Northern Ireland	UKM	G BRITAIN	
234	United Kingdom of Great Britain and Northern Ireland	UKM	G BRITAIN	
235	United Kingdom of Great Britain and Northern Ireland	UKM	G BRITAIN	
236	Gibraltar	GIB	GIBRALTAR	
237	Greece	GRE	GREECE	
238	Croatia (Republic of)	CRT	CROATIA	
239	Greece	GRE	GREECE	
240	Greece	GRE	GREECE	
241	*			
242	Morocco (Kingdom of)	MOR	MOROCCO	

(1) The country code is a 3-digit decimal number allocated to each country by the International Telecommunication Union (ITU) and listed as Maritime Identification Digits (MIDs) in Appendix 43 of the ITU Radio Regulations.

* Not allocated. ** Not available for allocation at this stage.

LIST OF COUNTRY CODES (Cont.)

COUNTRY CODE	ALLOCATED TO	ABBREVIATIONS 3 LTRS	10 LETTERS	LATEST REVISION
364	Turks and Caicos Islands	TUK	CAICOS IS	
365	*			
366	United States of America	USA	USA	
367	United States of America	USA	USA	
368	United States of America	USA	USA	
369	United States of America	USA	USA	
370	*			
371	*Panama (Republic of)*	*PAN*	*PANAMA*	*2005*
372-374	*			
375	Saint Vincent and the Grenadines	SVG	ST VINCENT	
376	Saint Vincent and the Grenadines	SVG	ST VINCENT	
377	Saint Vincent and the Grenadines	SVG	ST VINCENT	
378	British Virgin Islands	BVI	VIRGIN GB	
379	United States Virgin Islands	USV	VIRGIN US	
380-400	**			
401	Afghanistan (Islamic State of)	AFG	AFGHAN	
402	*			
403	Saudi Arabia (Kingdom of)	SAU	SAUDI	
404	*			
405	Bangladesh (People's Republic of)	BAN	BANGLADESH	
406-407	*			
408	Bahrain (State of)	BAH	BAHRAIN	
409	*			
410	Bhutan (Kingdom of)	BHU	BHUTAN	
411	*			
412	China (People's Republic of)	CHN	CHINA	
413	China (People's Republic of)	CHN	CHINA	
414-415	*			
416	Chinese Taipei	TAI	TAIPEI	
417	Sri Lanka (Democratic Socialist Republic of)	SRI	SRI LANKA	
418	*			
419	India (Republic of)	IND	INDIA	
420-421	*			
422	Iran (Islamic Republic of)	IRN	IRAN	
423	Azerbaijani Republic	AZR	AZERBAIJAN	
424	*			
425	Iraq (Republic of)	IRQ	IRAQ	
426-427	*			
428	Israel (State of)	ISR	ISRAEL	
429-430	*			
431	Japan	JPN	JAPAN	
432	Japan	JPN	JAPAN	
433	*			
434	Turkmenistan	TKM	TURKMENIST	
435	*			
436	Kazakhstan (Republic of)	KAZ	KAZAKHSTAN	
437	*			
438	Jordan (Hashemite Kingdom of)	JOR	JORDAN	
439	*			
440	Korea (Republic of)	KOR	KOREA SOU	
441	Korea (Republic of)	KOR	KOREA SOU	
442	*			

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
501	Adelie Land	RCC Australia	(71) 62349 MRCCAUS AA62349	(61.2) 62306868	YSARYCYX rccaus@amsa. gov.au	(61.2) 62306820	AusSAR, Australian Maritime Safety Authority, GPO Box 2181, Canberra City ACT 2601, Australia	AUMCC
401	Afghanistan	CENTAF-AUAB CAOC JSRC	T.B.D.	(974) 4327382	T.B.D.	(974) 4503452 4364193	T.B.D.	ITMCC
303	Alaska (State of)	USMCC	6737651 USMCC	(1.301) 4575406	usmcc@noaa.gov	(1.301) 4575428	USMCC, E/SP3, RM 3320, FB-4 NOAA, 5200 Auth Road Suitland, MD 20746-4303, USA	USMCC X.25
201	Albania	Rinas Tirana International Airport	-	-	LATIZRZX LATIYCYX	-	-	ITMCC
605	Algeria	ALMCC	65550_ MCCDZ	(213.2) 1495112	DAALZSZX *mcc_alger@mdn.dz*	(213.2) 1495102	Service SAR, 123, rue de Tripoli BP428, Hussein-Dey, Algiers Algeria	ALMCC X.25
559	American Samoa	Coast Guard Marine Safety Detachment American Samoa	-	-	-	(684) 2587001 2587002 2587003 2587004	-	AUMCC New Zealand SRR
202	Andorra	FMCC	530800 NCSAR A 530013 MCSAR U 530682 MCSAR N	(33) 561274878	LFIAZSZX fmcc@cnes.fr	(33) 561254382	Cospas-Sarsat - FMCC CNES - Centre Spatial de Toulouse BPI 903 - 18, avenue Edouard Belin, 31401 Toulouse Cedex 9, France	FMCC
603	Angola	Luanda RCC	-	-	FNLUYFYX	-	-	ASMCC
301	Anguilla	MRCC Fort de France	912008	(596) 632450	crossag@ equipement.gouv.fr	(596) 719292	MRCC Fort de France BP 621 97261 Fort de France Cedex Martinique FWI	FMCC

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
304	Antigua and Barbuda	MRCC Fort de France	912008	(596) 632450	crossag@ equipement.gouv.fr	(596) 719292	MRCC Fort de France BP 621 97261 Fort de France Cedex Martinique FWI	FMCC
701	Argentina	ARMCC	(33) 9100 FUAER AR	(54.11) 44802292	SAEZZSZX *armcc@sass.gov.ar* ~~armcc@impsat1. com.ar~~	(54.11) 44802486	ARMCC Región Aérea Centro Aerop. Intern. “Ministro Pistarini” Ezeiza Casilla de Correo N^{o}6 CP (1802) Buenos Aires Argentina	ARMCC ~~X.25~~
216	*Armenia*	-	-	-	-	-	-	*CMC*
307	Aruba	JRCC Curaçao	(93) 1506	(5999) 4637950	kw.rcc@czmcarib.an cgcuracao@ hotmail.com	(5999) 4637700	Coastguard Netherlands Antilles & Aruba Nightingaleweg, Curaçao Netherlands Antilles	USMCC
608	Ascension	Ascension Island Air Operations	-	(247) 6780	FHAWYWYO	(247) 3315, 3316	Ascension Air Operations BFPO 677 Mill Hill, London NW7 1PX, UK	SPMCC Ascension SRR
503	Australia	RCC Australia	(71) 62349 MRCCAUS AA62349	(61.2) 62306868	YSARYCYX rccaus@amsa. gov.au	(61.2) 62306820	AusSAR, Australian Maritime Safety Authority, GPO Box 2181 Canberra, City ACT 2601 Australia	AUMCC X.25 Australia SRR
203	Austria	RCC Vienna	114276	(43.1) 7979876	LOWWYCYX	(43.1) 7988380	Federal Office of Civil Aviation, RCC, Schnirchgasse 11 A-1030 Vienna Austria	FMCC
423	Azerbaijan	Radiocommuni- cation Centre	(784) 142102 MRF AI	(994.12) 935339	gkmp@caspar. baku.az	(994.12) 934506	Caspian Shipping Company 5 M.Rasulzade Street Baku 370005 Azerbaijan	CMC

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
327	Dominican Republic	San Juan RSC	-	(787) 7296706	-	(787) 7296770	Greater Antilles Section U.S. Coast Guard Base Box S 2029, San Juan Puerto Rico 00903-2029	USMCC
-	East Timor	*EUNMISET RCC (Civil Aviation Division)*	*6703317111*	-	*WPDLZTZX* *comeroatsc@ hotmail.com*	*(670) 3317110*	*Civil Aviation Dividion* *Ministry of Transport and Communications*	IDMCC
735	Ecuador	Fuerza Aerea Ecuatoriana	-	(593.4) 2294131	coaala22@ fae.ffaa.mil.ec	(593.4) 2692741	Fuerza Aerea Ecuatoriana Quito, Ecuador	USMCC
622	Egypt	SAR Centre	(91) 21095 RCCC RUN	(20.2) 4184531 4184537	HECCYCYX mmc@saregypt.net	(20.2) 4184537 4184531	SAR Centre Almaza Air Base Heliopolis, Cairo, Egypt	ALMCC
359	El Salvador	COCESNA	-	(504) 2342488	jroyuela@ cocesna.hn	(504) 2342507	Director ACNA COCESNA PO Box 660, Tegucigalpa, Honduras	USMCC
631	Equatorial Guinea	RSC Bata	-	-	FGBTYCYX	-	-	SPMCC Brazzaville SRR
625	Eritrea	RCC Asmara/ ACC Asmara	-	(291.1) 124334	HHAAYAYX	(291.1) 182752 181822 Ext 216	Director General Civil Aviation Department P.O.Box 252, Asmara, Eritrea	ITMCC
276	Estonia	MRCC Tallinn	(537) 173341 PIIR EE	(372.6) 922501	ncc_estonia@ pohja.pv.ee	(372.6) 922222	Estonian Board of Border Guard Coast Guard Department Susta 15, 11712 Tallinn, Estonia	NMCC
624	Ethiopia	-	-	-	HAAAZQZX	(251.1) 88888	-	ITMCC
740	Falkland Islands	FIRCC	2427 CBFFI FK	(500) 32164	-	(500) 74210	Commander British Forces Theatre Operations Centre HQ BFFI, BFPO 655, Falkland Islands	ARMCC

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
336	Haiti	Miami RCC	62076733	(305) 5365643	-	(305) 5365611	Seventh U.S. Coast Guard District, 909 South East First St., Miami FL 33131-3050, USA	USMCC
334	Honduras	COCESNA	-	(504) 2342488	jroyuela@ cocesna.hn	(504) 2342507	Director ACNA COCESNA PO Box 660 Tegucigalpa, Honduras	USMCC
477	Hong Kong, China	HKMCC	(802) 70428 HKLUT HX	(852) 25417714	VHHHZSZX hkmrcc@mardep. gov.hk	(852) 22337999	Marine Department Search and Rescue Section G.P.O. Box 4155 Hong Kong, China	HKMCC X.25
243	Hungary	Budapest Air Traffic Control Centre (ATCC)	-	(361) 2969152	LHBPYCYX	(361) 2969122 2916252	-	CMC
251	Iceland	GUFUNES Telecom. Centre	2089 GUF IS	(354) 5629043	BICCYFYB vardstj@simi.is	(354) 5533032	GUFUNES Telecommunications Centre Smararima-1, IS112 Reykjavik, Iceland	NMCC
419	India	INMCC	-	(91.80) 28371857	VOBGYCYS *inmcc@istrac.org* ~~inmcc@istrac.~~ ~~vsnl.net.in~~ ~~inmcc@istrac.gov.in~~	(91.80) 28094546 28371857	ISTRAC/ISRO Department of Space Plot No.12 Peenya Industrial Estate Bangalore-560058, India	INMCC
525	Indonesia	IDMCC	(796) 43586 SARJKT	(62.21) 5501513	WIIIYCYX basarnas@indo. net.id	(62.21) 5501111	National SAR Agency (Badan SAR National) JL. Medan Merdeka Timur 5 Jakarta 10110, Indonesia	IDMCC

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
422	Iran	RCC Tehran	-	(98.21) 4525882	OIIIZRZX	(98.21) 91022293	Civil Aviation Organization SAR Coordination Centre Mehrabad Airport, Tehran, Iran	ITMCC
425	Iraq	CENTAF-AUAB CAOC JSRC	T.B.D.	(974) 4327382	T.B.D.	(974) 4503452 4364193	T.B.D.	ITMCC
250	Ireland	Irish Coastguard	-	(353.1) 6620795 6785951	EIDWIMES mrccdublin@ irishcoastguard.ie	(353.1) 6620922 6620923	Irish Coastguard Leeson Lane Dublin 2, Ireland	UKMCC
428	Israel	Tel Aviv Bengurion Airport	(606) 31127	(972.3) 9710595 9721819	LLBGYDYX LLTAZRZX LLADYAYX	-	-	ITMCC
247	Italy	ITMRCC	614156 611172 *614103*	(39.06) 5922737 59084793	~~centraleoperativa1@ libero.it~~ *cgcp3rep4@ infrastrutturetrasporti.it*	(39.06) 5923569 5924145 *59084697* *59084409*	Italian Maritime Rescue Coordination Centre, Headquaters of Italian Coast Guard, Via dell' Arte 16 00144, Rome, Italy	ITMCC ~~X.25~~
339	Jamaica	Miami RCC	62076733	(305) 5365643	-	(305) 5365611	Seventh U.S. Coast Guard District, 909 South East, First St. Miami, FL 33131-3050, USA	USMCC
431 432	Japan	JAMCC	- ~~22853 JAMCC~~	(81.3) 35916107	jamcc@kaiho.mlit. go.jp	(81.3) 35916106	Japan Coast Guard (JCG) Operation Centre - JAMCC, 2-1-3 Kasumigaseki Chiyodaku, Tokyo 100-8989, Japan	JAMCC X.25
438	Jordan	RCC Amman	-	-	OJAMYCYX	(962.6) 4451401 4451672	RCC, Civil Aviation Authority Amman Airport Hashemite Kingdom of Jordan	SAMCC
		ACC Amman	-	-	OJACZRZX	(962.6) 4451607	-	

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
436	Kazakhstan	-	-	-	-	-	-	CMC
634	Kenya	Nairobi RCC	(987) 25239	(254.2) 824719	HKNAZQZX HKNCYAYX	(254.2) 824566 824587	Nairobi RCC P.O.Box 19031 Nairobi, Kenya	ITMCC
635	Kerguelen Islands	MRCC La Réunion	916140 RE	(262) 711595	-	(262) 434343	COSRU, Base Navale, Port des Galets 97821 LE, Port Cedex	FMCC
529	Kiribati	Marine Guard	~~76177022~~ ~~(Marine Division)~~	*(686)* *26468*	*dom@mid.gov.ki* ~~PLCHYMTX~~ ~~(Meteorological)~~	(686) ~~26523~~ *26512* *26468 (Director of Marine)*	-	AUMCC Nadi SRR
440 441	Korea (Rep.of)	KOMCC	(801) 45502 KOMCC	(82.42) 8612331	komcc2@ kornet.net	(82.42) 8612330	Korea National Maritime Police Agency, KARI Building Room 501, 45 Eoeun dong Yuseong gu, Daejeon, Korea, 305-333	KOMCC X.25
447	Kuwait	*RCC Kuwait*	-	-	*OKBKYCYX*	-	*Rescue Co-ordination Centre* *Directorate General of Civil Aviation, Kuwait International Airport, P.O.Box 17, Kuwait*	SAMCC
		ACC Kuwait	-	-	*OKACZRZX*	-	-	
531	Laos	-	-	-	*VLVTZAZX*	-	-	SIMCC
275	Latvia	MRCC Riga	(538) 161396 MRCC LV	(371) 7320100 9270690	sar@mrcc.lv	(371) 7323103 9476101 7082070	MRCC Riga Meldru Iela 5a Riga, LV-1015, Latvia	NMCC
450	Lebanon	-	-	-	*OLBAYCYX*	*(961.1)* *629014*	-	SAMCC
644	Lesotho	MRCC Cape Town	095527722 095527946	(27.21) 7872228	FACTYCYX FACTZGZX	-	-	ASMCC

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636 637	Liberia	RCC Roberts	-	(224) 404987 431004	GLRBZQZX robertsfir@ roberts.org.gn	(224) 404332/72/73/60	RCC, P.O.Box 30, Roberts International Airport, Liberia	SPMCC Roberts SRR
642	Libya	-	-	-	*HLLTYCYX*	*(218.21) 30734*	-	ALMCC
252	Liechtenstein	RCC Zurich	-	(41.44) 6543587	*<u>LSARYCYX</u>* *<u>ops@rega.ch</u>* ~~LSZHSAZX~~ ~~sar@rega.ch~~	(41.44) 6543538	RCC Zurich~~/Swiss Air Ambulance~~ REGA, Box 14 14, CH-8058 Zurich-Airport, Switzerland	FMCC
277	Lithuania	ARCC Vilnius		(370.2) 739122	EYVCYCYX	(370.2) 739112	Lietuvos Respublikos Civilnes Aviacijos Direkcija, Rodunes Kellas 2, Vilnius 2023, Lithuania	NMCC
253	Luxembourg	*RSC Luxembourg*	-	-	*ELLXZPZX*	*(352) 432078*	-	FMCC/Inside Belgium SRR
453	Macao	Macao Marine Department	88424	(853) 511986	-	(853) 559922	-	HKMCC
274	Macedonia (The Former Yugoslav Republic of)	-	-	(389) 91112026	LWSKYCYX LWSKYEYX LWSKYAYX	(389) 91711209	-	ITMCC
647	Madagascar	RCC Antananarivo	22286 ASEMAD MG	(261.20) 2245909	FMMIYCYX acm@acm.mg	(261.20) 2244410 2245909	Centre de Coordination Recherches et Sauvetage, P.O.Box 46, Antananarivo Ivato 105, Madagascar	FMCC
255	Madeira	MRCC Lisboa	(04404) 60747 MRCC L	(351.21) 440954	-	(351.21) 4416581	MRCC Lisboa, Redute Gomes Freire Estrada da Mendosa 2780-070 OEIRAS Portugal	FMCC
655	Malawi	Lilongue RCC	-	-	FNKIYCYX FNHQYCYX	-	-	ASMCC

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650	Mozambique	Maputu MRCC	-	(258.1) 494396	safmar@zebra.ufm.mz	(258.1) 494396	297 Avenue Marques de Pombal Maputu, Mozambique	ASMCC
506	Myanmar	-	08321228	-	VYYYYAYX	-	-	SIMCC
659	Namibia	NAMSAR	-	(264.64) 2082325	vladimir@namport.com.na	(264.64) 2082263/4/5	NAMSAR, P.O.Box 361 Walvis Bay, Namibia	ASMCC
544	Nauru	RCC Nauru	-	(674) *3177* ~~3188~~	ANAUYFYX *rfshief@yahoo.com*	(674) *3500* ~~3181~~	*Airport Rescue Fire Service* *Central pacific Republic of Nauru*	AUMCC Fiji SRR
459	Nepal	Department of Civil Aviation	(891) 2553 DCA NP	(977) 1222416	VNKTYAYX	(977) 1227287	Director General of Civil Dept. of Civil Aviation Babar Mahal, Kothamandu, Nepal	INMCC
244 245 246	Netherlands (The)	The Netherlands Coast Guard	71088 KUSTW NL	(31.223) 658358	-	(31.223) 542300	The Netherlands Coast Guard P.O.Box 10000, 1780 CA Den Helder, The Netherlands	FMCC
306	Netherlands Antilles	JRCC Curaçao	(93) 1506	(5999) 4637950	kw.rcc@czmcarib.an cgcuracao@hotmail.com	(5999) 4637700	Coastguard Netherlands Antilles & Aruba, Nightingaleweg, Curaçao Netherlands Antilles	USMCC
540	New Caledonia	*RSC TONTOUFA* ~~RCC Nouméa~~	-	(687) *239658* ~~352428~~	NWWWYCYX	(687) 352435	*RSC TONTOUFA* ~~RCC Nouméa~~ Civil Aviation Tontouta Airport P.O.Box 37 Tontouta, New Caledonia	AUMCC New Caledonia SRR
		MRCC NOUMEA	-	*(687) 292303*	*mrcc.nc@lagoon.nc*	*(687) 292332, 264772*	*MRCC NOUMEA BP Q1* *98851 NOUVELLE CALEDONIE*	
512	New Zealand	RCC New Zealand	-	(64.4) 9148388	NZWNYCYX rccnz@msa.govt.nz	(64.4) 9148380	RCCNZ P.O. Box 30050 Lower Hutt, New Zealand	AUMCC New Zealand SRR
350	Nicaragua	COCESNA	-	(504) 2342488	jroyuela@cocesna.hn	(504) 2342507	Director ACNA COCESNA PO Box 660 Tegucigalpa, Honduras	USMCC

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656	Niger	*RCC Niamey*	-	-	*DRRVYCYX*	*(227) 722511*	*Centre de Coordination de Recherche et de Sauvetage BP 230, Niamey, Niger*	ALMCC
		ACC Niamey	-	-	*DRRRZRZX*	-	-	
657	Nigeria	NIMCC	-	(234) 94131749	nema@rosecom.net	(234) 94134341	NEMA (The Presidency) Plot 439, Ademola Adetokunbo Crescent, Maitama, P.M.B. 357 Garki, Abuja, Nigeria	SPMCC Nigeria SRR before IOC of NIMCC NIMCC after IOC of NIMCC
542	Niue	RCC *Wellington* ~~New Zealand~~	-	(64.4) *6834010* ~~9148388~~	NZWNYCYX rccnz@msa.govt.nz	(64.4) *6834000* ~~9148388~~	*Telecom Niue* ~~RCC New Zealand~~ P.O.Box *37* ~~30050~~ *Alofi, Niue* ~~Lower Hutt, New Zealand~~	AUMCC New Zealand SRR
536	Northern Mariana Islands	Honolulu RCC	230392401 CG14UD	(808) 5412123	-	(808) 5412500	Fourteenth U.S. Coast Guard District, PGKK Federal Building 300 Ala Moana Boulevard Honolulu, HI 96850-4982, USA	USMCC
257 258 259	Norway	NMCC	-	(47) 75524200	ENBOYCYX mailto@ jrcc-bodoe.no	(47) 75559000	HOVEDREDNINGS- SENTRALEN, NORD-NORGE Box 1016, 8001 Bodoe, Norway	NMCC X.25
		JRCC Stavanger (back-up)	33163 RCC SN	(47) 51652334	ENZVYCYX	(47) 51646000	JRCC Southern Norway Sikrings Bygget, 4050 Sola, Norway	
461	Oman	*RCC Muscat*	-	-	*OOMSYCYX*	*(968) 614211*	*RCC, HQ SOAF P.O.Box 1772 Central PostOffice Seeb Int. Airport, Sultanat of Oman*	SAMCC
		ACC Muscat	-	-	*OOMMZRZX*	-	-	
463	Pakistan	PAMCC	-	(92.42) 5220756	sclhr@brain.net.pk	(92.42) 5220517	Satellite Research and Development Centre Samsani Road, P.O.Punjab University Lahore - 54590, Pakistan	PAMCC

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511	Palau	Honolulu RCC	230392401 CG14UD	(808) 5412123	-	(808) 5412500	Fourteenth U.S. Coast Guard District, PGKK Federal Building 300 Ala Moana Boulevard Honolulu, HI 96850-4982, USA	USMCC
443	Palestinian Authority	-	-	-	-	-	-	ITMCC
351 352 353 354 355 356 357 *371*	Panama	Aeronautica Civil	-	(507) 3150254	-	(305) 3150167	Dirección Aeronautica Civil Apartado 7501 Panamá 5, Panamá	USMCC
553	Papua New Guinea	RCC Port Moresby	70322137 (ARCC-24Hrs)	(675) 254094 (ARCC-24Hrs)	AYPYYCYX (ARCC-24Hrs)	(675) 256885	~~Department of Transport~~ ~~and~~ Civil Aviation ***Authority*** P.O.Box 684, Boroko N.C.D. Papua New Guinea	AUMCC Papua New Guinea SRR
755	Paraguay	Asuncion RCC	-	(595.021) 645599	SGASYFYX	(595.021) 645599	RCC ASU, Aeropuerto Internacional Silvio Petirossi, Luque, Paraguay	CHMCC
760	Peru	PEMCC	26042_PE_ DICAPI	(51.1) 4291547	pemcc@marina. mil.pe	(51.1) 4202020	Centro de Control de Misiones del Peru, Calle Constitucion 150 Callao 1, Peru	PEMCC
548	Philippines	Manila RCC	-	(63.2) 7599503	RPMMYCYX	(63.2) 8323013 8321961 Ext 3030	Air Transportation Office Domestic Airport Pasay City Philippines	HKMCC
555	Pitcairn Island	Pitcairn Police	-	(00872) 762941161	mop.pitcairn@ gtnet.gov.uk	(00872) 762854699	-	FMCC

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341	Saint Kitts and Nevis	MRCC Fort de France	912008	(596) 632450	crossag@ equipement.gouv.fr	(596) 719292	MRCC Fort de France BP 621 97261 Fort de France Cedex Martinique FWI	FMCC
343	Saint Lucia	MRCC Fort de France	912008	(596) 632450	crossag@ equipement.gouv.fr	(596) 719292	MRCC Fort de France BP 621 97261 Fort de France Cedex Martinique FWI	FMCC
607	Saint Paul and Amsterdam	RCC Australia	(71) 62349 MRCCAUS AA62349	(61.2) 62306868	YSARYCYX rccaus@amsa. gov.au	(61.2) 62306820	AusSAR, Australian Maritime Safety Authority GPO Box 2181, Canberra City ACT 2601, Australia	AUMCC Australia SRR
361	Saint Pierre and Miquelon	-	-	-	-	-	-	CMCC Inside Canada SRR
375 376 377	Saint Vincent and the Grenadines	San Juan RSC	-	(787) 7296706	-	(787) 7296770	Greater Antilles Section U.S. Coast Guard Base Box S 2029, San Juan Puerto Rico 00903-2029	USMCC
561	Samoa	Samoa National Surveillance Centre	-	(685) 20848	NSFAZTZX (Faleolo ATC Control Tower)	(685) 22222 *24957*	Police Headquaters P.O.Box 53 Apia, Samoa	AUMCC New Zealand SRR
268	San Marino	-	-	-	-	-	-	ITMCC
668	Sao Tome and Principe	-	-	-	-	-	-	SPMCC Brazzaville SRR
403	Saudi Arabia	SAMCC	-	(966.2) 6854021	OEJNJSAR salemjahdli@ hotmail.com	(966.2) 6855033 6855038 6855812	SAMCC PCA P.O.Box 929, Jeddah 21421 Saudi Arabia	SAMCC

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663	Senegal	RCC Dakar	-	(221) 8396037 8396028 8396016	GOOVYCYX	(221) 8396198	Centre de Coordination de Recherche et de Sauvetage Etat Major Général BP 4042, Dakar, Senegal	SPMCC Dakar SRR
279	Serbia and Montenegro	ACC Belgrado	-	-	LYBAZQZX	-	-	ITMCC
		SATCO	-	(381.38) 502460	BKPRZPZX BKPRZQZX	(381.38) 503603 Ext 6272	Senior Air Traffic Controller (SATCO), c/o ATCS, Pristina Airport Slatina, Kosovo – United Nations Mission inKosovo (UNMIK)	
664	Seychelles	Seychelles RCC	(965) 2239 DCA SZ	(248) 373222 384032 384009	FSIAYCYX FSSSZQZX dcaops@seychelles.net	(248) 373001 384053 384052 722205 722203	Directorate of Civil Aviation Operations and Aviation Safety P.O.Box 181, Victoria Seychelles	INMCC
667	Sierra Leone	RSC Freetown	-	(233.22) 228488	GFLLYAYX	(233.22) 222106 025307	RSC, Department of Civil Aviation Ministry of Transport Ministerial Building, George Street Freetown, Sierra Leone	SPMCC Roberts SRR
563 564	Singapore	SIMCC	20622 SIMCC	(65) 65422548	WSSSCSRS raymond_seah@caas.gov.sg (office hours only)	(65) 65425024 65412668	MCC Singapore, Singapore Air Traffic Control Centre (SATCC) Biggin Hill Road, Singapore 509950 Republic of Singapore	SIMCC X.25
267	Slovakia	Bratislava RCC	093217	-	LZBBYCYX	(42.7) 292409	M.R.Stefanik Aerodrom, SAR 823 07 Bratislava 21, Slovakia	CMC
278	Slovenia	Harbour Master Office	34235 UPPOM SI	(386.66) 271447	LJLAYLYX	(386.66) 272290	Harbour Master Office 66000 Koper, Slovenia	ITMCC
557	Solomon Islands	MRCC Honiara	-	(677) 23798	*AGGHYCYX*	(677) 21609, ~~21611~~ *96099* ~~22510~~	MRCC Honiara P.O.Box G32 Honiara, Solomon Islands	AUMCC Solomon Islands SRR

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666	Somalia	-	-	(254.2) 522340	HCMMYAYX icaosom@ africaonline.co.ke	(254.2) 622785/6/9	c/o ICAOREP P.O.Box 46294 Nairobi, Kenya	ITMCC
601	South Africa	ASMCC	(95) 521850 ASMCC SA	(27.21) 5513760	*FACTYCYX* maritimeradio@ ixmail.co.za	(27.21) 5529752	ASMCC, Telkom SA Maritime Services, Private Bag XI Milnerton 7435, South Africa	ASMCC
224 225	Spain	SPMCC	SPMCC 95008	(34.928) 727107	GCMPZSZX spmcc@inta.es	(34.928) 727104 727105 727106	Cospas-Sarsat/SPMCC INTA, Centro Espacial de Canarias Aptdo. 29, 35100 Maspalomas Las Palmas, Spain	SPMCC X.25
417	Sri Lanka	Colombo RCC	-	(94.1) 635106 431448	VCCCYCYX	(94.1) 635105-6 625555 611572	RCC Colombo Airport Ratmalana, Sri Lanka	INMCC
662	Sudan	-	*22650* DGCA SD	(249.1) 1773632 1779125	HSSSYCYX HSSSZQZX	(249.1) 1779125	-	ITMCC
765	Surinam	Department of Civil Aviation	148 CIVPBM SN	-	SMPBYAYX	(597) 97914 98898	Department of Civil Aviation P.O.Box 1981, Zorg en Hoop Paramaribo-South, Surinam	FMCC
669	Swaziland	*RSC Matsapha*	-	-	*FDMSZTZK*	*(268)* *84455*	-	ASMCC
265 266	Sweden	ARCC Göteborg	- ~~17017~~ ~~MKV S~~	(46) *31648110* ~~31698496~~	ESORYCYX	(46) *31648080* *31648060* ~~31648000~~ ~~31648050~~	Flygredningstjenesten ARCC Box 5159 42605 Västra Frölunda, Sweden	NMCC

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269	Switzerland	RCC Zurich	-	(41.44) 6543587	*LSARYCYX* ~~*Z*~~ *ops@rega.ch* ~~LSZHSAZX~~ ~~sar@rega.ch~~	(41.44) 6543538	RCC Zurich~~/Swiss Air Ambulance~~ REGA, Box 1414, CH-8058 Zurich-Airport, Switzerland	FMCC
468	Syria	-	-	-	*OSDIZQZX*	*(963.11)* *430405 Ext 349*	-	SAMCC
674 677	Tanzania	Dar es Salaam RCC	-	-	HTDCYCYX	(255.51) 35622	-	INMCC
567	Thailand	THMCC	*22720* *BKKRCCTH*	(66.2) 2873186 2855452	VTBAYCYX bkkrcc@aviation. go.th	(66) 2860594 2860506	*Flight Standards Bureau, Department of Civil Aviation* ~~Air Safety Division, Thai Department of Aviation~~, Ngarmdu-Plee Tung Mahemek, Bangkok *10*1*20*, Thailand	THMCC X.25
671	Togo	RSC Lome	-	-	DXXXYCYX	-	-	SPMCC Accra SRR
570	Tonga	Tonga Defence Services (TDS)	-	(676) 23934 (TDS HQ) *23150* ~~23190~~ (MSA)	NFTFYSYX	(676) 23099, *24696* (TDS HQ-24Hrs)	Tonga Defence Services P.O.Box 72 Nuku'Alofa, Tonga 23119 (MSA)	AUMCC New Zealand SRR
362	Trinidad and Tobago	San Juan RSC	-	(787) 7296706	-	(787) 7296770	Greater Antilles Section U.S. Coast Guard Base, Box S 2029 San Juan, Puerto Rico 00903-2029	USMCC
672	Tunisia	Tunis - ACC	-	(216.1) 783126	DTTCZRZS	(216.1) 783126	Centre de Controle Regional, Office de l'Aviation Civile et des Aeroports B.P. 137-147, 1080 Tunis Cedex - Tunisia	FMCC
271	Turkey	*TRMCC* ~~MSRCC Ankara~~	- ~~(607) 44144~~ ~~(607) 46201~~	(90.312) *2312902* ~~2320823~~ ~~4172845~~	*LTACZSZX* ~~LTAAZIZX~~ ~~hakan.durmaz@denizcilik.gov.tr~~ ~~h.durmaz@mynet.com~~ ~~trmcc@denizcilik.gov.tr~~	(90.312) *2313374* ~~2319105~~ ~~2324783~~	*TRMCC, Denizcilik Mustesarligi* *G.M.K. Bul No: 128/A* *Maltepe/Ankara/Turkey*	*TRMCC* ~~ITMCC~~

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434	Turkmenistan	-	-	-	-	-	-	CMC
364	Turks and Caicos Islands	Miami RCC	62076733	(305) 5365643	-	(305) 5365611	Seventh U.S. Coast Guard District, 909 South East, First St. Miami, FL 33131-3050, USA	USMCC
572	Tuvalu	ARCC Funafuti	-	(68*8*~~5~~) *2015, 201489* ~~24281~~	NGFUYFYX	(68*8*~~5~~) *20726, 20157* ~~23202~~	*Tuvalu Police HQ-Funafuri, Tuvalu*	AUMCC Fiji SRR
675	Uganda	Entebbe RCC	-	-	HUENYFYX	-	-	ASMCC
272	Ukraine	Odessa MRCC	(680) 232139	(380.482) 634243	mrcc@morcom.org.ua	(380.482) 637619 634243	State Department of Maritime and River Transport of Ukraine MRCC, 270058, 29 Shevchenko Avenue, Odessa, Ukraine	CMC
470	United Arab Emirates	Emirates RCC	-	(971.2) 5851347	OMAEYCYX	(971.2) 5851323	Emirates RCC, P.O.Box 666 Abu Dhabi, UAE	SAMCC
232 233 234 235	United Kingdom of Great Britain and Northern Ireland	UKMCC	75194 UKMCCK G	(44.1309) 678308 678309	EGQPZSZX ukmcc@atlas.co.uk	(44.1343) 836015 (44.1309) 672469	UKMCC ARCC Kinloss, RAF Kinloss Forres, Moray IV36 3UH, United Kingdom	UKMCC X.25
		Back-up UKMCC	73125 UKMCCA G	(44.1309) 690923	EGQPZSZX ukmcc@atlas.co.uk	(44.1309) 690005	UKMCC ARCC Kinloss, RAF Kinloss Forres, Morayshire IV36 3UH, United Kingdom	
338 366 367 368 369	United States of America	USMCC	6737651 USMCC	(1.301) 4575406	KZDCZSZA usmcc@noaa.gov	(1.301) 4575428	USMCC E/SP3, RM 3320, FB-4 NOAA, 5200 Auth Road Suitland, MD 20746-4303, USA	USMCC X.25
		USMCC Back-up Facility	*(same as above)*	*(1.301) 7946536*	*KCDCZSZC*	*(1.301) 7946535*	*(same as above)*	*(same as above)*

COUNTRY CODE	COUNTRY NAME	NAME OF C/S SAR POINT OF CONTACT	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MAILING ADDRESS	ASSOCIATED MCC/REMARKS
379	United States Virgin Islands	San Juan RSC	-	(787) 7296706	-	(787) 7296770	Greater Antilles Section U.S. Coast Guard Base, box S 2029 San Juan, Puerto Rico 00903-2029	USMCC
770	Uruguay	Carrasco RCC	-	(598.2) 6040112	SUMUYCYX ccrfau@adinet com.uy	(598.2) 6040297 6041702	CCR Carrasco, Ruta 101, Km. 19 Post Code 9101, Uruguay	CHMCC
576	Vanuatu	Vanuatu *Maritime Authority* *P. O. Box 320* ~~AUMCC~~ *Port Vila, Vanuatu* ~~Meteorological Services~~		-	(678) *23128* ~~25012~~	NVVVYMYX	(678) 22433 22550 Port Vila, Vanuatu	Vanuatu ological Services Fiji Private Mail Bag 4
208	Vatican City	-	-	-	-	-	-	ITMCC
775	Venezuela	RCC Maiquetia	-	(58.212) 3322891 3321019 3310813 3327387	SVSCYFYX rcc-miq@onsa. org.ve	(58.212) 3322891 3321019	-	USMCC
574	Vietnam	VMRCC	-	(84.4) 7683048	-	(84.4) 7683051 7683050	No.8, Pham Hung Cau Giay Hanoi, Vietnam	HKMCC before IOC VNMCC after IOC of VNMCC
578	Wallis and Futuna	RCC Nouméa	-	(687) 352428	NWWWYCYX	(687) 352435	RCC Nouméa, Civil Aviation Tontouta Airport, P.O.Box 37 Tontouta, New Caledonia	AUMCC New Caledonia SRR
473 475	Yemen	*RCC Sanaa*	-	-	*OYSNYCYX*	-	*RCC, Department of Civil Aviation, P.O.Box 424* *Crater 101 Aden, Yemen*	SAMCC
		ACC Sanaa	-	-	*OYSNZRZX*	-	-	

LIST OF COUNTRIES
HAVING REQUESTED NOCR SERVICE (Cont.)

Country Name	Country Code	Support MCC
JAPAN	431, 432	JAMCC
KERGUELEN ISLANDS	635	FMCC
KOREA (Republic of)	440, 441	KOMCC
LATVIA	275	NMCC
LIECHTENSTEIN	252	FMCC
MALTA	215, 248, 249, 256	ITMCC
MARTINIQUE	347	FMCC
MONACO	254	FMCC
MAYOTTE	660	FMCC
NETHERLANDS (THE)	244, 245, 246	FMCC
NETHERLANDS ANTILLES	306	FMCC
NEW CALEDONIA	540	AUMCC
NEW ZEALAND	512	AUMCC
NIGERIA	657	SPMCC (NIMCC* after IOC of NIMCC)
NORWAY	257, 258, 259	NMCC
PAKISTAN	463	PAMCC
PERU	760	PEMCC
PORTUGAL	263	FMCC
REUNION	660	FMCC
RUSSIA	273	CMC
SAINT PAUL AND AMSTERDAM ISLANDS	607	FMCC
SAINT PIERRE AND MIQUELON	361	FMCC
SAUDI ARABIA	403	SAMCC
SINGAPORE	563, 564	SIMCC
SOUTH AFRICA	601	ASMCC
SPAIN	224, 225	SPMCC
SWEDEN	265	NMCC
SWITZERLAND	269	FMCC
THAILAND	567	THMCC
TUNISIA	672	FMCC
TURKEY	*271*	*TRMCC*
UNITED KINGDOM	232, 233, 234, 235	UKMCC
UNITED STATES OF AMERICA	303, 338, 366, 367, 368, 369	USMCC
VANUATU	576	AUMCC
VIETNAM	574	HKMCC (VNMCC after IOC of VNMCC)
WALLIS AND FUTUNA	578	AUMCC

Note: * - under development.

- END OF ANNEX I / E -

COUNTRY CODE	**COUNTRY**	**------------------ ACCESS TO 406 MHz BEACON REGISTERS ------------------**					**ASSOCIATED**	**MAINTAINED BY:**
		NAME	**TELEX**	**FACSIMILE**	**AFTN / E-MAIL**	**TELEPHONE**	**MCC or RCC**	
501	Adelie Land	-	-	-	-	-	AUMCC	see France (226, 227, 228)
401	Afghanistan	-	-	-	-	-	-	-
303	Alaska (State of)	-	-	-	-	-	USMCC	see USA (338, 366, 367, 368, 369)
201	Albania	-	-	-	-	-	-	-
605	Algeria	ALMCC	65550_ MCCDZ	(213.2) 1495112	DAALZSZX *mcc_alger@mdn.dz*	(213.2) 149510	ALMCC	ALMCC
559	American Samoa	-	-	-	-	-	-	see USA (338, 366, 367, 368, 369)
202	Andorra	-	-	-	-	-	-	-
603	Angola	-	-	(242) 339848	-	(242) 390034	-	-
301	Anguilla	-	-	-	-	-	-	-
304	Antigua and Barbuda	-	-	(596.596) 632450	mrcc.fortdefrance@ wanadoo.fr	(596.596) 709292	-	-
701	Argentina	ARMCC (EPIRBs, ELTs, PLBs)	(33) 9100 FUAER AR	(54.11) 44802292	SAEZZSZX *armcc*@sass.gov.ar ~~armcc@impsat1.com.ar~~	(54.11) 44802486	ARMCC	ARMCC
216	*Armenia*	-	-	-	-	-	-	-
307	Aruba	JRCC Curaçao	(93) 1506	(5999) 4637950	kw.rcc@czmcarib.an cgcuracao@ hotmail.com	(5999) 4637700	JRCC Curaçao	Coastguard Netherlands Antilles & Aruba, Nightingaleweg Curaçao, Netherlands Antilles
608	Ascension	-	-	-	-	-	-	-

COUNTRY CODE	COUNTRY	NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
219 220	Denmark	RCC Karup (EPIRBs, ELTs, PLBs)	66160 RESCUE DK	(45) 99624954	EKMCYCYX	(45) 99624950 Ext 5631	NMCC / RCC Karup	Flyvertaktisk Kommando RCC Karup, Koelvraa DK-7470 Karup J, Denmark
621	Djibouti	-	-	-	-	-	-	-
325	Dominica	-	-	-	-	-	-	-
327	Dominican Republic	-	-	-	-	-	-	-
-	East Timor	-	-	-	-	-	-	-
735	Ecuador	Ecuador DAC (EPIRBs)	-	-	dirdac@ramt.com	(593.2) 2506592	USMCC	-
622	Egypt	*RCC - Alamaza Air Force Base*	*21095* *RCCCR UN*	*(20.2)* *4185431*	*HECCYCYX*	*(20.2)* *4184537* *4185431*	-	-
359	El Salvador	-	-	-	-	-	-	-
631	Equatorial Guinea	-	-	-	-	-	-	-
625	Eritrea	-	-	-	-	-	-	-
276	Estonia	MRCC Tallinn (EPIRBs, ELTs)	(537) 173341 PIIR EE	(372.6) 922501	ncc_estonia@ pohja.pv.ee	(372.6) 922222	MRCC Tallinn	Estonian Board of Border Guard Coast Guard Department Susta 15, 11712 Tallinn, Estonia
624	Ethiopia	-	-	-	-	-	-	-
740	Falkland Islands	-	-	-	-	-	FIRCC	-
231	Faroe Islands	RCC Karup	66160 RESCUE DK	(45) 99624954	EKMCYCYX	(45) 99624950 Ext 5631	NMCC/ RCC Karup	see Denmark (219, 220)

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------- TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
520	Fiji	*Air Safety Department (ELTs)*	-	*(679) 725125*	*sao@caaf.org.fj*	*(679) 721555*	*Air Traffic Control Nadi International Airport* ~~Nadi RCC~~	*Senior Airworthiness Officer*
230	Finland	RCC Turku (EPIRBs, ELTs, PLBs)	(57) 62249	(358.2) 2500950	mrcc@raja.fi	(358.2) 041001	RCC Turku	Finnish Communications Regulatory Authority
226 227 228	France	FMCC (ELTs, PLBs)	530800 NCSAR A	(33.5) 61274878	LFIAZSZX fmcc@cnes.fr	(33.5) 61254382	FMCC	FMCC
		MRCC Gris Nez (EPIRBs)	130680	(33.3) 21877855	LFINZPZX cross-gris-nez@ equipment.gouv.fr	(33.3) 21872187 ops 21877820 office hours	FMCC	Maritime Affairs
546	French Polynesia	-	-	-	-	-	FMCC	see France (226, 227, 228)
626	Gabon	-	-	-	-	-	-	-
629	Gambia	-	-	-	-	-	-	-
213	Georgia	RCC Georgia (EPIRBs)	-	(995.222) 73905	mrccgeorgia@ iberiapac.ge	(995.222) 73913	-	-
211 218	Germany	RCC Munster (EPIRBs, ELTs)	811885 (First word of text: Att:SAR)	(49.251) 135759	ETRAYCYX Ltkdosarleitstelle@ bundeswehr.org	(49.251) 135757	MRCC Bremen RCC Glücksburg	Federal Office of Post and Telecommunication Branch Hamburg
627	Ghana	-	-	-	-	-	-	-
236	Gibraltar	Gibraltar Port Authority (EPIRBs)	2130 GIBPOR GK	(350) 40434	-	(350) 78134 77272 77615	-	-

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------- TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
477	Hong Kong, China	HKMCC (EPIRBs, ELTs)	(802) 70428 HKLUT HX	(852) 25417714	VHHHZSZX hkmrcc@mardep. gov.hk	(852) 22337999	HKMCC	Marine Department Search and Rescue Section P.G.O Box 4155 Hong Kong, China
243	Hungary	-	-	-	-	-	-	-
251	Iceland	GUFUNES Telecom. Centre (EPIRBs, ELTs, PLBs)	2089 GUF IS	(354) 5629043	BICCYFYB vardstj@simi.is	(354) 5533032	NMCC	Post & Telecom Administration Smidjuvegur 68-70 200 Kopavogur, Iceland
419	India	INMCC (EPIRBs, ELTs, PLBs)	-	(91.80) 28371857	VOBGYCYS *imcc@istrac.org* ~~inmcc@istrac. vsnl.net.in~~ ~~inmcc@istrac.gov.in~~	(91.80) 28094546 28371857	INMCC	ISTRAC/ISRO Department of Space Plot No. 12, Peenya Industrial Estate, Bangalore-560058, India
525	Indonesia	IDMCC (EPIRBs)	(796) 43586 SARJKT	(62.21) 5501512	WIIIYCYX basarnas@indo. net.id	(62.21) 5501111	IDMCC	National SAR Agency (Badan SAR National) JL Medan Merdeka Timur 5 Jakarta 10110, Indonesia
422	Iran	-	-	-	-	-	-	
425	Iraq	-	-	-	-	-	-	-
250	Ireland	Irish Coastguard (EPIRBs, ELTs)	-	(353.1) 6620795 6762666	EIDWIMES mrccdublin@ irishcoastguard.ie	(353.1) 6620922	UKMCC	Irish Coastguard Leeson Line Dublin 2, Ireland
428	Israel	-	-	-	-	-	-	-
247	Italy	ITMCC (EPIRBs, ELTs, PLBs)	811376 (Manual) 811375	(39.080) 5342145	LIBDZSZX itmcc247@infinito.it itmcc.gismondi@ infinito.it	(39.080) 5341571 5344033 5341053	ITMCC	ITMCC Stazione Satellitare Cospas/Sarsat Lungomare Starita, 5 Bari 70123, Italy

COUNTRY CODE	COUNTRY	------------------	ACCESS TO 406 MHz BEACON REGISTERS			-------------------	ASSOCIATED	MAINTAINED BY:
		NAME	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	MCC or RCC	
339	Jamaica	-	-	-	-	-	-	-
431 432	Japan	JAMCC (EPIRBs, ELTs)	- ~~22853~~ ~~JAMCC~~	(81.3) 35916107	jamcc@kaiho.mlit. go.jp	(81.3) 35916106	JAMCC	Japan Coast Guard (JCG) Operation Centre - JAMCC 2-1-3 Kasumigaseki Chiyodaku Tokyo 100-8989, Japan
438	Jordan	-	-	-	-	-	-	-
436	Kazakhstan	-	-	-	-	-	-	-
634	Kenya	Directorate of Civil Aviation Headquaters (ELTs)	-	(254.2) 824716	HKNCYAYD dca@insightkenya. com	(254.2) 824557 824002	-	Directorate of Civil Aviation
635	Kerguelen Islands	-	-	-	-	-	FMCC	see France (226, 227, 228)
529	Kiribati	-	-	-	-	-	-	-
440 441	Korea (Rep.of.)	KOMCC (EPIRBs, ELTs, PLBs)	(801) 45502 KOMCC	(82.42) 8612331	komcc2@ kornet.net	(82.42) 8612330	KOMCC	Korea National Maritime Police Agency, KARI Building, Room 501, 45 Eoeun dong, Yuseong gu Daejeon, Korea, 305-333
447	Kuwait	-	-	-	-	-	-	-
531	Laos	-	-	-	-	-	-	-
275	Latvia	MRCC Riga (EPIRBs, ELTs, PLBs)	(538) 161396 MRCC LV	(371) 7320100	sar@mrcc.lv	(371) 7323103	MRCC Riga Meldru 5A, Riga Latvia LV-1015	-
450	Lebanon	-	-	-	-	-	-	-

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------- TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
644	Lesotho	-	-	-	-	-	-	-
636 637	Liberia	Liberian International Ship and Corporate Registry LLC (EPIRBs)	-	(1.703) 7905655	-	(1.703) 7903434	-	-
642	Libya	-	-	-	-	-	-	-
252	Liechtenstein	-	-	-	-	-	-	see Switzerland (269)
277	Lithuania	MRCC Klaipeda (EPIRBs)	278486 SAR LT	(370.6) 499677	mrcc.klaipeda@takas.lt	(370.6) 499670 499669 399502	NMCC	MRCC Klaipeda 24 J. Janonio Street Klaipeda 5800 Lithuania
253	Luxembourg	*Service des Opération Aéronautiques (ELTs)*	-	-	*ELLXZPZX* *ais @airport.etat.lu*	*(352)* *47982023* *47982024*	-	-
453	Macao	-	-	-	-	-	-	-
274	Macedonia (The Former Yugoslav Republic of)	-	-	-	-	-	-	-
647	Madagascar	RCC Antananarivo (EPIRBs, ELTs)	22286 ASEMAD MG	(261.20) 2245909	FMMICYCYX acm@acm.mg	(261.20) 2244410 2245909	FMCC	-
255	Madeira	-	-	-	-	-	-	-
655	Malawi	-	-	-	-	-	-	-

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------ TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
443	Palestinian Authority	-	-	-	-	-	-	-
351 352 353 354 355 356 357 *371*	Panama	-	-	-	-	-	-	-
553	Papua New Guinea	ARCC (EPIRBs, ELTs)	-	(675) 3244817	AYPMYCYX	(675) 3256885	ARCC	-
755	Paraguay	-	-	*(59521) 224048 211987*	*SGASZRZX sar@dinac.gov.py*	*(59521) 224048*	-	-
760	Peru	PEMCC (EPIRBs, ELTs, PLBs)	26042_PE_ DICAPI	(51.1) 4291547	pemcc@marina. mil.pe	(51.1) 4202020	PEMCC	Centro de Control de Misiones del Peru, Calle Constitucion 150 Callao 1, Peru
548	Philippines	Manila RCC (EPIRBs, ELTs)	-	(63.2) 8323013	RPMMYCYX	(63.2) 8323013 8321961 Ext 3030	HKMCC	-
555	Pitcairn Island	-	-	-	-	-	-	-
261	Poland	MRCK Gdynia (EPIRBs)	-	(48.58) 62054262 6216811	-	(48.58) 6216811 6205551 6205338	-	-
263	Portugal	Instituto Maritimo Portuario (IMP) (EPIRBs, ELTs)	-	(351.21) 3979794	-	(351.21) 3914500	MRCC Lisboa	-

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------ TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
268	San Marino	-	-	-	-	-	-	-
668	Sao Tome and Principe	-	-	-	-	-	-	-
403	Saudi Arabia	SAMCC (EPIRBs, ELTs, PLBs)	-	(966.2) 6854021	OEJNJSAR salemjahdli@ hotmail.com	(966.2) 6855033 6855038 6855812	SAMCC	SAMCC PCA, P.O.Box 929 Jeddah 21421 Saudi Arabia
663	Senegal	-	-	-	-	-	-	-
279	Serbia and Montenegro	-	-	-	-	-	-	-
664	Seychelles	Seychelles Coast Guard (EPIRBs)	-	(248) 323288	seycoast@ seychelles.net	(248) 224411	-	-
667	Sierra Leone	-	-	-	-	-	-	-
563 564	Singapore	SIMCC (EPIRBs, ELTs)	20622 SIMCC	(65) 65422548	WSSSCSRS raymond_seah@ caas.gov.sg (ofice hours only)	(65) 65425024 65412668	SIMCC	MCC Singapore, Singapore Air Traffic Control Centre, Biggin Hill Road, Singapore 509950, Republic of Singapore
267	Slovakia	RCC (EPIRBs, ELTs)	-	(421.2) 48572185	LZIBYCYX karel.bemoc@lps.sk	(421.2) 43292409	-	-
278	Slovenia	-	-	-	-	-	-	-
557	Solomon Islands	-	-	-	-	-	-	-
666	Somalia	-	-	-	-	-	-	-
601	South Africa	ASMCC (EPIRBs, ELTs, PLBs)	(95) 521850 ASMCC SA	(27.21) 5513760	*FACTYCYX* maritimeradio@ ixmail.co.za	(27.21) 5529752	ASMCC	MRCC Cape Town Private Bag X1 Tokai 7966, South Africa

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------- TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
224 *225*	Spain	SPMCC (EPIRBs, ELTs, PLBs)	95008 SPMCC	(34.928) 727107	GCMPZSZX spmcc@inta.es	(34.928) 727104 727105 727106	SPMCC	Cospas-Sarsat/SPMCC INTA, Centro Espacial de Canarias, Aptdo.29, 35100 Maspalomas, Las Palmas, Spain
417	Sri Lanka	-	-	-	-	-	-	-
662	Sudan	-	-	-	-	-	-	-
765	Surinam	Department of Civil Aviation (ELTs)	148 CIVPBM SN	-	SMPBYAYX	(597) 97914 98898	FMCC	-
669	Swaziland	-	-	-	-	-	-	-
265 266	Sweden	ARCC Göteborg (ELTs)	17017 MKV S	(46) 31698496	ESORYCYX	(46) 31648050	NMCC	Swedish Civil Aviation Administration/ARCC
		MRCC Göteborg (EPIRBs)	20180 MRCCGBG S	(46) 31648010	-	(46) 31699080		Swedish Maritime Administration/MRCC
269	Switzerland	~~Berna Radio (EPIRBs)~~	~~-~~	~~(41.31) 6884465~~	~~LSSBYSYX~~	~~(41.31) 6884433~~	~~FMCC~~	
		RCC Zurich (*EPIRBs,* ELTs, PLBs)	-	(41.44) 6543587	*LSARYCYX* *ops@rega.ch* ~~LSZHSAZX~~ ~~sar@rega.ch~~	(41.44) 6543538	*FMCC*	Schweizerisches Seeschiffahrtsamt (EPIRBs) Federal Office for Civil Aviation (ELTs) BAKOM (PLBs)
468	Syria	-	-	-	-	-	-	-
674 677	Tanzania	-	-	-	-	-	-	-
567	Thailand	THMCC (EPIRBs, ELTs, PLBs)	*22720* *BKKRCCTH* ~~2855452~~	(66.2) 2873186	VTBAYCYX bkrcc@aviation.go.th	(66.2) 2860594 2860506	THMCC	-

COUNTRY CODE	COUNTRY	------------------ NAME	ACCESS TO 406 MHz BEACON REGISTERS TELEX	FACSIMILE	AFTN / E-MAIL	------------------ TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
671	Togo	-	-	-	-	-	-	-
570	Tonga	RCC New Zealand (EPIRBs, ELTs, PLBs)	-	(64.4) 9148388	NZWNYCYX rccnz@msa.govt.nz	(64.4) 9148383	AUMCC RCC New Zealand	RCC New Zealand P.O Box 30050 Lower Hutt, New Zealand
362	Trinidad and Tobago	-	-	-	-	-	-	-
672	Tunisia	-	-	-	-	-	-	-
271	Turkey	*TRMCC* ~~MSRCC Ankara~~	(607) 44144 ~~(607) 46201~~	(90.312) 2320823 ~~4172845~~	~~LTAAZIZX~~ ~~hakan.durmaz@ denizcilik.gov.tr~~ ~~h.durmaz@mynet. com~~ trmcc@denizcilik.gov.tr	(90.312) 2319105 2324783 *2313374*	*TRMCC* ~~ITMCC~~	*TRMCC* ~~MSRCC~~ Denizcilik Mustesarligi G.M.K. Bulvari No:128/A Maltepe/Ankara/Turkey
434	Turkmenistan	-	-	-	-	-	-	-
364	Turks and Caicos Islands	-	-	-	-	-	-	-
572	Tuvalu	-	-	-	-	-	-	-
675	Uganda	-	-	-	-	-	-	-
272	Ukraine	Odessa MRCC (EPIRBs)	-	(380.482) 634243	mrcc@morcom.org. ua	(380.482) 637619	CMC	State Department of Maritime and River Transport of Ukraine MRCC, 270058, 29 Shevchenko Avenue, Odessa, Ukraine
470	United Arab Emirates	General Civil Aviation Authority (ELTs)	-	(971.2) 4054587	OMAEATCC	(971.2) 4054590	SAMCC	General Civil Aviation Authority Air Traffic Control Centre P.O.Box 6558, Abu Dhabi, UAE

COUNTRY CODE	COUNTRY	NAME	TELEX	FACSIMILE	AFTN / E-MAIL	TELEPHONE	ASSOCIATED MCC or RCC	MAINTAINED BY:
		------------------ ACCESS TO 406 MHz BEACON REGISTERS ------------------						
232 233 234 235	United Kingdom of Great Britain and Northern Ireland	UKMCC (ELTs)	75194 UKMCCK G	(44.1309) 678308 678309	EGQPZSZX ukmcc@atlas.co.uk	(44.1309) 690469 (44.1343) 836015	UKMCC	UKMCC, ARCC Kinloss RAF Kinloss, Forres Moray IV36 3UH United Kingdom
		MRCC Falmouth (EPIRBs)	45560 FALMC G	(44.1326) 319264 318342	-	(44.1326) 211569 317575	UKMCC	MRCC Falmouth, Pendennis Point Castle Drive, Falmouth, Cornwall TR11 4WZ, United Kingdom
338 366 367 368 369	United States of America	USMCC (EPIRBs, ELTs, PLBs)	6737651 USMCC	(1.301) 4575406	KZDCZSZA usmcc@noaa.gov	(1.301) 4575428	USMCC	USMCC, E/SP3, RM 3320, FB-4 NOAA, 5200 Auth Road Suitland, MD 20746-4304, USA
		<u>*(same as above)*</u>	<u>*(same as above)*</u>	<u>*(1.301) 7946536*</u>	<u>*KZDCZSZC usmcc@noaa.gov*</u>	<u>*(1.301) 7946535*</u>	<u>*(same as above)*</u>	<u>*(same as above)*</u>
379	United States Virgin Islands	-	-	-	-	-	-	see USA (338, 366, 367, 368, 369)
770	Uruguay	Carrasco RCC (EPIRBs, ELTs)	- 6040112	(5982.2)	ccrfau@adinet.com.uy	(5982.2) 6040297 6041702	-	RCC Montevideo
576	Vanuatu	Vanuatu Maritime Services (EPIRBs)	-	(1.212) 4259652 (1.914) 2762706 (after NY office hours)	vmsnyc@attglobal.net	(1.212) 4259600	AUMCC	Vanuatu Maritime Services 42 Broadway, Suite 1200-18 New York, NY 10004, USA
208	Vatican City	-	-	-	-	-	-	-
775	Venezuela	RCC Maiquetia	-	(58.212) 3322891 3321019 3310813, 3327387	SVSCYFYX rcc-miq@onsa.org.ve	(58.212) 3322891 3321019	USMCC	-

A. LIST OF 406 MHz BEACON MANUFACTURERS (Cont.)

UKRAINE (Cont.)

State Designer's Bureau of Radiocommunication	29 Vakulenchuk St. Sevastopol 335053 Ukraine	Tel: 380-692 247173 Fax: 380-692 243170

UNITED KINGDOM

AMS Ltd.	Lyon Way, Frimley, Camberley Surrey GU16 7EX, United Kingdom	Tel: 44-1276 63331 Fax: 44-1276 695485
Caledonian Airborne Systems Ltd.	6 Ninian Road Dyce, Aberdeen Airport AB2 0PD Scotland, United Kingdom	Tel: 44-1224 722274 Tlx: 73645 CASABZ G Fax: 44-1224 722896
Lokata Ltd.*	Sartech Engineering *Ltd.* *80 Brighton Road, Lower Kingswood* *Surrey KT20 6SY* ~~Portsmouth,~~ ~~Hampshire PO3 5PB~~ United Kingdom	Tel: 44-1737 832237 Fax: 44-1737 833903 E-mail: pforey@sartech.co.uk

* (models no longer in production but supporterd by Sartech Engineering *Ltd.*)

McMurdo Ltd.	Silver Point, Airport Service Road Portsmouth, Hampshire PO3 5PB United Kingdom	Tel: 44-2392 623900 Fax: 44-2392 623997 E-mail: sales@mcmurdo.co.uk
Nova Marine Systems Ltd.	(See McMurdo Ltd. - UK)	
Signature Industries Ltd.	Tom Cribb Road Thamesmeead London SE28 0BH, United Kingdom	Tel: 44-20 83164477 Tel: 44-20 83171717 Fax: 44-20 83166218 E-mail: bclayton@ntlworld.com
Techtest Limited	Street Court,. Kingland, Leominster Herefordshire HR6 9QA, United Kingdom	Tel: 44-1568 708744 Fax: 44-1568 708713
Thales Underwater Systems Ltd.	Ocean House, Templecombe Somerset BA8 0DH, UK	Tel: 44-1963 372362 E-mail:gareth.jenkins@uk.thalesgroup.com

UNITED STATES OF AMERICA

ACR Electronics, Inc.	5757 Ravenswood Road Ft. Lauderdale Florida 33312 USA	Tel: 1-954 9813333 Tlx: 519645 Fax: 1-954 9835087, 1-508 8982427 E-mail: jflood@acrelectronics.com
Alden Marine	(See Northern Airborne Technology Ltd. - Canada)	
Artex Aircraft Supplies, Inc.	14405 Keil Road, NE Aurora, Oregon 97002 USA	Tel: 1-503 6787929 Fax: 1-503 6787930 E-mail: info@artex.net
Ultra Electronics ~~BAE SYSTEMS -~~ Ocean Systems	115 Bay State Drive Braintree, Massachusetts 02184 USA	Tel: 1-781 *794 3744* ~~848 3400~~ Fax: 1 781 843 2153 E-mail: hartigan@hazeltine.com
DME Corporation	6830 N.W. 16thTerrace. Fort Lauderdale, FL 33309-1518, USA	Tel.: 1-954 9752100. Fax: 1-554 9793313
Microwave Monolithics, Inc.	2263 Ward Avenue Simi Valley, California 93065, USA	Tel: 1-805 5846642 Fax: 1-805 5849594

(a1) In July 2000, Socata (France) sold the design and production rights for ELT models ELT 96, ELT 96 S and ELT 97 (Certif. No.74) to Air Precision (France).

(a2) Models no longer in production, but supported by Sartech Engineering.

(a3) Non Float-Free EPIRB – Class 2.

(a4) Beacon is produced by Seimac Ltd., but marketed by Northern Airborne Technology Ltd.

(a5) Company name was changed from Samyang to Saracom Co., Ltd.

(a6) In July 2004 company name was changed from DRS Flight Safety and Communications to DRS Data and Imaging Systems.

(a7) On 7 October 2003 company name was changed from GEC-Marconi Radar and Defence Systems to AMS Ltd.

D. LIST OF SPECIAL USE 406 MHz BEACONS

C/S Reference No.	Model	Manufacturer	C/S Class	Application	Effective Date
701	MR 509	Becker Avionic Systems	2	PLB	10 Jul. 98
702	AF/PRC-807 “Warrendi”	BAE SYSTEMS Australia Ltd.*	2	PLB	24 Sep. 98
703	AN-PRC-149	Tadiran Spectralink, Inc.	2	PLB	15 Dec. 99
704	AF/PRC-807A “Warrendi”	BAE SYSTEMS Australia Ltd.*	2	PLB	7 Sep. 00

Note: * Former British Aerospace Australia.

BAE SYSTEMS Australia Ltd.	40-52 Talavera Road North *Ry~~i~~de*, New South Wales 2113 Australia	Tel: 61-2 *98558905* ~~98558973~~ Fax: 61-2*98558930* ~~98558909~~ E-mail: *david.j.abbott@baesyatems.com* ~~ed.spicer@baesystems.com~~
Becker Avionic Systems	Becker Flugfunkwerk GmbH Flugplatz, postfach 34 76549 Hügelsheim, Germany	Tel: 49-7229 305330 Fax: 49-7229 305217 E-mail: kunze@becker-avionics.de
KDC TechSolutions	6540 Lusk Blvd., Suit C-135 San Diego, CA 92121 USA	Tel: 1-858 6250979 Fax: 1-858 6259023 E-mail: dcoates@kdcsolutions.com
Tadiran Spectralink, Inc.	(See KDC TechSolutions who provides services for Tadiran Spectralink Ltd.)	

- END OF ANNEX I / G -

- END OF PART I -

Table II / A.1 : Details of MCCs (1/2)

MCC Name/ Code	**Telex**	**AFTN**	**Fax**	**Telephone**	**X.25**
ALMCC 6050	65550_MCCDZ	DAALZSZX	(213.2) 1495112	(213.2) 1495102	Number provided on a need to know basis
ARMCC 7010	(33) 9100 FUAER AR	SAEZZSZX	(54.11) 44802292	(54.11) 44802486	- 7227 3191 8992
ASMCC 6010	(95) 521850 ASMCC SA	*FACTYCYX*	(27.21) 5513760	(27.21) 5529752	6550 12 63 1642
AUMCC 5030	(71) 62349 MRCCAUS AA62349	YSARYCYX	(61.2) 62306868	(61.2) 62306820	5052 6275 203250* 5052 6275 2032** * = Receive only ** = Transmit only
BRMCC 7100	611018 MAERBR	SBBRZSZX	(55.61) 33652964 33651212	(55.61) 33652964 *33648395*	*724 1613 0123* 1613 0123
CHMCC 7250	340692 CHMCC CK	SCTIZSZX	(56.2) 5305972	(56.2) 5305941	73 0220 0120 3200
CMC 2730	113934 MKVC RU	UUUUYCYX	(7.095) 9269375	(7.095) 9261374 9261460	2501 7729 0049
CMCC 3160	-	CYTRZSYX	(1.613) 9657190	(1.613) 9657265 9653872	3020 2390 0035
CNMCC 4120	Receive- 210395 CNMCC CN Transmit- 210396 CNMCC CN	ZBBBZSZX	(86.10) 65293296	(86.10) 65293298 65292221	4603 2021 2182
FMCC 2270	530800 NCSAR A 530013 MCSAR U 530682 MCSAR N	LFIAZSZX	(33.5) 61274878	(33.5) 61254382	02080 31149 42114
HKMCC 4770	(802) 70428 HKLUT HX	VHHHZSZX	(852) 25417714	(852) 22337999	4545 4532 5102 4545 4532 1402 (back-up)
IDMCC 5250	(796) 43586 SARJKT	WIIIYCYX	(62.21) 5501513	(62.21) 5501449	5101 5002 0411
INMCC 4190	-	VOBGYCYS	(91.80) 28371857	(91.80) 28094546 28371857	-
ITMCC 2470	811376 (Manual) 811375	LIBDZSZX	(39.080) 5342145	(39.080) 5341571 5344033 5341053	0222 2800 0238
JAMCC 4310	-22853_JAMCC	-	(81.3) 35916107	(81.3) 35916106	Number provided on a need to know basis

Table II / A.1 : Details of MCCs (2/2)

MCC Name/ Code	E-mail	Mailing Address
ALMCC 6050	mcc_alger@mdn.dz	Service SAR 123, rue de Tripoli, BP 428, Hussein-Dey Algiers, ALGERIA
ARMCC 7010	*armcc@sass.gov.ar* ~~armcc@impsat1.com.ar~~	SASS, Servicio de Alerta de Socorro Satelital, Edificio “Libertad”, Avenida Comodoro Py 2055, Piso 12 Of. 54 CP (C1104 BEA) Ciudad Autonóma de Buenos Aires, ARGENTINA
ASMCC 6010	maritimeradio@ixmail.co.za	ASMCC Telkom SA, Maritime Services Private Bag XI, Milnerton 7435, SOUTH AFRICA
AUMCC 5030	rccaus@amsa.gov.au	AusSAR Australian Maritime Safety Authority GPO Box 2181, Canberra City ACT 2601 , AUSTRALIA
BRMCC 7100	brmcc1@cindacta1.aer.mil.br	CINDACTA1 / BRMCC SHIS QI 05 Lago Sul – Area Especial 12 CEP - 71615-600, Brasilia – DF, BRAZIL
CHMCC 7250	chmcc@fach.cl	Fuerza Aerea De Chile, Servicio SAR Correo Los Cerrillos, Santiago, CHILE
CMC 2730	cmc@morflot.ru	1/4 Rozhdestvenka St. Moscow 103759 RUSSIA
CMCC 3160	cmcc@dnd.ca	CMCC / RCC 8 Wing Trenton, Cdn Forces STN 1000 Astra, Ontario, CANADA KOK 3W0
CNMCC 4120	cnmcc@mail.eastnet.com.cn	CNMCC China Maritime, Search and Rescue Centre 11 Jianguomennei Avenue Beijing, CHINA (P.R.of) 100736
FMCC 2270	fmcc@cnes.fr	CNES - Centre Spatial de Toulouse Cospas-Sarsat FMCC – bpi 903 18 avenue Edouard Belin 31401 Toulouse Cedex 9, FRANCE
HKMCC 4770	hkmrcc@mardep.gov.hk	Marine Department Search and Rescue Section G.P.O.Box 4155, Hong Kong, CHINA
IDMCC 5250	basarnas@indo.net.id	National SAR Agency (Badan SAR National) JL. Medan Merdeka Timur 5 Jakarta 10110 INDONESIA
INMCC 4190	*inmcc@istrac.org* ~~inmcc@istrac.vsnl.net.in~~ ~~inmcc@istrac.gov.in~~	ISTRAC / ISRO Department of Space, Plot No.12 Peenya Industrial Estate Peenya Bangalore-560058, INDIA
ITMCC 2470	~~itmcc247@infinito.it~~ ~~itmcc.gismondi@infinito.it~~ *itmcc247@cospas-sarsat-italy.it* *itmccdirector@cospas-sarsat-italy.it* *itmccvicedir@cospas-sarsat-italy.it*	*ITMCC,* Stazione Satellitare Cospas/Sarsat Lungomare Starita, 5 Bari 70123 ITALY
JAMCC 4310	jamcc@kaiho.mlit.go.jp	Japan Coast Guard (JCG) Operation Centre - JAMCC 2-1-3 Kasumigaseki Chiyodaku Tokyo 100-8989, JAPAN

Table II / A.1 : Details of MCCs (1/2) (Cont.)

MCC Name/ Code	Telex	AFTN	Fax	Telephone	X.25
KOMCC 4400	(801) 45502 KOMCC	-	(82.42) 8612331	(82.42) 8612330	4500 421 1061
NIMCC* 6570	-	-	(234) 94131749	(234) 94134341	-
NMCC 2570	-	ENBOYCYX	(47) 75524200	(47) 75559000	Number provided on a need to know basis
PAMCC 4630	-	-	(92.42) 5220756	(92.42) 5220517	Number provided on a need to know basis
PEMCC 7600	26042_PE_DICAPI	-	(51.1) 4291547	(51.1) 4202020	71 6014 0007 0504 (receive only) 71 6014 0007 0506 (transmit only)
SAMCC 4030	-	OEJNJSAR	(966.2) 6854021	(966.2) 6855033 6855038 6855812	165 704 102
SIMCC 5630	20622 SIMCC	WSSSCSRS	(65) 65422548	(65) 65425024 65412668	Number provided on a need to know basis
SPMCC 2240	95008 SPMCC	GCMPZSZX	(34.928) 727107	(34.928) 727104 727105 727106	Number provided on a need to know basis
TAMCC 4160	(769) 26200 TAMCC TP	RCTPRESX	(886.2) 25046754	(886.2) 87703661 25046284	0487 622 591
THMCC 5670	*22720 BKKRCCTH* ~~T.B.D.~~	VTBAYCYX	(66.2) 2873186 (66.2) 2855452	(66.2) 2860506 (66.2) 2860594	Number provided on a need to know basis
TRMCC *2710*	-	*LTACZSZX* ~~*LTACDNZM*~~	*(90.312)* *2312902*	*(90.312)* *2313374*	*028634112107124* ~~*4112 107 124*~~
UKMCC 2320	75194 UKMCCK G	EGQPZSZX	(44.1309) 678308 678309	(44.1343) 836015 (44.1309) 672469	*Address* ~~Number~~ provided on a need to know basis
USMCC 3660 *Back-up Facility*	6737651 USMCC *(same as above)*	KZDCZSZA *KZDCZSZC*	(1.301) 4575406 *(1.301)* *7946535*	(1.301) 4575428 *(1.301)* *7946536*	Number provided on a need to know basis *Address to be provided on a need to know basis.*
VNMCC 5740	805311282 VNMCC VT	-	(84.31) 842979	(84.31) 822181	452297331015

Table II / A.1 : Details of MCCs (2/2) (Cont.)

MCC Name/ Code	E-mail	Mailing Address
KOMCC 4400	komcc2@kornet.net	Korea National Maritime Police Agency KARI Building, Room 501, 45 Eoeun dong Yuseong gu Daejeon, KOREA, 305-333
NIMCC* 6570	nema@rosecom.net	NEMA, Plot 439, Ademola Adetokunbo Crescent Maitama, P.M.B. 357, Garki, Abuja, Nigeria
NMCC 2570	mailto@jrcc-bodoe.no	HOVEDREDNINGS-SENTRALEN NORD-NORGE, Box 1016 8001 Bodoe, NORWAY
PAMCC 4630	sclhr@brain.net.pk	Satellite Research and Development Centre Samsani Road, P.O.Punjab University Lahore – 54590, PAKISTAN
PEMCC 7600	pemcc@marina.mil.pe	Centro de Control de Misiones del Peru Calle Constitucion 150 Callao 1 PERU
SAMCC 4030	salemjahdli@hotmail.com	SAMCC PCA P.O.Box 929, Jeddah 21421 SAUDI ARABIA
SIMCC 5630	raymond_seah@caas.gov.sg (office hours only)	MCC Singapore Singapore Air Traffic Control Centre (SATCC) Biggin Hill Road, Singapore 509950 REPUBLIC OF SINGAPORE
SPMCC 2240	spmcc@inta.es	Cospas-Sarsat / SPMCC INTA, Centro Espacial de Canarias, Aptdo.29 35100 Maspalomas, Las Palmas, SPAIN
TAMCC 4160	tamcc@ms23.hinet.net	Taipei Mission Control Centre Ministry of Communications and Transportation 362 Pin-Kiang Street, Taipei
TRMCC 2710	*trmcc@denizcilik.gov.tr*	*TRMCC, Denizcilik Mustesarligi* *G.M.K. Bul No: 128/A* *Maltepe/Ankara/Turkey*
THMCC 5670	bkkrcc@aviation.go.th	THMCC, Flight Safety Bureau, Department of Aviation 71 Soi Ngamdupliee, Rama IV Road, Sathorn Bangkok 10120, Thailand
UKMCC 2320	ukmcc@atlas.co.uk	UKMCC ARCC Kinloss, RAF Kinloss Forres, Moray IV36 3UH UNITED KINGDOM
USMCC 3660	usmcc@noaa.gov	USMCC E/SP3, RM 3320, FB-4 NOAA, 5200 Auth Road Suitland, MD 20746-4304, USA
VNMCC 5740	vnmcc@vishipel.com.vn vnmcc@vishipel.com	VNMCC 02, Nguyen Thuong Hien Street Haiphong City, Vietnam

Notes: T.B.D. To be determined.
* Under development.

Table II / A.2 : Summary Status of MCCs (1/2)

as of: *14 June 2005* ~~7 October 2004~~

MCC Name / Location	Data Distribution Region	MCC Code	Status	Comments
ALMCC (Algiers, Algeria)	*South* Central DDR	6050	FOC	*See SPMCC*
ARMCC (Ezeiza, Argentina)	Western DDR	7010	FOC	*Staffed 24 / 7*
ASMCC (Cape Town, South Africa)	Southwest Pacific DDR	6010	FOC	*Staffed 24 / 7*
AUMCC (Canberra, Australia)	Southwest Pacific DDR	5030	FOC	Nodal MCC *Staffed 24 / 7*
BRMCC (Brasilia, Brazil)	Western DDR	7100	FOC	*Staffed 24 / 7*
CHMCC (Santiago, Chile)	Western DDR	7250	FOC	*Staffed 24 / 7*
CMC (Moscow, Russia)	Eastern DDR	2730	FOC	Nodal MCC
CMCC (Trenton, Canada)	Western DDR	3160	FOC	*Staffed 24 / 7*
CNMCC (Beijing, P. R. of China)	*Northwest Pacific* DDR	4120	FOC	
FMCC (Toulouse, France)	Central DDR	2270	FOC	Nodal MCC *Staffed 24 / 7*
HKMCC (Hong Kong, China)	Northwest Pacific DDR	4770	FOC	*Staffed 24 / 7*
IDMCC (Jakarta, Indonesia)	Southwest Pacific DDR	5250	FOC	
INMCC (Bangalore, India)	Eastern DDR	4190	FOC	*Note b*
ITMCC (Bari, Italy)	Central DDR	2470	FOC	*Staffed 24 / 7*
JAMCC (Tokyo, Japan)	Northwest Pacific DDR	4310	FOC	Nodal MCC *Staffed 24 / 7*
KOMCC (Daejeon, R. of Korea)	Northwest Pacific DDR	4400	FOC	
NIMCC (Abuja, Nigeria)	*South* Central DDR	6570	Under development (a)	*See SPMCC*
NMCC (Bodoe, Norway)	Central DDR	2570	FOC	*Staffed 24 / 7*
PAMCC (Lahore, Pakistan)	Eastern DDR	4630	Under development (a)	Upgrading in progress
PEMCC (Callao, Peru)	Western DDR	7600	FOC	
SAMCC (Jeddah, Saudi Arabia)	Southwest Pacific DDR	4030	FOC	
SIMCC (Singapore, Singapore)	Southwest Pacific DDR	5630	FOC	
SPMCC (Maspalomas, Spain)	Central DDR	2240	FOC	*Nodal for new South Central DDR, at IOC* *Staffed 24 / 7*
TAMCC (ITDC/Taipei MCC)	Northwest Pacific DDR	4160	FOC	

Table II / A.2 : Summary Status of MCCs (2/2)

as of: *14 June 2005* ~~7 October 2004~~

MCC Name / Location	Data Distribution Region	MCC Code	Status	Comments
THMCC (Bangkok, Thailand)	Southwest Pacific DDR	5670	FOC	
TRMCC (Ankara, Turkey)	*Central DDR*	*2710*	*Under development*	
UKMCC (Kinloss, UK)	Central DDR	2320	FOC	*Staffed 24 / 7*
USMCC (Suitland, USA)	Western DDR	3660	FOC	Nodal MCC *Staffed 24 / 7*
USMCC Back-up Facility	*(same as above)*	*(same as above)*		*(same as above)*
VNMCC (Haiphong, Vietnam)	Northwest Pacific DDR	5740	Under development (a)	

Notes: (a) MCCs under development could change their status to operational before the next revision of this document.

(b) Manned from Monday to Saturday between 03-30 UTC and 12-00 UTC
During un-manned hours contact:
ISTRAC - Phone: (91.80) 28376029 or (91.80) 28094534, Fax: (91.80) 28094444
Mr. N. K. Shrivastava - Phone: (91.80) 23456954 or (91.80) 28094546
Mr. P. Soma - Phone: (91.80) 26667800 or (91.80) 28094583
Mr. S. K. Shivakumar - Phone: (91.80) 26660708 or (91.80) 28094581 or (91) 98455070935

Table II / A.3 : MCCs Contact Numbers for Automated Exchange of SIT Messages

MCC Name	Telex	AFTN	X.25
ALMCC	65550_ MCCDZ	DAALZSZX	Number provided on a need to know basis
ARMCC	(33) 9100 FUAER AR	SAEZZSZX	- ~~7227 3191 8992~~
ASMCC	(95) 521850 ASMCC	T.B.D.	6550 1263 1642
AUMCC[1]	(71) 62349 MRCCAUS AA62349 * * = Receive only	YSARYCYX	5052 6275 203250* 5052 6275 2032** * = Receive only ** = Transmit only
BRMCC	611018 MAERBR	SBBRZSZX	*724 1613 0123* ~~1613 0123~~
CHMCC	~~340692 CHMCC CK~~	SCTIZSZX	73 0220 0120 3200
CMC[2]	113934 MKVC RU	UUUUYCYX	Number provided on a need to know basis
CMCC	-	CYTRZSYX	3020 2390 0035
CNMCC	Receive - 210395 CNMCC CN Transmit - 210396 CNMCC CN	ZBBBZSZX	4603 2021 2182
FMCC	530800 NCSAR A 530013 MCSAR U	LFIAZSZX	02080 31149 42114 02080 31060 36014
HKMCC	(802) 70428 HKLUT HX	VHHHZSZX	4545 4532 5102
INMCC	-	VOBGYCYS	-
IDMCC	(796) 43586 SARJKT	T.B.D.	T.B.D.
ITMCC[3]	811375	LIBDZSZX	0222 2800 0238
JAMCC	- ~~J22853 JAMCC~~	-	Number provided on a need to know basis
KOMCC	(801) 45502 KOMCC	-	4500 421 1061
NIMCC*	T.B.D.	T.B.D.	T.B.D.
NMCC	-	ENBOYCYX	Number provided on a need to know basis
PAMCC	T.B.D.	T.B.D.	T.B.D.
PEMCC	26043 PE	T.B.D.	71 6014 0007 0504 (receive only) 71 6014 0007 0506 (transmit only)
SAMCC	T.B.D.	OEJNJSAR	165 704 101
SIMCC	20622 SIMCC	WSSSCSRS	Number provided on a need to know basis
SPMCC	95008 SPMCC	GCMPZSZX	Number provided on a need to know basis
TAMCC	T.B.D.	T.B.D.	T.B.D.
THMCC	*22720 BKKRCCTH* ~~T.B.D.~~	VTBAYCYX	Number provided on a need to know basis
TRMCC	-	*LTACZSZX* ~~LTACDNZM~~	*028634112107124* ~~*4112 107 124*~~
UKMCC	75194 UKMCCK G	EGQPZSZX	Number provided on a need to know basis
USMCC	6737651 USMCC	KZDCUSMC	*Address* ~~Number~~ provided on a need to know basis
USMCC Back-up Facility	*(same as above)*	*KZDCZSZC*	*(same as above)*
VNMCC	805311282 VNMCC VT	-	452297331015

Notes: T.B.D. To be determined.
(1) E-mail address for SIT alerts only: aumcc@amsa.gov.au
(2) E-mail address for SIT 915 only: cmc@morflot.ru
(3) E-mail address for SIT alerts only: itmccoperator@cospas-sarsat-italy.it
* Under development.

- END OF ANNEX II / A -

Table II / B.1 : Details and Status of LEOLUTs

as of: *14 June 2005* ~~7 October 2004~~

Ground Segment Operator	LEOLUT Name	Code	Associated MCC	Location		LEOLUT Commis. Report	G-SARP Comms. Report	Status	Comments
				Latitude	Longitude				
Algeria	Ouargla	6051	ALMCC	31° 52.80' N	005° 29.40' E	JC-10	JC-10	FOC	
	Algiers	6052		*36° 45.20' N* ~~T.B.D.~~	*003° 22.86' E* T.B.D.	*JC-19* ~~T.B.D.~~	*JC-19* ~~T.B.D.~~	*IOC* ~~T.B.D.~~	
Argentina	*Rio Grande*	7012	ARMCC	53° 46.75' S	067° 42.32' W	JC-16	JC-10	FOC	
	Parana	7013		31° 47.65' S	060° 28.83' W	JC-16	JC-10	FOC	
Australia	Bundaberg	5032	AUMCC	24° 45.50' S	152° 24.77' E	*JC-18* ~~JC-10~~	*JC-18* ~~JC-10~~	FOC	
	Albany	5033		35° 07.20' S	117° 53.94' E	*JC-19* ~~JC-10~~	*JC-19* ~~JC-10~~	FOC	
Brazil	Brasilia	7101	BRMCC	15° 51.43' S	047° 54.16' W	JC-18	JC-18	IOC	
	Recife	7102		08° 08.30' S	034° 55.50' W	JC-18	JC-18	IOC	
	Manaus	7103		03° 01.*86*~~84~~' S	060° 02.*46*~~07~~' W	*JC-19* ~~T.B.D.~~	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	
Canada	Goose Bay	3161	CMCC	53° 18.76' N	060° 27.96' W	JC-18	JC-18	*FOC* ~~IOC~~	
	Churchill	3162		58° 45.54' N	093° 59.64' W	JC-18	JC-18	*FOC* ~~IOC~~	
	Edmonton	3163		53° 40.69' N	113° 18.97' W	JC-18	JC-18	*FOC* ~~IOC~~	
	Ottawa	3168		45° 19.72' N	075° 40.47' W	*JC-19* ~~T.B.D.~~	*JC-19* ~~T.B.D.~~	*FOC* ~~IOC~~	Test facility
Chile	Santiago	7251	CHMCC	33° 29.70' S	070° 42.24' W	JC-10	JC-10	FOC	
	Punta Arenas	7252		53° 00.36' S	070° 50.82' W	JC-11	JC-11	FOC	
	Easter Island	7254		27° 09.01' S	109° 26.22' W	JC-15	JC-15	FOC	
China (P.R.of)	Beijing (1)	4121	CNMCC	39° 54.47' N	116° 00.42' E	JC-11	JC-11	FOC	
	Beijing (2)	4122		39° 54.47' N	116° 00.42' E	JC-11	JC-11	FOC	
France	Toulouse (1)	2271	FMCC	43° 33.64' N	001° 28.85' E	JC-18	JC-18	FOC ~~IOC~~	
	~~Toulouse (2)~~	~~2272~~		~~43° 33.63' N~~	~~001° 28.85' E~~	~~JC-8~~	~~JC-9~~	~~FOC~~	
	Toulouse *(2)*	*2272*		43° 33.63' N	001° 28.85' E	JC-18	JC-18	*FOC*	~~For Toulouse (2) replacement~~
Hong Kong, China	Hong Kong (1)	4771	HKMCC	22° 16.56' N	114° 08.76' E	JC-10	JC-10	FOC	
	Hong Kong (2)	4772		22° 16.56' N	114° 08.76' E	JC-10	JC-10	FOC	
India	Bangalore	4191	INMCC	13° 02.09' N	077° 30.70' E	JC-17	JC-17	FOC	
	Lucknow	4192		26° 54.80' N	080° 57.44' E	JC-5	JC-17	FOC	
Indonesia	Ambon	5251	IDMCC	03° 42.21' S	128° 05.38' E	JC-8		N	
	Jakarta	5252		06° 07.53' S	106° 39.47' E	JC-8		FOC	
Italy	Bari	2471	ITMCC	41° 08.26' N	016° 50.86' E	JC-14	JC-14	FOC	

Ground Segment Operator	LEOLUT Name	Code	Associated MCC	Location		LEOLUT Commis. Report	G-SARP Comms. Report	Status	Comments
				Latitude	Longitude				
ITDC	Keelung (1)	4161	TAMCC	25° 08.10' N	121° 45.42' E	***JC-11***	JC-11	FOC	
	Keelung (2)	4162		25° 08.10' N	121° 45.42' E	JC-11	JC-11	FOC	
Japan	Yokohama (1)	4311	JAMCC	35° 21.59' N	139° 35.63' E	JC-11	JC-11	FOC	
	Yokohama (2)	4312		35° 21.59' N	139° 35.63' E	JC-11	JC-11	FOC	
Korea	Daejeon (1)	4401	KOMCC	36° 22.50' N	127° 21.30' E	JC-10	JC-10	FOC	
	Daejeon (2)	4402		36° 22.50' N	127° 21.30' E	JC-10	JC-10	FOC	
New Zealand	Wellington	5121	AUMCC	41° 09.12' S	175° 30.27' E	*JC-19* ~~JC-11~~	*JC-19* ~~JC-11~~	FOC	
Nigeria	Abuja	6571	NIMCC	09° 04.56' N	007° 29.58' E	JC-18	JC-18	IOC	
Norway	Tromsoe	2571	NMCC	69° 39.74' N	018° 56.42' E	JC-7	JC-10	FOC	
	Spitsbergen	2573		78° 13.74' N	015° 23.76' E	JC-17	JC-17	FOC	
Pakistan	Lahore	4631	PAMCC	31° 28.80' N	074° 15.60' E	JC-6&CSC-9		FOC	Data not distributed internationally. See note *
Peru	Callao	7601	PEMCC	12° 01.62' S	077° 07.62' W	JC-10	JC-10	FOC	
Russia	Moscow[a]	2731	CMC	55° 37.20' N	037° 30.48' E	Note (b)		N	
	Arkhangelsk[a]	2732		64° 22.60' N	040° 36.52' E	Note (b)		FOC	See note **
	Nakhodka[a]	2733		42° 51.50' N	132° 47.37' E	Note (b)		FOC	See note **
	Novosibirsk[a]	2734		54° 35.40' N	082° 22.20' E	Note (b)		N	
Saudi Arabia	Jeddah (1)	4031	SAMCC	21° 39.90' N	039° 08.76' E	T.B.D.	T.B.D.	UD	See notes * and **
	Jeddah (2)	4032		21° 39.90' N	039° 08.76' E	JC-14	JC-14	FOC	
Singapore	Singapore (1)	5631	SIMCC	01° 21.*12*~~30~~' N	103° 59.*28*~~43~~' E	*JC-19* ~~JC-6~~	*JC-19*	*IOC* ~~FOC~~	
	~~Singapore (2)~~	~~5632~~		~~01° 21.30' N~~	~~103° 59.43' E~~	~~JC-6~~	~~JC-11~~	~~FOC~~	
South Africa	Cape Town	6011	ASMCC	33° 52.80' S	018° 30.00' E	JC-13	JC-13	FOC	
Spain	Maspalomas	2241	SPMCC	27° 45.84' N	015° 38.04' W	JC-7	JC-10	FOC	
Thailand	Bangkok (1)	5671	THMCC	13° 43.03' N	100° 32.60' E	JC-18	JC-18	FOC	
	Bangkok (2)	5672		13° 43.03' N	100° 32.59' E	JC-18	JC-18	FOC	
Turkey	*Ankara (1)*	*2711*	*TRMCC*	*40° 08.45' N*	*032° 59.38' E*	*JC-19*	*JC-19*	*IOC*	
	Ankara (2)	*2712*		*40° 08.44' N*	*032° 59.38' E*	*JC-19*	*JC-19*	*IOC*	
UK	Combe Martin	2321	UKMCC	51° 10.20' N	004° 03.06' W	JC-18	JC-18	IOC	
USA	Alaska 1 (AK1)	3031	USMCC	64° 58.42' N	147° 31.04' W	JC-18	JC-18	FOC	
	Alaska 2 (AK2)	3032		64° 58.41' N	147° 31.06' W	JC-18	JC-18	FOC	
	Hawaii 1 (HI1)	3381		21° 31.24' N	157° 59.78' W	JC-18	JC-18	FOC	

Ground Segment Operator	LEOLUT Name	Code	Associated MCC	Location		LEOLUT Commis. Report	G-SARP Comms. Report	Status	Comments
				Latitude	Longitude				
USA (Cont.)	Hawaii 2 (HI2)	3382		21° 31.24' N	157° 59.78' W	JC-18	JC-18	FOC	
	Guam 1 (GU1)	3383		13° 34.70' N	144° 56.34' E	JC-18	JC-18	FOC	
	Guam 2 (GU2)	3384		13° 34.70' N	144° 56.35' E	JC-18	JC-18	FOC	
	~~Texas 1 (TX1)~~	~~3661~~		~~29° 33.60' N~~	~~095° 05.58' W~~	~~JC-7~~	~~JC-9~~	~~FOC~~	
	~~Texas 2 (TX2)~~	~~3662~~		~~29° 33.66' N~~	~~095° 05.52' W~~	~~JC-7~~	~~JC-9~~	~~FOC~~	
	Florida 1 (FL1)	3663		25° 36.*96*~~87~~' N	080° 23.03' W	JC-18	JC-18	FOC	
	Florida 2 (FL2)	3664		25° 36.98' N	080° 23.03' W	JC-18	JC-18	FOC	
	~~Maryland (OSE)~~	~~3665~~		~~38° 48.62' N~~	~~076° 53.53' W~~	~~JC-7~~	~~JC-10~~	~~FOC~~	
	California 1 (CA1)	3667		34° 39.*75*~~78~~' N	120° 33.*09*~~12~~' W	JC-7	*JC-19* ~~JC-10~~	*IOC* ~~FOC~~	
	California 2 (CA2)	3668		34° 39.*74*~~66~~' N	120° 33.*10*~~18~~' W	JC-7	*JC-19* ~~JC-10~~	*IOC* ~~FOC~~	
	Maryland (LSE)	3673		38° *51.00* ~~30.60~~' N	076° 55.80' W	JC-18	JC-18	IOC	
Vietnam	Haiphong	5741	VNMCC	20° 48.07' N	106° 42.60' E	JC-18	JC-18	IOC	

<u>Notes</u>:
- (a) Indicates that this LUT location has not yet been provided in the Bureau International de l'Heure (BIH) Geodetic Reference System.
- (b) LUT commissioned as per CSC-5 decision.
- N Not operational.
- NA Not available.
- ~~OSE Operational Support Equipment (located at Suitland, Maryland).~~
- LSE LEOSAR Support Equipment (located at Suitland, Maryland).
- T.B.D. To be determined.
- UD Under development(could change their status to operational before the next revision of this document).
- IOC Initial Operational Capability.
- FOC Full Operational Capability.
- * Implementation of C/S T.002 (Issue 3) has not been confirmed.
- ** Implementation of new location protocol (C/S T.001) has not been confirmed.

Table II / B.2 : Details and Status of GEOLUTs

as of: *14 June 2005* ~~7 October 2004~~

Ground Segment Operator	GEOLUT Name	Code	Associated MCC	Location: Latitude	Location: Longitude	Operational Satellite	GEOLUT Commis. Report	Status	Comments
Algeria	*Algiers*	6053	ALMCC	*36° 45.20'N* ~~T.B.D.~~	*003° 22.86' E* ~~T.B.D.~~	MSG-1	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	
Argentina	*Ezeiza*	7011	ARMCC	34° 49.48' S	058° 33.30' W	GOES-12	JC-16	FOC	
Brazil	Brasilia	7104	BRMCC	15° 51.43' S	047° 54.16' W	GOES-12	JC-16	FOC	
	Recife	7105		08° 08.30' S	034° 55.50' W	GOES-12	JC-17	FOC	
Canada	Edmonton	3166	CMCC	53° 40.69' N	113° 18.97' W	GOES-10	JC-18	*FOC* ~~IOC~~	
	Ottawa (1)	3167		45° 20.63' N	075° 40.46' W	GOES-12	JC-16	FOC	
	Ottawa (2)	3169		45° 20.63' N	075° 40.46' W	GOES-12 / 10	T.B.D.	UD	Test facility
Chile	*Santiago*	7253	CHMCC	33° 29.70' S	070° 42.23' W	GOES-12	JC-16	FOC	
France	Toulouse	2273	FMCC	43° 33.52' N	001° 28.85' E	MSG-1	JC-18	*FOC* ~~IOC~~	
India	Bangalore	4193	INMCC	13° 02.09' N	077° 30.70' E	INSAT-3A	T.B.D.	F	
New Zealand	Wellington (1)	5122	AUMCC	41° 09.12' S	175° 30.27' E	GOES-10	JC-14	FOC	
	Wellington (2)	5123		41° 09.12' S	175° 30.27' E	GOES-9	JC-18	FOC	
Norway	*Fauske* ~~Bodoe~~	2572	NMCC	67° 14.*22*~~12~~' N	015° *18*~~17~~.*12*~~83~~' E	MSG-1	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	
Spain	Maspalomas (1)	2242	SPMCC	27° 45.84' N	015° 38.04' W	GOES-12	JC-16	FOC	
	Maspalomas (2)	2243		27° 45.84' N	015° 38.04' W	MSG-1	*JC-19* ~~T.B.D.~~	*IOC* ~~F~~	
Turkey	*Ankara*	*2713*	*TRMCC*	*40° 08.42*~~3~~*' N*	*032° 59.40' E*	*MSG-1*	*JC-19*	*IOC*	
UK	Combe Martin	2322	UKMCC	51° 10.*05*~~20~~' N	004° *02*~~03~~.*83*~~06~~' W	MSG -1	*JC-19* ~~T.B.D.~~	*IOC* ~~F~~	*GOES-12 is used as a standby satellite when needed (commissioning report agreed at JC-14)*
USA	Maryland (1)	3674		*38° 51.02' N* ~~T.B.D.~~	076° 55.80' W ~~T.B.D.~~	GOES-12	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	
	GSE	3675		*38° 51.02' N* ~~T.B.D.~~	076° 55.80' W ~~T.B.D.~~	GOES-10/GOES-12	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	Spare/Test facility
	Maryland (2)	3676		*38° 51.02' N* ~~T.B.D.~~	076° 55.80' W ~~T.B.D.~~	GOES-10	*JC-19* ~~T.B.D.~~	*IOC* ~~UD~~	

Notes:
F Functional (functional GEOLUTs have not been commissioned, however, alert data are used operationally).
GSE GEOSAR Support Equipment. UD Under development. T.B.D. To be determined.
O Operational. IOC Initial Operational Capability. FOC Full Operational Capability.

- END OF ANNEX II / B -

II / C.AL ALMCC - ALGERIAN MISSION CONTROL CENTRE

1. GENERAL

The Algerian Mission Control Center is located at Algiers. The ALMCC controls one LEOLUT at Ouargla (see location at Annex II / B).

The Ouargla LEOLUT 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 LEOLUT has a three-frequency capability (121.5/243/406 MHz). It can localize transmitters and distress beacons in local mode and also 406 MHz Cospas-Sarsat distress beacons in the global mode. Interferers in the 406.0 to 406.1 MHz band are localized in the local mode and this information is provided to the Algerian Telecommunication for action through the ITU.

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

2. SPOCs SUPPORTED

ALMCC provides 121.5 MHz and 406 MHz alert data to SPOCs in the ALMCC service area including:

Algeria	Libya
Burkina Faso	Niger
Egypt	

It also routes alert messages to ~~FMCC, ITMCC, NMCC~~, SPMCC, ~~and UKMCC~~ and can receive these messages from *this* ~~these~~ sources.

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

A communication summary for these interfaces is shown below:

Algerian RCC:	AFTN, Telex, Fax, Voice
~~FMCC:~~	~~X.25, AFTN, Telex, Fax, Voice~~
~~ITMCC:~~	~~X.25, AFTN, Telex, Fax, Voice~~
~~NMCC:~~	~~X.25, AFTN, Fax, Voice~~
NIMCC:	*T.B.D.*
SPMCC:	~~X.25,~~ AFTN, *FTPV*, ~~Telex~~, Fax, Voice
~~UKMCC:~~	~~AFTN, Telex, Fax, Voice~~

3. NOTIFICATION SERVICE

Algeria has requested the Cospas-Sarsat notification service (NOCR). The ALMCC provides NOCR service to these countries wishing to be notified according to the notification procedures of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. SYSTEM INFORMATION MESSAGES

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

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

5. BACK-UP 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.

LUT operators will forward written notice of intention to perform maintenance routines involving deactivation of the LUT well in advance. The MCC will inform all other MCCs as soon as a decision has been taken and will confirm the times a minimum of two weeks prior to deactivation.

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

6. OTHER INFORMATION

To be determined.

- END OF THIS SECTION -

II / C.AR ARMCC – ARGENTINE MISSION CONTROL CENTRE

1. GENERAL

The Argentine Mission Control Centre (ARMCC) is located at Ezeiza, the site of the main international airport serving Buenos Aires. The ARMCC controls two LEOLUTs and one GEOLUT at the following locations:

	Latitude	Longitude
a. Ezeiza GEOLUT	34^{o} 49.48' S	058^{o} 33.30' W
b. Rio Grande LEOLUT	53^{o} 46.75' S	067^{o} 42.32' W
c. Parana LEOLUT	31^{o} 47.65' S	060^{o} 28.83' W

The Argentine LEOLUTs provide full processing of the 121.5 MHz, 243.0 MHz, and 406 MHz frequency bands, including G-SARP processing of the transponded 406 MHz 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, Paraquay, Uruguay, Chile, part of Antarctica, the Southwestern Atlantic Ocean and Southeastern Pacific Ocean.

The Argentine GEOLUT receives data from the GOES-*12*~~East~~ satellite and provides it to the ARMCC for distribution and to the LEOLUTs for combined LEO/GEO processing. *Although the LEOLUTs are capable of performing LEO/GEO processing since the system was installed, combined LEO/GEO alert data are still not delivered, as the facility has not been commissioned yet.*

The communication interfaces available at the ARMCC are ~~X.25~~, Telex, AFTN, *FTPV,* Voice and Fax. These communication means are used as follows:

ARMCC-USMCC:	*FTPV*	AFTN	~~X.25~~	Telex
ARMCC-RCCs:	AFTN			
ARMCC-Malvinas/Falkland Islands:	Facsimile	Voice		
ARMCC-CHMCC:	AFTN	~~X.25~~		

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.

2. SPOCs SUPPORTED

The ARMCC supports the RCCs in Argentina and Falkland Islands / Malvinas 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.

3. NOTIFICATION SERVICE

Australia has requested the Cospas-Sarsat notification service (NOCR). The AUMCC will provide NOCR service to those countries wishing to be notified in accordance with the provisions of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

The AUMCC has requested the ambiguity resolution message and 406 MHz interference message.

4. 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, SAMCC and SIMCC;
SARP calibration:	receive from FMCC and forward to ASMCC, IDMCC, SAMCC and SIMCC;
System status:	originate, receive and forward from/to ASMCC, CMC, FMCC, IDMCC, JAMCC, SAMCC, SIMCC, *SPMCC* and USMCC.

5. BACK-UP PROCEDURES AND AGREEMENTS

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

An agreement is in place with the USMCC to provide back-up 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. contact the IDMCC and SIMCC and advise them to divert all their traffic to the USMCC and to expect System information direct from the USMCC;

c. 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

d. 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.

SPMCC: *T.B.D.*
USMCC: FTP, X.25, Telex

3. NOTIFICATION SERVICE

Russia has requested the Cospas-Sarsat notification service (NOCR).

The CMC provides notification NOCR service in accordance with the provisions of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. 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. BACK-UP PROCEDURES AND AGREEMENTS

The Russian LEOLUTs in Moscow and Arkhangelsk have largely overlapping local mode coverage areas, which is taken into account in planning satellite pass processing so that one LEOLUT backs up the other in the case of failure or planned maintenance downtime. In the event of CMC equipment failure, alert messages may be received or transmitted by telephone. If the CMC is inoperative, Russian LEOLUTs forward their alert data to national RCCs.

All alert information obtained at CMC is archived for up to 90 days.

The provisions of the back-up agreement between the AUMCC, FMCC, USMCC and the CMC to provide support in case of failure of the CMC are as follows:

- CMC by means of any available communication facility will inform back-up MCCs about the failure;
- CMC will provide fax, telephone numbers and e-mail address to communicate with;
- AUMCC will cover CMC, INMCC and PAMCC service areas;
- FMCC will cover the CMC SPOCs in Europe;
- USMCC will provide System information if required;
- the data will be transmitted in SITs 185, 915 and 215.

6. OTHER INFORMATION

Registration of 406 MHz beacons

A register on national units equipped with 406 MHz beacons is maintained at the CMC.

- END OF THIS SECTION -

Alert data to French overseas territories:

- Reunion Islands and Mayotte (Indian Ocean);
- French Antilles, French Guiana and Surinam (South American Region);
- French Polynesia (Pacific Region).

The listed countries are part of the FMCC service area, unless they indicate that they wish to receive the alert data from another MCC or start operation of their own LEOLUT/MCC. The list of SPOCs used by the French MCC is provided at Annex I / D.

Cospas-Sarsat alerts localised inside the FMCC service area are forwarded to the responsible SPOC or RCC. For alerts localized inside the FMCC service area in a country which has not designated a SPOC, the FMCC forwards alert data to the CROSS Gris Nez for handling in accordance with agreed international SAR regulation.

The FMCC uses the following communication interfaces:

French RCCs:	-	AFTN	Telex	Voice	Fax
~~ALMCC:~~	~~X.25~~	~~AFTN~~	~~Telex~~	~~Voice~~	~~Fax~~
AUMCC	X.25	AFTN	Telex	Voice	Fax
CMC:	X.25	AFTN	Telex	Voice	Fax
ITMCC:	X.25	AFTN	Telex	Voice	Fax
JAMCC:	X.25	AFTN	Telex	Voice	Fax
NMCC:	X.25	AFTN	-	Voice	Fax
SPMCC:	X.25	AFTN	Telex	Voice	Fax
UKMCC:	X.25	AFTN	Telex	Voice	Fax
USMCC:	X.25	AFTN	Telex	Voice	Fax

The FMCC cooperates with the ALMCC, CMC, CMCC, ITMCC, NMCC, SPMCC, UKMCC and USMCC to resolve ambiguity on 121.5 MHz signals within mutual LUT coverage.

3. NOTIFICATION SERVICE

France has requested the Cospas-Sarsat notification service (NOCR). The FMCC provides Cospas-Sarsat NOCR service to countries wishing to be notified, according to the notification procedures of the document “Cospas-Sarsat Data Distribution Plan” (C/S A.001).

4. 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 ~~ALMCC~~, ITMCC, NMCC, ~~SPMCC~~, and UKMCC;
SARP calibration:	originate to ~~ALMCC~~, AUMCC, CMC, ITMCC, JAMCC, NMCC, SPMCC, UKMCC and USMCC.

5. BACK-UP PROCEDURES AND AGREEMENTS

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

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.

The 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 service area and/or within other areas to designated SPOCS or RCCs.

In the case of complete failure or unavailability of the ITMCC (or the UKMCC), the FMCC will assume the duties of the ITMCC (or the UKMCC). The FMCC will send validated Cospas-Sarsat alert data within the ITMCC (or the UKMCC) service area and/or within other areas to designated RCCs or SPOCs.

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 ALMCC service area will be directly transmitted to the ALMCC.

6. OTHER INFORMATION

Nil.

- END OF THIS SECTION -

The communication interfaces used by ITMCC are:

X.25	AFTN	Telex	Facsimile	Voice

The Italian MCC cooperates with the FMCC, NMCC, SPMCC and UKMCC to resolve ambiguity on 121.5 MHz signals within mutual LUT coverage area.

3. NOTIFICATION SERVICE

Italy has requested the Cospas-Sarsat notification service (NOCR). The ITMCC provides notification service to those countries wishing to be notified, according to the notification procedure of document C/S A.001 (DDP).

4. 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. BACK-UP PROCEDURES AND AGREEMENTS

The Bari LEOLUT has overlapping local mode coverage areas with the following LEOLUTs: Combe Martin, Maspalomas, Ouargla, Toulouse and Tromsoe. It is feasible for one to back-up 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.

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 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 other MCCs in the Central DDR.

In the case of complete failure or unavailability of the ITMCC, the FMCC will assume the duties of the ITMCC. The FMCC will send validated Cospas-Sarsat alert data within the ITMCC service area and/or within other areas to designated RCCs or SPOCs.

~~In case of failure of the SPMCC, all the MCCs will be notified and the ITMCC will be the back-up MCC assuming the responsibility of alert message distribution within the SPMCC service area. It was agreed to exchange periodically test messages between the ITMCC and the Spanish RCCs (RCC Madrid and CNCS) to check the communication links.~~

System status: originate, receive and forward from/to AUMCC, CMC, FMCC, USMCC, CNMCC, HKMCC, KOMCC, *SPMCC,* TAMCC and VNMCC.

5. BACK-UP 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.

6. OTHER INFORMATION

To be determined.

- END OF THIS SECTION -

II / C.NI NIMCC - NIGERIA MISSION CONTROL CENTRE
(under development)

1. GENERAL

The Nigeria Mission Control Centre is co-located with one LEOLUT in the National Emergency Management Agency Building at the following location:

Latitude	Longitude
09° 04.56' N	007° 29.58' E

The local mode of the Abuja LEOLUT covers Central Africa and the Eastern part of the Atlantic Ocean. The LEOLUT has a dedicated antenna and has three-frequency capability (121.5 MHz, 243 MHz, and 406 MHz). It can locate transmitters and distress beacons radiating on these frequencies in local mode as well as in 406 MHz global mode. The Nigeria MCC and LEOLUT operate 24 hours a day throughout the year and send alert data to MCCs and SPOCs, in accordance with the document "Cospas-Sarsat Data Distribution Plan" (C/S A.001) and national procedures.

2. SPOCs SUPPORTED

Nigeria

3. NOTIFICATION SERVICE

Nigeria has requested the Cospas-Sarsat notification service (NOCR). The NIMCC provides NOCR service to those countries wishing to be notified in accordance with the provisions of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. SYSTEM INFORMATION MESSAGES

The following System information are received/originated at NIMCC:

Orbit vectors: receive from *SPMCC* ~~FMCC~~;
SARP calibration: receive from *SPMCC* ~~FMCC~~;
System status: originate to and receive from *SPMCC* ~~FMCC~~.

5. BACK-UP PROCEDURE AND AGREEMENTS

In case of complete failure of the NIMCC, the SPMCC will assume the duties of the NIMCC. The SPMCC will send validated Cospas-Sarsat alert data within the NIMCC service area to designated SPOCs or RCCs.

~~The NIMCC presently has no back-up agreements with other MCCs. Negotiations to develop procedures for backup with other MCCs will be initiated soon.~~

II / C.NO NMCC - NORWEGIAN MISSION CONTROL CENTRE

1. GENERAL

The Norwegian Mission Control Centre is a combination between the LEOLUTs in Tromsoe and Spitsbergen, and MCC Bodoe. These form the NMCC with the Tromsoe and Spitsbergen LEOLUTs as the technical bodies of the MCC, and MCC Bodoe as the operational body. The NMCC is integrated and co-located with JRCC Bodoe.

Two LEOLUTs are installed at the following locations:

	Latitude	Longitude
Tromsoe	69° 39.74' N	018° 56.42' E
Spitsbergen	78° 13.74' N	015° 23.76' E

The NMCC also provides 406 MHz global mode locations. The NMCC operates 24 hours per day, 7 days a week.

The Ministry of Justice and Police is responsible for the coordination of SAR.

2. SPOCs SUPPORTED

The NMCC provides 121.5 MHz and 406 MHz 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:	X.25	AFTN	Fax	
ALMCC:	X.25	AFTN	Voice	Fax
FMCC:	X.25	AFTN	Voice	Fax
ITMCC:	X.25	AFTN	Fax	
~~SPMCC:~~	~~X.25~~	~~AFTN~~	~~Fax~~	
UKMCC:	X.25	AFTN	Voice	Fax

The NMCC cooperates with CMC, CMCC, FMCC, ITMCC and UKMCC to resolve ambiguity on 121.5 MHz signals within mutual LEOLUT coverage.

3. NOTIFICATION SERVICE

Singapore has requested Cospas-Sarsat notification (NOCR) service. The SIMCC provides Cospas-Sarsat NOCR service to countries wishing to be notified, according to the notification procedures of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. SYSTEM INFORMATION MESSAGES

The SIMCC 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. BACK-UP 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 back-up 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 back-up of the THMCC should the THMCC become unserviceable and messages will be passed via AFTN or fax.

6. OTHER INFORMATION

Registration of 406 MHz distress beacons

A register of national ships equipped with 406 MHz beacons is maintained by the *Maritime and Port Authority* ~~Marine Department, Singapore~~. Users of maritime 406 MHz 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 are maintained by the Civil Aviation Authority of Singapore (CAAS). Users of aviation 406 MHz beacons carried on board Singapore registered aircraft are required to register their beacons with the CAAS. A register for botyh aviation and maritime beacons is available at the SIMCC.

- END OF THIS SECTION -

II / C.SP SPMCC - SPANISH MISSION CONTROL CENTRE

1. GENERAL

The Spanish Mission Control Centre is co-located with one LEOLUT in Instituto Nacional de Técnica Aerospacial (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 has a three-frequency capability (121.5 MHz, 243 MHz and 406 MHz) and can localize transmitters and distress beacons in local mode and also 406 MHz Cospas-Sarsat distress beacons in the global mode. Interferers in the 406.0 MHz to 406.1 MHz band are localized 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 the document "Cospas-Sarsat Data Distribution Plan" (C/S A.001) and national procedures.

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:

Ascension	Equatorial Guinea	Mauritania
Benin	Gabon	Nigeria
Cameroon	Gambia	Sao Tome and Principe
Cape Verde	Ghana	Senegal
Central African Republic	Guinea	Sierra Leone
Congo	Guinea-Bissau	Spain
Côte d'Ivoire	Liberia	Togo
	Mali	

The communication interfaces used by the SPMCC are:

~~X.25 AFTN Telex Voice Facsimile~~

ALMCC:	*X.25*	*AFTN*	*Telex*	
AUMCC:	*X.25*	*AFTN*	*Telex*	
CMC:	*X.25*	*AFTN*	*Telex*	
FMCC:	*X.25*	*AFTN*	*Telex*	*FTPV*
JAMCC:	*FTPV*	*Fax*		
NIMCC:	*Fax*			
USMCC:	*X.25*	*AFTN*	*Telex*	*FTPV*

The SPMCC co-operates with the ALMCC, FMCC, ITMCC, *NIMCC,* NMCC and UKMCC to resolve ambiguity on 121.5 MHz signals within mutual LEOLUT coverage area.

3. NOTIFICATION SERVICE

Spain has requested the Cospas-Sarsat notification service (NOCR). The SPMCC provides NOCR service to those countries wishing to be notified in accordance with the provisions of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. SYSTEM INFORMATION MESSAGES

The following System information are received/originated at SPMCC:

Orbit vectors:	receive from *CMC and USMCC and forward to ALMCC and NIMCC* ~~*FMCC*~~;
SARP calibration:	receive from FMCC *and forward to ALMCC and NIMCC*;
System status:	originate, ~~to and~~ receive *from and forward to ALMCC, AUMCC, CMC,* ~~from~~ FMCC, *JAMCC, NIMCC and USMCC* .

5. BACK-UP PROCEDURE AND AGREEMENTS

The Maspalomas LEOLUT has overlapping local mode coverage areas with the following LEOLUTs: *Abuja*, Bari, Combe Martin, Maspalomas, Ouargla and Toulouse. It is feasible for one to back-up 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 other European 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 ALMCC service area will be directly transmitted to the ALMCC.*

~~In case of failure of the SPMCC, all the MCCs will be notified and the ITMCC will be the back-up MCC assuming the responsibility of alert message distribution within the SPMCC service area. It was agreed to exchange periodically test messages between the Spanish RCCs (RCC Madrid and CNCS) and the ITMCC to check the communication links.~~

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.

6. OTHER INFORMATION

Registration of 406 MHz Beacons

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.

- END OF THIS SECTION -

II / C.TR TRMCC – TURKEY MISSION CONTROL CENTRE

1. 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) and 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 have a three frequency capability (121.5, 243 and 406 MHz) and can localize transmitters and distress beacons radiating on these frequencies in both local mode and 406 MHz global mode.

The TRMCC and LEOLUTs operate 24 hours a day throughout the year.

The communication interfaces used by TRMCC are as follows:

AFTN FTPV X.25 Facsimile Voice

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.

3. NOTIFICATION SERVICE

Turkey is requesting Cospas-Sarsat notification (NOCR) service. The TRMCC will provide Cospas-Sarsat NOCR service to countries wishing to be notified, according to the notification procedures of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

4. SYSTEM INFORMATION MESSAGES

The TRMCC originates and receives the following System information:

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. BACK-UP PROCEDURES AND AGREEMENTS

In case of complete failure of the TRMCC the ITMCC will back up the TRMCC.

6. OTHER INFORMATION

A register of 406 MHz beacons is maintained at the TRMCC.

- *END OF THIS SECTION* -

II / C.UK UKMCC - UNITED KINGDOM MISSION CONTROL CENTRE

1. GENERAL

The United Kingdom Mission Control Centre is co-located with the ARCC at Kinloss, Scotland and controls one LEOLUT and one GEOLUT located at Combe Martin (see Annex II /B). The UKMCC has a hot back-up MCC, also located at Kinloss and a slave Operators' Control Console is located at MRCC Falmouth. The UKMCC is manned 24 hours per day throughout the year, including public holidays.

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 Assured Restore lines with automatic 64 kb ISDN back-up, one line feeding the Primary MCC and one the back-up MCC. The UKMCC uses X.25, AFTN, Telex, Fax, point-to-point data-link and voice telephone to distribute data to MCCs and RCCs.

2. SPOCs SUPPORTED

The UKMCC provides 121.5/243 and 406 MHz alert data to United Kingdom and Republic of Ireland MRCCs and ARCCs.

The UKMCC also provides alert and Notification of Beacon Registration (NOCR) messages to MCCs within the Central Data Distribution Region and has a bilateral arrangement with the CMCC for the direct exchange of alert and NOCR data. Alert messages for areas outside the Central DDR are routed to the FMCC. NOCR messages are routed in accordance with Figure III / B.9 of document C/S A.001.

The communications interfaces used by UKMCC are:

UK ARCC:	Data-link	Telex	Fax	Voice	
UK MRCCs:	Telex	Fax	Voice		
Irish MRCC:	Telex	AFTN	Fax	Voice	
ALMCC:	AFTN	Telex	Fax	Voice	
FMCC:	X.25	AFTN	Telex	Fax	Voice
ITMCC:	AFTN	X.25	Telex	Fax	Voice
NMCC:	X.25	AFTN	Fax	Voice	
~~SPMCC:~~	~~X.25~~	~~AFTN~~	~~Telex~~	~~Fax~~	~~Voice~~
CMCC:	X.25	AFTN	Fax	Voice	

The UKMCC co-operates with the ALMCC, CMCC, FMCC, ITMCC, NMCC and SPMCC to resolve ambiguity of 121.5 MHz signals within mutual LUT coverage.

3. NOTIFICATION SERVICE

The United Kingdom has requested Cospas-Sarsat notification (NOCR) service. The UKMCC provides Cospas-Sarsat NOCR service to countries wishing to be notified, according to the notification procedures of document "Cospas-Sarsat Data Distribution Plan" (C/S A.001).

II / C.US USMCC - UNITED STATES MISSION CONTROL CENTRE

1. GENERAL

The United States Mission Control Centre is located at the National Oceanic and Atmospheric Administration, Suitland, Maryland. The USMCC controls dual LEOLUTs at the following locations (see Annex II / B):

a. Fairbanks, Alaska
b. Vandenberg AFB, California
c. Wahiawai, Hawaii
~~d. Houston, Texas~~
d ~~e~~. Suitland, Maryland ~~(Operational Support Equipment (OSE) and~~ LEOSAR Support Equipment (LSE))
e ~~f~~. Andersen AFB, Guam
f ~~g~~. 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. Operations are 24 hours per day, seven days a week. When available, the OSE, and LSE are used operationally. The LSE is also used for LEOLUT system development and testing. The OSE is air transportable and can be set up at any location as required.

The USMCC also controls two operational GEOLUTs (MD1and 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 (see Annex II / B).

The USMCC uses a dedicated frame relay network for communications with its LUTs and the majority of its RCCS. AFTN, a public packet switching network, and FTP over VPN are used for communication with other MCCs. AFTN and Fax are used for communication with the USMCC SPOCs.

The USMCC also assumes the nodal responsibilities for the Western DDR as defined at Annex III / A of this document.

The National Oceanic and Atmospheric Administration is the lead agency in the United States for the Cospas-Sarsat Programme.

2. SPOCs SUPPORTED

In support of the United States National Search and Rescue Plan, the USMCC provides 121.5/243.0/406 MHz alert data to U.S. Coast Guard and Air Force Rescue Co-ordination Centres. In accordance with document "Cospas-Sarsat Data Distribution Plan" (C/S A.001), the USMCC also exchanges alert and notification (NOCR) messages with other MCCs. The USMCC distributes alert data for the following SPOCs:

ANNEX II / D

SID IMPLEMENTATION STATUS

The document C/S A.002 "Cospas-Sarsat Mission Control Centres Standard Interface Description" has been approved by the Council. It contains standardized 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. After each MCC has added the capability to use any of these messages, it shall notify other MCCs in accordance with section 1.4.

SYSTEM INFORMATION MESSAGES

as of: *14 June 2005* ~~7 October 2004~~

MCC	**SIT NUMBER**												
Name	215	216	415	416	425	435	445	510	515	525	535	545	605
ALMCC	R		R	-	-	-	-	-	-	-	-	-	B
ARMCC	R		R	-	-	-	-	-	-	-	-	-	B
ASMCC	R		R	-	-	-	-	-	-	-	-	-	B
AUMCC	B		B	-	-	-	-	R*	-	-	-	-	B
BRMCC	R		R	-	-	-	-	R*	-	-	-	-	B
CHMCC	R		R	-	-	-	-	-	-	-	-	-	B
CMC	B		R	-	-	-	-	-	-	-	-	-	B
CMCC	R		R	R	R	-	-	O	R	R	O	R	B
CNMCC	R		R	-	-	-	-	-	-	-	-	-	B
FMCC	B		B	R	R	O	R	-	-	-	-	-	B
HKMCC	R		R	-	-	-	-	-	-	-	-	-	B
IDMCC	R		R	-	-	-	-	-	-	-	-	-	R
INMCC	R		R	-	-	-	-	-	-	-	-	-	B
ITMCC	R		R	-	-	-	-	-	-	-	-	-	B
JAMCC	B		B	-	-	-	-	-	-	-	-	-	B
KOMCC	R		R	-	-	-	-	-	-	-	-	-	B
NIMCC**	T.B.D.		T.B.D.	-	-	-	-	-	-	-	-	-	T.B.D.
NMCC	R		R	-	-	-	-	-	-	-	-	-	B
PAMCC	R		R	-	-	-	-	-	-	-	-	-	B
PEMCC	R		R	-	-	-	-	-	-	-	-	-	B
SAMCC	R		R	-	-	-	-	-	-	-	-	-	B
SIMCC	R		R	-	-	-	-	-	-	-	-	-	R
SPMCC	R		R	-	-	-	-	-	-	-	-	-	B
TAMCC	R		R	-	-	-	-	-	-	-	-	-	B
THMCC	R		R	-	-	-	-	-	-	-	-	-	B
TRMCC	*R*		*R*	-	-	-	-	*R**	-	-	-	-	*B*
UKMCC	R		R	-	-	-	-	R	-	-	-	-	B
USMCC	B		R	O	O	R	O	B	O	O	R	O	B
VNMCC	R		R	-	-	-	-	-	-	-	-	-	B

Legend: O originate. B both originate and receive. R receive. - not implemented.

Notes: * will commence when combined LEO/GEO processing is authorized.

** under development.

T.B.D. to be determined.

ALERT & NARRATIVE MESSAGES

as of: *14 June 2005* ~~7 October 2004~~

MCC Name	SIT Number														Multiple SIT Capability
	115	117	121	122	123	124	125	126	127	132	133	185	915	925	
ALMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
ARMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
ASMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
AUMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
BRMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R
CHMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
CMC	B	B	B	B	B	B	B	B	B	B	B	B	B	-	R
CMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
CNMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R
FMCC	B	B	-	B	B	B	B	B	B	B	B	B	B	B	B
HKMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
IDMCC	B	B	B	B	B	B	B	B	B	B	B	O	B	B	B
INMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
ITMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	T.B.D.	B
JAMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
KOMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
NIMCC *	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
NMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
PAMCC	B	B	B	B	B	B	B	B	B	B	R	O	B	B	R
PEMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
SAMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
SIMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
SPMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
TAMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
THMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R
TRMCC	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*R*
UKMCC	B	B	R	B	B	B	B	B	B	B	B	B	B	B	R
USMCC	B	B	B	B	B	B	B	B	B	B	B	O	B	B	R
VNMCC	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R

Legend: O originate. R receive. B both originate and receive. - not implemented.

Notes: T.B.D. to be determined.
* under development.

- END OF ANNEX II / D -

Other Cospas-Sarsat Reference Beacons

Identification	Location (Lat. / Long.)	Elevation (metres)	Time Interval (secs)	Transmit Frequency (MHz)	Remarks
CANADA A79EE E26E3 2E1D0	53°40.72' N 113°18.90' W	654	50	406.021843	Edmonton
FRANCE 9C7FEC2AACD3590 *	49°21.09' S 070°15.36' E	80	*30* ~~50~~	406.021856	Kerguelen
RUSSIA A23C0 00000 00000 *	55°37.20' N 037°30.48' E	T.B.D.	50	406.022103	Moscow
UK 9D1FC FA7AB 0D990	51°10.20' N 004°03.06' W	265	50	406.022000	Combe Martin

Notes: * Indicates that this location has not yet been provided in the Bureau International de l'Heure (BIH) Geodetic Reference System

Reference beacons are beacons which are installed and operated on a semi-permanent basis. Users should consult the national MCC for current status information. These beacons may not meet the orbitography specifications. Reference beacons must meet the following requirements:

- be encoded with a test protocol;
- transmit with a repetition period of 50 ± 2.5 sec and preferably be varied over that range; and
- from 1 January 1999 transmit at 406.022 MHz ± 1 kHz if possible.

T.B.D. To be determined.

- END OF ANNEX II / E -

Table II / F.1 : Operational Status of the Cospas-Sarsat SAR Payloads

as of: *14 June 2005* ~~7 October 2004~~

LEOSAR System

Satellite (Launch Date)	121.5 MHz SARR	243 MHz SARR	406 MHz SARR	406 MHz SARP			Comments			
				Global Mode	Local Mode	Message Format	Pseudo Mode	Altitude (km)	Equator Crossing Time	Other
Sarsat-6 (1994)	Operational	Operational	Operational	Not Operational	Not Operational		NA	847	1658A	
Sarsat-7 (1998)	Operational	Operational (1)	Operational	Operational	Operational	Long	Disabled	810	1920A	
Sarsat-8 (2000)	Operational	Not Operational	Operational	Operational	Operational	Long	Disabled	853	1354A	
Sarsat-9 (2002)	Operational	Operational	Operational	Operational	Operational	Long	Disabled	823	1000A	
Sarsat-10 (2005)	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*Launched on 20 May 2005*
Cospas-4 (1989)	Not Operational	NA		Not Operational	Not Operational	Short	NA	about 1000	NA	Not in continuous operation with limited operation in Southern hemisphere, (battery degradation)
Cospas-9 (2000)	Operational			Not Operational	Not Operational	Short		about 700	1430A	

GEOSAR System

Satellite (Launch Date)				Comments
GOES-9 (1995)	NA	Operational	NA	Supports operations of the Japanese Meteorological Agency (SAR repeater active)
GOES-10 (1997)		Operational		
GOES-11 (2000)		Standby		
GOES-12 (2001)		Operational		
INSAT-3A (2003)		Operational		Long format beacon messages are processed as short format messages by GEOLUT
MSG-1 (2002)		Operational		

Notes: NA Not applicable.
(1) Operates intermittently.

Table II / F.2 : Status of LEOSAR Satellite Payloads

as of: *14 June 2005* ~~7 October 2~~004

Satellite	L-band Down-link	121.5 MHz SARR Status	121.5 MHz SARR Gain Control	243 MHz SARR Status	243 MHz SARR Gain Control	406 MHz SARR Status	406 MHz SARR Gain Control	406 MHz SARP Status Global Mode	406 MHz SARP Status Local Mode	406 MHz SARP Status Band-width	406 MHz SARP Status Pseudo Mode	Comments
Sarsat-6	F	F	AGC	F	AGC	F	AGC	NO	NO	NA	NA	
Sarsat-7	F	F	AGC	L	AGC	F	AGC	F	F	40 kHz	Disabled	243 MHz SARR exhibits intermittent loss of service which may affect part of, or an entire satellite pass
Sarsat-8	F	*L* ~~F~~	AGC	NO	AGC	F	AGC	F	F	40 kHz	Disabled	*Some degradation of 121.5 MHz payload*
Sarsat-9	F	F	AGC	F	AGC	F	AGC	F	F	40 kHz	Disabled	
Sarsat-10	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*T.B.D.*	*Launched on 20 May 2005*
Cospas-4	L	L	AGC	NA				L	L	24 kHz	NA	Not in continuous operation with limited operation in Southern hemisphere, *(*battery degradation*)*
Cospas-9	F	F	AGC					NO	NO	24 kHz		

Notes:
- AGC — Automatic gain control.
- F — Full operational status.
- L — Limited operational status.
- NO — Not operational.
- NA — Not applicable.

Table II / F.3 : Configuration of GEOSAR Satellite Payloads

as of: *14 June 2005* ~~7 October 2004~~

Satellite	**Position**	**Downlink**			**406 MHz Transponder**			**Comments**
		Status	**Frequency**	**Type**	**Status**	**Bandwidth**	**Gain Control**	
GOES-9	155° *E* ~~W~~	F	1544.5 MHz	Broad	F	406.010 MHz-406.090 MHz	Fixed	Operational
GOES-10	135° W	F	1544.5 MHz	Broad	F	406.010 MHz-406.090 MHz	Fixed	Operational
GOES-11	105° W	Standby	1544.5 MHz	Standby	Standby	T.B.D.	Standby	Standby
GOES-12	75° W	F	1544.5 MHz	Broad	F	406.010 MHz-406.090 MHz	AGC	Operational
INSAT-3A	93.5° E	F	4505.695549 MHz	Narrow	F	406.010 MHz-406.090 MHz	T.B.D.	Operational
MSG-1	3.4° W	F	1544.5 MHz	Broad	F	406.010 MHz-406.090 MHz	Fixed	Operational

Notes:
- AGC Automatic gain control.
- F Full operational status.
- T.B.D. To be determined.

- END OF ANNEX II / F -

ANNEX III / A

DATA DISTRIBUTION REGIONS AND INTER-MCC DATA EXCHANGE

III / A.1 INTRODUCTION

This annex 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 (see section II / B.1) only after confirmation by the appropriate host MCC, that the MCC under development has achieved Initial Operational Capability (IOC).

III / A.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.

III / A.3 DATA EXCHANGE BETWEEN DDRs

The inter-nodal network diagram is provided as Figure III / A.1.

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

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

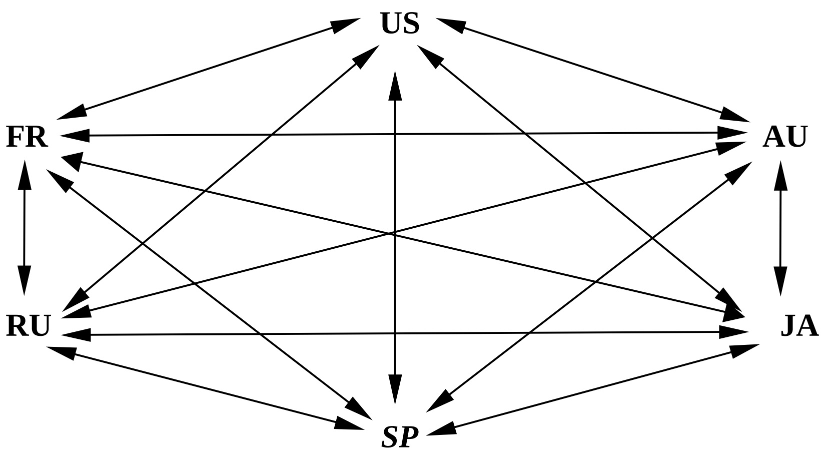


Figure III / A.1 : Inter-Nodal Network Diagram

III / A.4 DATA EXCHANGE WITHIN DDRs

III / A.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 Annex II / C.

Data flow in Western DDR (ARMCC, BRMCC, CHMCC, CMCC, PEMCC, and USMCC) is described in Figure III / A.2.

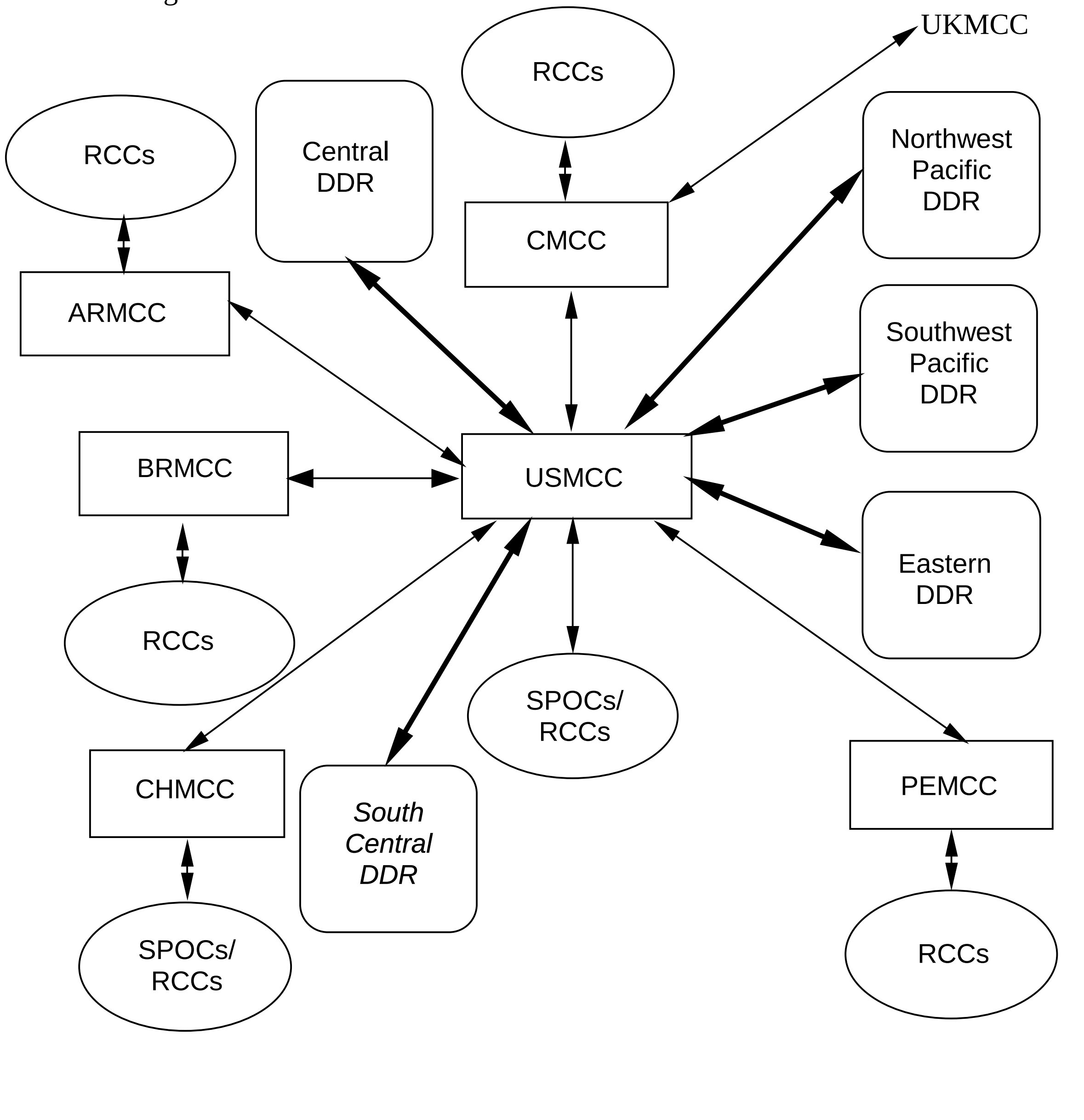


Figure III / A.2 : Western DDR Network Diagram

III / A.4.2 Central DDR

Data flow in Central DDR (~~ALMCC~~, FMCC, ITMCC, ~~NIMCC*~~, NMCC, ~~SPMCC~~ *TRMCC* and UKMCC) is described in Figure III / A.3. Central DDR MCCs validate locations before forwarding them to the SAR organizations.

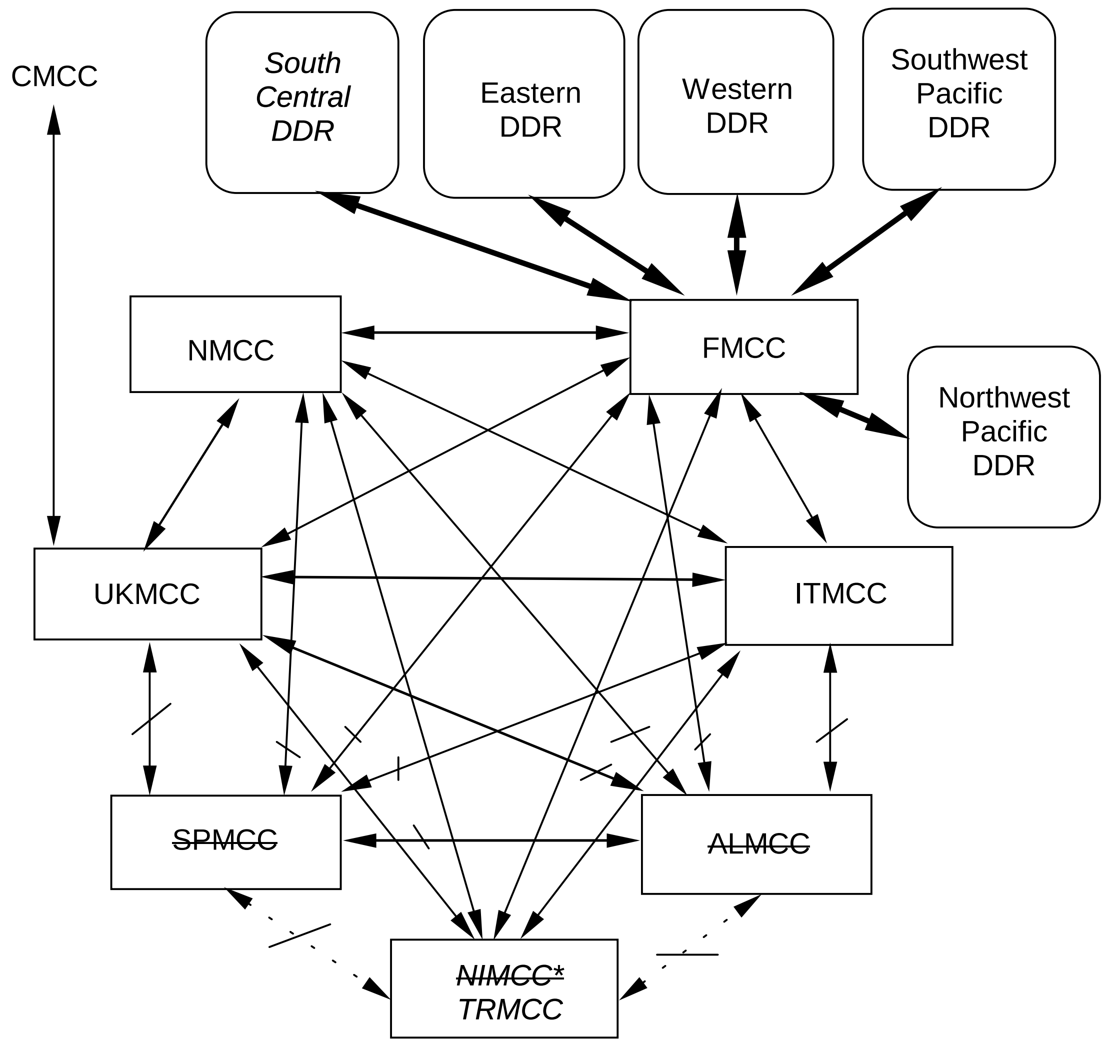


Figure III / A.3 : Central DDR Network Diagram

~~Note: * - Under development.~~

III / A.4.3 Eastern DDR

The CMC has no formal regional agreements.

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

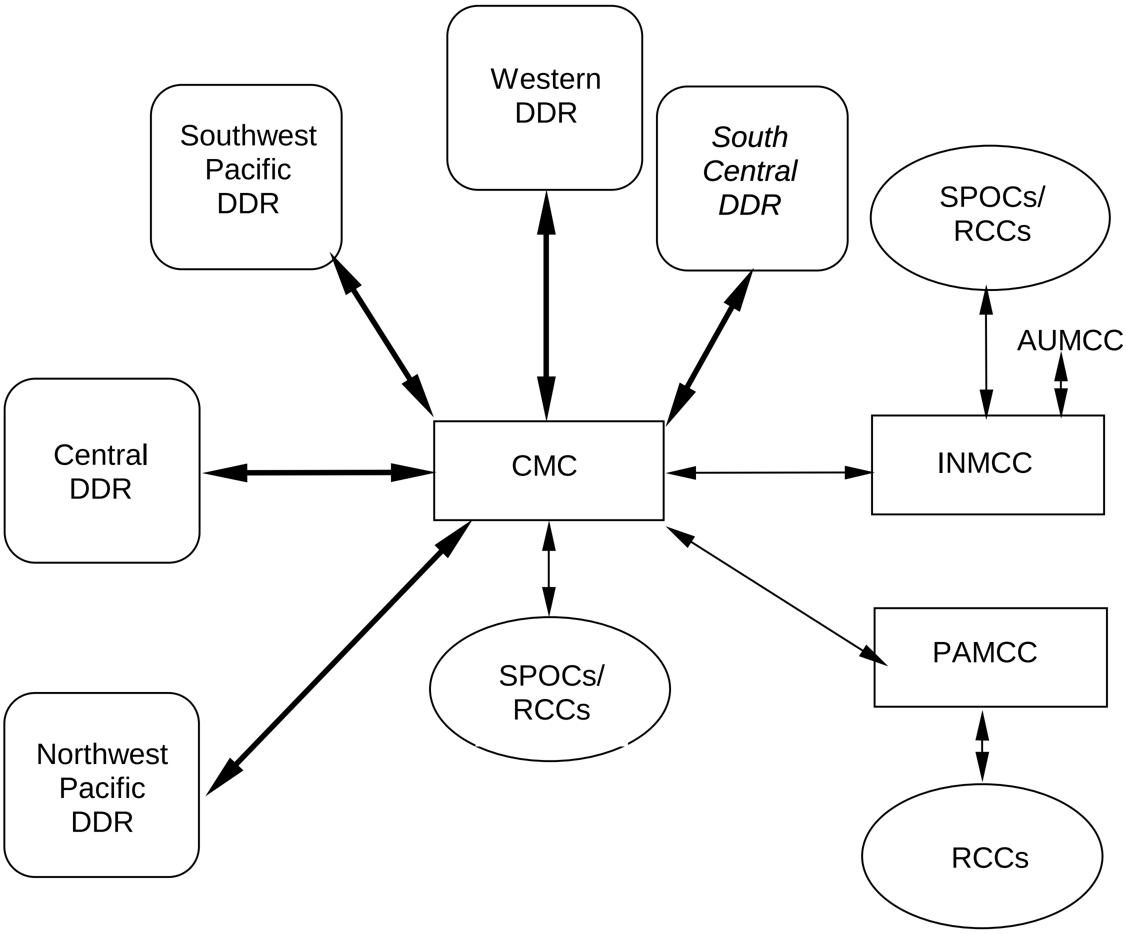


Figure III / A.4 : Eastern DDR Network Diagram

III / A.4.4 Southwest Pacific DDR

Data flow in Southwest Pacific DDR (ASMCC, AUMCC, IDMCC, SAMCC, SIMCC and THMCC) is described in Figure III / A.5.

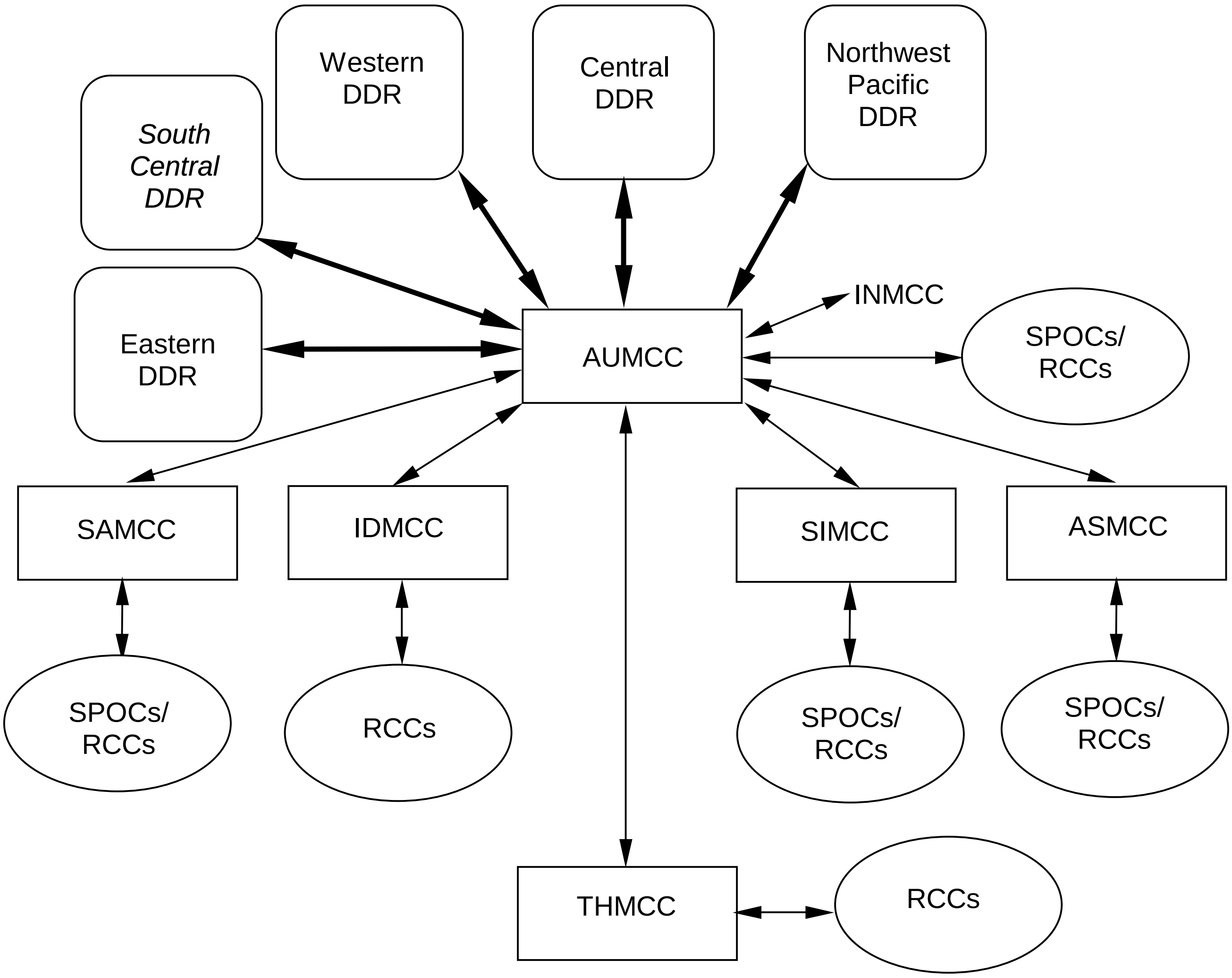


Figure III / A.5 : Southwest Pacific DDR Network Diagram

III / A.4.5 Northwest Pacific DDR

Data flow in Northwest Pacific DDR (CNMCC, HKMCC, JAMCC, KOMCC, TAMCC and VNMCC) is described in Figure III / A.6.

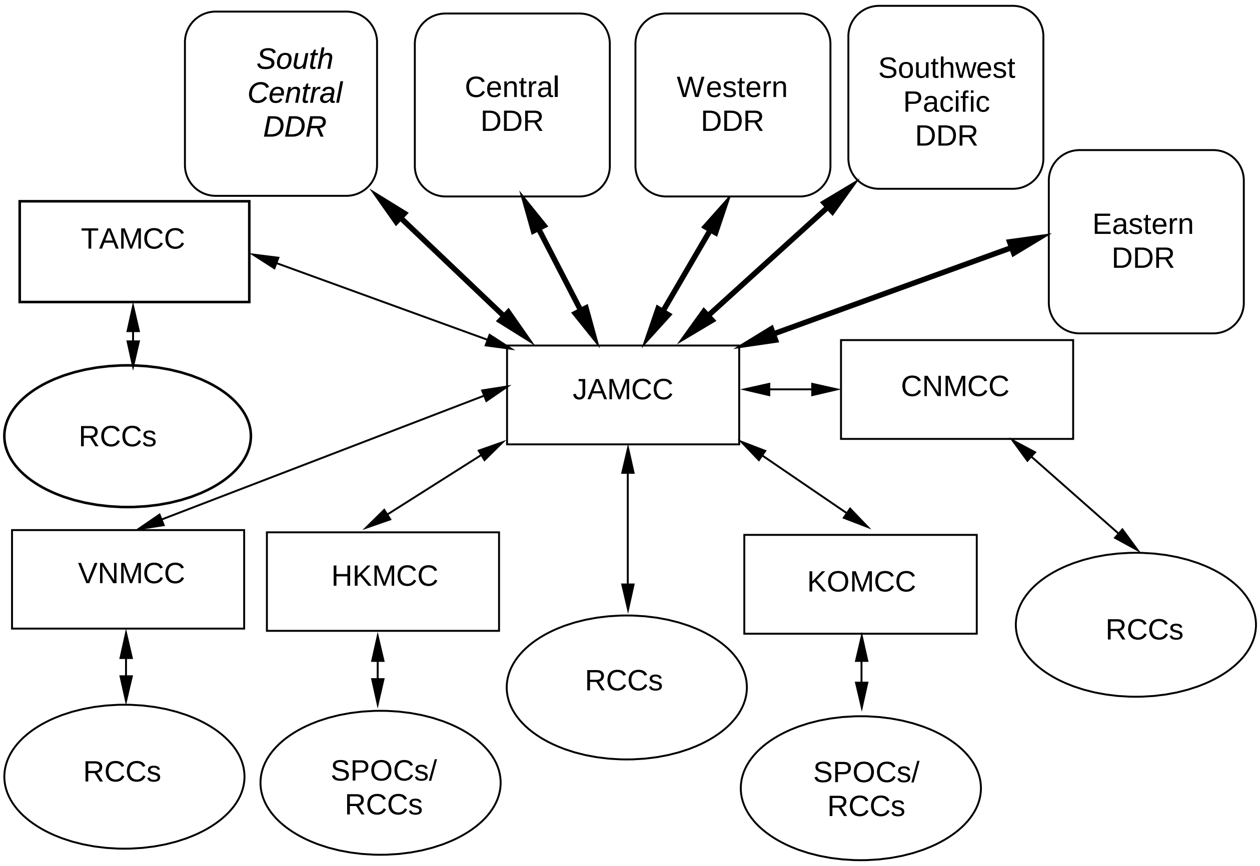


Figure III / A.6 : Northwest Pacific DDR Network Diagram

III / A.4.6 South Central DDR

Data flow in South Central DDR (ALMCC, NIMCC and SPMCC) is described in Figure III / A.7.

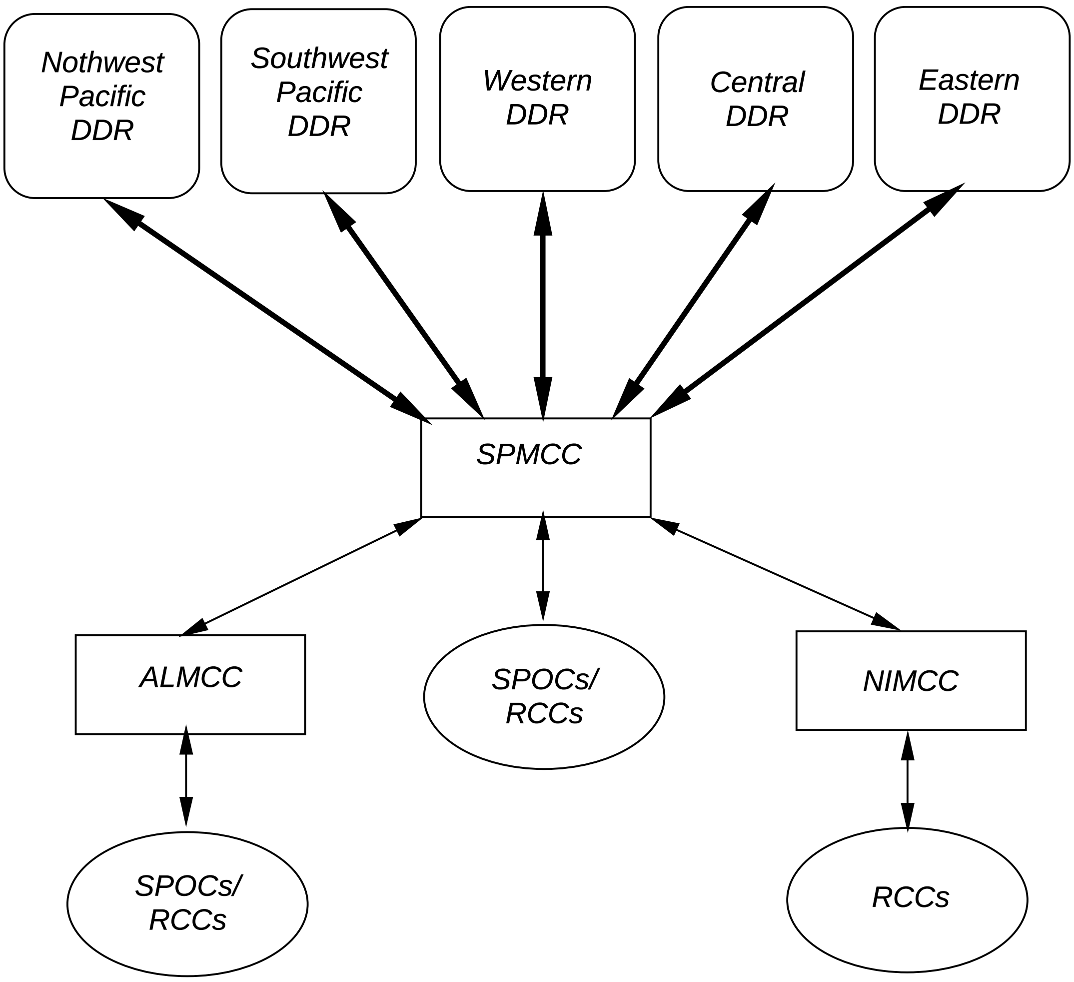


Figure III / A.7 : South Central DDR Network Diagram

Receiving MCC: / Location in Service Area of:	ALMCC	ARMCC	ASMCC	AUMCC	BRMCC	CHMCC	CMC	CMCC	CNMCC	FMCC	HKMCC	IDMCC	INMCC
ALMCC	Nat. Pr.	USMCC	AUMCC	*SPMCC* ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	*SPMCC* ~~ALMCC~~	JAMCC	AUMCC	CMC
ARMCC	*SPMCC* ~~FMCC~~	Nat. Pr.	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
ASMCC	*SPMCC* ~~FMCC~~	USMCC	Nat. Pr.	ASMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
AUMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	Nat. Pr.	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	AUMCC
BRMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	Nat. Pr.	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
CHMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	Nat. Pr.	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
CMC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	CMC	USMCC	USMCC	Nat. Pr.	USMCC	JAMCC	CMC	JAMCC	AUMCC	CMC
CMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	Nat. Pr.	JAMCC	USMCC	JAMCC	AUMCC	CMC
CNMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	Nat. Pr.	JAMCC	JAMCC	AUMCC	CMC
FMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	Nat. Pr.	JAMCC	AUMCC	CMC
HKMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	Nat. Pr.	AUMCC	CMC
IDMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	IDMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	Nat. Pr.	CMC
INMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	INMCC	USMCC	USMCC	INMCC	USMCC	JAMCC	CMC	JAMCC	AUMCC	Nat. Pr.
ITMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	ITMCC	JAMCC	AUMCC	CMC
JAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
KOMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
NIMCC*	*SPMCC* NIMCC	USMCC	AUMCC	SPMCC ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	*SPMCC* ~~NIMCC~~	JAMCC	AUMCC	CMC
NMCC	*SPMCC* ~~NMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	NMCC	JAMCC	AUMCC	CMC
PAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	CMC	USMCC	USMCC	PAMCC	USMCC	JAMCC	CMC	JAMCC	AUMCC	CMC
PEMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
SAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	SAMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
SIMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	SIMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
SPMCC	SPMCC	USMCC	AUMCC	*SPMCC* ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	SPMCC	JAMCC	AUMCC	CMC
TAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
THMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	THMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
TRMCC	*SPMCC*	*USMCC*	*AUMCC*	*FMCC*	*USMCC*	*USMCC*	*FMCC*	*USMCC*	*JAMCC*	*TRMCC*	*JAMCC*	*AUMCC*	*CMC*
UKMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	UKMCC	JAMCC	UKMCC	JAMCC	AUMCC	CMC
USMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
VNMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC

Figure III / A.7 : Routing Matrix for Alert Data (1/2)

Notes: Nat.Pr. - National Procedures. * - Under development.

Receiving MCC: / **Location in lervice Area of:**	**ITMCC**	**JAMCC**	**KOMCC**	**NIMCC***	**NMCC**	**PAMCC**	**PEMCC**	**SAMCC**	**SIMCC**	**SPMCC**	**TAMCC**	**THMCC**	***TRMCC***	**UKMCC**	**USMCC**	**VNMCC**
ALMCC	*FMCC* ~~ALMCC~~	SPMCC ~~FMCC~~	JAMCC	*SPMCC* ~~ALMCC~~	*FMCC* ~~ALMCC~~	CMC	USMCC	AUMCC	AUMCC	ALMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~ALMCC~~	*SPMCC* ~~FMCC~~	JAMCC
ARMCC	FMCC	SMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	ARMCC	JAMCC
ASMCC	FMCC	UMCC	JAMCC	*SPCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
AUMCC	FMCC	UMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
BRMCC	FMCC	SMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC.*	FMCC	BRMCC	JAMCC
CHMCC	FMCC	SMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CHMCC	JAMCC
CMC	FMCC	CMC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
CMCC	FMCC	SMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	CMCC	CMCC	JAMCC
CNMCC	FMCC	NMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
FMCC	FMCC	FMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	FMCC	JAMCC	AUMCC	*FMCC*	FMCC	FMCC	JAMCC
HKMCC	FMCC	HKMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
IDMCC	FMCC	AUMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
INMCC	FMCC	CMC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
ITMCC	Nat. Pr.	FMCC	JAMCC	*SPMCC* ~~FMCC~~	ITMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~ITMCC~~	JAMCC	AUMCC	*ITMCC*	ITMCC	FMCC	JAMCC
JAMCC	FMCC	Nat. Pr.	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
KOMCC	FMCC	KOMCC	Nat. Pr.	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
NIMCC*	*FMCC* ~~NIMCC~~	*SPMCC* ~~FMCC~~	JAMCC	Nat. Pr.	FMCC	CMC	USMCC	AUMCC	AUMCC	NIMCC	JAMCC	AUMCC	*FMCC*	FMCC ~~NIMCC~~	*SPMCC* ~~JAMCC~~	JAMCC
NMCC	NMCC	FMCC	JAMCC	*SPMCC* ~~NMCC~~	Nat. Pr.	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~NMCC~~	JAMCC	AUMCC	*NMCC*	NMCC	FMCC	JAMCC
PAMCC	FMCC	CMC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	Nat. Pr.	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
PEMCC	FMCC	USMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	Nat. Pr.	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	PEMCC	JAMCC
SAMCC	FMCC	AUMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	Nat. Pr.	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
SIMCC	FMCC	AUMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	Nat. Pr.	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
SPMCC	*FMCC* ~~SPMCC~~	*SPMCC* ~~FMCC~~	JAMCC	SPMCC	*FMCC* ~~SPMCC~~	CMC	USMCC	AUMCC	AUMCC	Nat. Pr.	JAMCC	AUMCC	*FMCC*	*FMCC* ~~SPMCC~~	*SPMCC* ~~FMCC~~	JAMCC
TAMCC	FMCC	TAMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	Nat. Pr.	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
THMCC	FMCC	AUMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	Nat. Pr.	*FMCC*	FMCC	AUMCC	JAMCC
TRMCC	*TRMCC*	*FMCC*	*JAMCC*	*SPMCC*	*TRMCC*	*CMC*	*USMCC*	*AUMCC*	*AUMCC*	*FMCC*	*JAMCC*	*AUMCC*	*Nat. Pr.*	*TRMCC*	*FMCC*	*JAMCC*
UKMCC	UKMCC	FMCC	JAMCC	*SPMCC* ~~UKMCC~~	UKMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~UKMCC~~	JAMCC	AUMCC	*UKMCC*	Nat. Pr.	FMCC	JAMCC
USMCC	FMCC	USMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	Nat. Pr.	JAMCC
VNMCC	FMCC	VNMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	Nat. Pr.

Figure III / A.7 : Routing Matrix for Alert Data (2/2)

Notes: Nat.Pr. - National Procedures. * - Under development.

Transmitting MCC:	ALMCC	ARMCC	ASMCC	AUMCC	BRMCC	CHMCC	CMC	CMCC	CNMCC	FMCC	HKMCC	IDMCC	INMCC
System Information:													
Sarsat Spacecraft & Ephemeris Data	LUTs	LUTs	LUTs	ASMCC IDMCC SAMCC SIMCC THMCC LUTs	LUTs	LUTs	INMCC PAMCC LUTs	LUTs	LUTs	~~ALMCC~~ ITMCC ~~NIMCC*~~ NMCC ~~SPMCC~~ *TRMCC* UKMCC LUTs	LUTs	LUTs	LUTs
Cospas Spacecraft & Ephemeris Data	LUTs	LUTs	LUTs	ASMCC IDMCC SAMCC SIMCC THMCC LUTs	LUTs	LUTs	AUMCC FMCC INMCC JAMCC PAMCC USMCC LUTs	LUTs	LUTs	~~ALMCC~~ ITMCC ~~NIMCC*~~ NMCC ~~SPMCC~~ *TRMCC* UKMCC LUTs	LUTs	LUTs	LUTs
Sarsat Time Calibration	LUTs	LUTs	LUTs	ASMCC IDMCC SAMCC SIMCC THMCC LUTs	LUTs	LUTs	INMCC PAMCC LUTs	LUTs	LUTs	~~ALMCC~~ AUMCC CMC ITMCC JAMCC ~~NIMCC*~~ NMCC SPMCC *TRMCC* UKMCC USMCC LUTs	LUTs	LUTs	LUTs
SARP Commands										USMCC			
SARP Cmd Response & Housekeeping													
SARR Commands								USMCC					
SARR Cmd Response & Housekeeping													
System Status	*SPMCC* ~~FMCC~~	USMCC	AUMCC	ASMCC CMC FMCC JAMCC IDMCC SAMCC SIMCC *SPMCC* THMCC USMCC	USMCC	USMCC	AUMCC FMCC INMCC JAMCC PAMCC *SPMCC* USMCC	USMCC	JAMCC	~~ALMCC~~ AUMCC CMC ITMCC JAMCC ~~NIMCC*~~ NMCC SPMCC *TRMCC* UKMCC USMCC	JAMCC	AUMCC	CMC
406 MHz SARR Frequency Calibration								~~UKMCC~~ USMCC					

Figure III / A.8 : System Information Distribution (1/2)

~~Note: * - Under development.~~

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

Figure III / A.8 : System Information Distribution (2/2)

Note: * - Under development.

- END OF ANNEX III / A -

III / B.1.1.2 Validation of SIT Message Field Content

Some message fields are essential to MCC alert processing. Each MCC should validate the contents of these fields. The contents of the message fields can be validated against allowable values defined in documents C/S A.002 or C/S T.001. Message Fields 2, 4, 6, 8, 10, 12, 13, 14, 20, 21, 25, 26, 27 and 31 should be checked against the range of values contained in Table B.1 of C/S A.002. Table III / B.2 defines the resultant action of the validation process.

Message Field	**Data Contents (According to C/S A.002, Table B.1)**	
	In Range	Out of Range
2, 4, 6, 8, 10, 12, 13, 14, 20, 21, 25, 26, 27 and 31	Process	Suppress
Other SIT Fields	Process	Process

Table III / B.2: MCC Action Based on Message Field Content

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

III / B.1.1.3 406 MHz Beacon Message Validation

In addition to the above validation, each MCC should perform a BCH check of all incoming 406 MHz alert messages from MCCs and LUTs to ensure that the 406 MHz beacon message (message field 23) is valid. In checking the BCH for the first protected field (bits 25 - 106), the resultant MCC action is defined by Table III / B.3. ~~If the second protected field (bits 107 - 144) has uncorrected BCH errors~~.

Number of Uncorrected BCH Errors Detected in the First Protected Field	Number of Points (as defined at Message Field 21 in document C/S A.002)	
	1	≥ 2
0	Process	Process
≥ 1	Suppress	Process (Doppler Only)*

* *The matching process shall be based on bits 26 – 85 of the 406 MHz Beacon Message with no bits defaulted. No other processing shall be based on any portion of the 406 MHz Beacon Message.* Distribute based on Doppler Location only.

Table III / B.3: MCC Action Based on BCH Error Determination in First Protected Field of 406 MHz Alert Messages

In addition, when the first protected field has no BCH errors, each MCC should compare the beacon message contents against a known protocol specification. Specifically, the following items in the protected field(s) should be validated against C/S T.001:

- country code,
- user protocol,
- Baudot characters,
- supplementary data field,
- binary coded decimal fields, and
- encoded latitude and longitude.

A 406 MHz beacon alert message fails when *one or more of* the conditions in Table III / B.4 below are met.

Item to Check	**Bits**	**Fail if:**
Country Code Not Allocated, per Annex I/C of C/S A.001	27 - 36	Decimal Value < 200 or > 780 or not allocated between 200 and 780
User Protocol	37 - 39	Bit 26 = 1 and Bits 37 - 39 = 101
Serial User Protocol	40 - 42	Bit 26 = 1 and Bits 40 - 42 = 101 or 111
Standard Location Ship Security Protocol	***25 - 26***	***Bit 25 = 0 and Bit 26=0 and Bits 37 – 40 = 1100***
Standard Location Ship Security Protocol	61 – 64	Bit 25 = 1 and Bit 26 = 0 and Bits 37 - 40 = 1100 and Bits 61 - 64 ≠ 0000
Maritime User, Radio Call Sign or Aviation User Protocol	82 - 83	Bit 26 = 1 and Bits 37 - 39 = 010, 110 or 001 and Bits 82 - 83 are non-zero
~~National Short~~ ~~Location Protocol and~~ ~~National Location Protocol~~ ***Unallocated Location Protocols***	37 - 40	Bit 26 = 0 and Bits 37 - 40 = 0000, 0001, 1001, or 1101
Modified Baudot Code	Varies	Unassigned Baudot Character
Binary Coded Decimal	Varies	Decimal Value for Four Bit Group > ~~10~~9
Encoded Latitude and Longitude	Varies	Encoded Latitude > 90 or Encoded Longitude > 180
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
Supplementary Data (Standard Location ~~Protocols, Long)~~ ***for Ship Security Protocol)***	107 - 110	Bit 25 = 1 and Bit 26 = 0 and Bits 37 - 40 = 1100, and Bits 107 - 110 ≠ 1101
Supplementary Data (National Location Protocol, Short)	107 - 110	Bit 25=0 and Bit 26 = 0, and Bits 37 - 40 = 1000, 1010, 1011 or 1111, and Bits 107 - 110 ≠ 1101
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

Table III / B.4 : Protocol Validation for 406 MHz Alert Messages

For items in the first protected field (bits 25 - 106), t *T*he appropriate action by an MCC based on the results of the comparisons of Table III / B.4 are given in Table III / B.5 below. If an item in the second protected field (bits 107 – 144) fails protocol validation, then no processing shall be based on any portion of the second protected field.

Protocol Check Results	Number of Points (as defined at Message Field 21 in document C/S A.002)	
	1	≥ 2
Pass	Process	Process
Fail	Suppress	Process (Doppler Only)*

** The matching process shall be based on bits 26 – 85 of the 406 MHz Beacon Message with no bits defaulted. No other processing shall be based on any portion of the 406 MHz Beacon Message.* Distribute based on Doppler Location only.

Table III / B.5 : MCC Action Based on Result of Protocol Validation in First Protected Field of 406 MHz Alert Messages

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 III/B.4.

III / B.1.1.4 Additional Validation

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

III / B.1.2 406 MHz 24-Hour Time Tag Errors (Cospas)

Each MCC should implement procedures to filter out 24-hour time tag errors. One method to determine a 24-hour error at the MCC is to compare each new 406 MHz alert to alerts on file for the same beacon ID. If a prior alert from the same satellite for the same beacon with a TCA which was 24 hours earlier (± 20 minutes) is on file at the MCC, the new alert can be assumed to be in error and suppressed from further transmission.

III / B.1.3 Doppler Position Footprint Validation

Each MCC shall implement the algorithm for determining if the Doppler positions are inside the satellite footprint at the time of detection as per Figure B.2 of the Cospas-Sarsat MCC Standard Interface Description, C/S A.002 document. If one of the LEOSAR Doppler positions is conclusively outside the footprint then the alert shall be processed based only on the 406 MHz beacon message and the Doppler solution data shall not be distributed.

III / B.1.4 Encoded Position Footprint Validation

Each MCC shall implement the algorithm for determining if the encoded position is inside the satellite footprint at the time of detection (MF#14 per C/S A.002) as per Figure B.2 of the Cospas-Sarsat MCC Standard Interface Description, C/S A.002 document. If the encoded position is conclusively outside the footprint then no processing shall be based on the encoded position.

III / B.2 406 MHz 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 technical parameters.

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, before ambiguity resolution, 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) for Doppler to Doppler matches and Doppler to encoded matches, the distance match criterion to be used for ambiguity resolution and for position conflict determination shall be the same;
b) the Doppler to Doppler distance match criterion shall be 50 kilometres;
c) the Doppler to encoded distance match criterion shall be 50 kilometres;
d) the encoded to encoded distance match criterion shall be 3 kilometres;
e) each of the above three distance match criterion shall be configurable; and

f) in the match process, the “best” match will be used to resolve ambiguity when multiple candidate positions meet the match criterion.

III / B.3 406 MHz AMBIGUITY RESOLUTION

Ambiguity resolution is the determination of the confirmed beacon position (the resolved position). This is achieved by the matching of Doppler position data from two unique LEO satellite passes (beacon events), the matching of encoded position data with Doppler position data from a LEO satellite pass, or by using operational criteria.

Transmitting MCC:	**ALMCC**	ARMCC	ASMCC	**AUMCC**	**BRMCC**	**CHMCC**	**CMC**	**CMCC**	**CNMCC**	**FMCC**	**HKMCC**	**IDMCC**	**INMCC**
Receiving / Support MCC													
ALMCC	-	-	-	-	-	-	-	-	-	- ~~117~~	-	-	-
ARMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
ASMCC	-	-	-	115 / 117	-	-	-	-	-	115 / 117	-	-	-
AUMCC	-	-	115 / 117	-	-	-	115* / 117	-	-	115 / 117	-	115 / 117	115 / 117
BRMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
CHMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
CMC	-	-	-	115 / 117	-	-	-	-	-	115 / 117***	-	-	115 / 117
CMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
CNMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
FMCC	- ~~115 / 117~~	-	-	115 / 117	-	-	115* / 117	-	-	-	-	-	-
HKMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
IDMCC	-	-	-	115 / 117	-	-	-	-	-	-	-	-	-
INMCC	-	-	-	115 / 117	-	-	117	-	-	-	-	-	-
ITMCC	- ~~115 / 117~~	-	-	-	-	-	-	-	-	115 / 117***	-	-	-
JAMCC	-	-	-	115 / 117	-	-	-	-	115 / 117	-	115 / 117	-	-
KOMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
NIMCC**	- ~~115 / 117~~	-	-	-	-	-	-	-	-	- ~~115 / 117~~	-	-	-
NMCC	- ~~117~~	-	-	-	-	-	-	-	-	117	-	-	-
PAMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
PEMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
SAMCC	-	-	-	115 / 117	-	-	-	-	-	115 / 117	-	-	-
SIMCC	-	-	-	115 / 117	-	-	-	-	-	-	-	-	-
SPMCC	117	-	-	*115 / 117*	-	-	*115 / 117*	-	-	115 / 117	-	-	-
TAMCC	-	-	-	115 / 117	-	-	-	-	-	-	-	-	-
THMCC	-	-	-	-	-	-	-	-	-	-	-	-	-
TRMCC	-	-	-	-	-	-	-	-	-	*115 / 117* ~~*T.B.D.*~~	-	-	-
UKMCC	- ~~117~~	-	-	-	-	-	-	-	-	117	-	-	-
USMCC	-	115 / 117	-	115 / 117	115 / 117	115 / 117	115* / 117	115 / 117	-	115 / 117	-	-	-
VNMCC	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure III / B.8 : Bilateral Agreements for the Exchange of 121.5 MHz Alert Data Between MCCs (1/2)

Notes: * - Will be available after installation of new software. ** - Under development. *** - 115 / 117 only within Russian and Italian area, 117 for associated countries.

Transmitting MCC: / **Receiving / Support MCC**	**ITMCC**	**JAMCC**	**KOMCC**	**NIMCC***	**NMCC**	**PAMCC**	**PEMCC**	**SAMCC**	**SIMCC**	**SPMCC**	**TAMCC**	**THMCC**	***TRMCC***	**UKMCC**	**USMCC**	**VNMCC**
ALMCC	- ~~115 / 117~~	-	-	- ~~115 / 117~~	- ~~115 / 117~~	-	-	-	-	115 / 117	-	-	-	~~- 117~~	-	-
ARMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115 / 117	-
ASMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AUMCC	-	115 / 117	-	-	-	-	-	115 / 117	115 / 117	-	-	115 / 117	-	-	115 / 117	-
BRMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115 / 117	-
CHMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115 / 117	-
CMC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115 / 117	-
CMCC	-	-	-	-	115 / 117	-	-	-	-	-	-	-	-	117	115 / 117	-
CNMCC	-	115 / 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FMCC	115 / 117	-	-	- ~~115 / 117~~	117	-	-	-	-	115 / 117	-	-	*115 / 117*	117	115 / 117	-
HKMCC	-	115 / 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IDMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ITMCC	-	-	-	- ~~115 / 117~~	115 / 117	-	-	-	-	- ~~115 / 117~~	-	-	*115 / 117*	117	-	-
JAMCC	-	-	115 / 117	-	-	-	-	-	-	-	115 / 117	-	-	-	115 / 117	115 / 117
KOMCC	-	115 / 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NIMCC*	-	-	-	-	- ~~115 / 117~~	-	-	-	-	115 / 117	-	-	-	- ~~117~~	-	-
NMCC	115 / 117	-	-	- ~~115 / 117~~	-	-	-	-	-	- ~~115 / 117~~	-	-	*115 / 117*	117	-	-
PAMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PEMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115 / 117	-
SAMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SIMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPMCC	- ~~115 / 117~~	*115 / 117*-	-	*117*	- ~~117~~	-	-	-	-	-	-	-	-	- ~~117~~	*115 / 117*	-
TAMCC	-	115 / 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-
THMCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRMCC	*115 / 117* ~~*T.B.D.*~~	-	-	-	*115 / 117* ~~*T.B.D.*~~	-	-	-	-	-	-	-	-	*115 / 117* ~~*T.B.D.*~~	-	-
UKMCC	115 / 117	-	-	- ~~117~~	- ~~117~~	-	-	-	-	- ~~117~~	-	-	*115 / 117*	-	-	-
USMCC	-	115 / 117	-	-	-	-	115 / 117	-	-	-	-	-	-	-	-	-
VNMCC	-	115 / 117	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure III / B.8 : Bilateral Agreements for the Exchange of 121.5 MHz Alert Data Between MCCs (2/2)

Note: * - Under development.

Transmitting MCC: / Receiving / Support MCC	ALMCC	ARMCC	ASMCC	AUMCC	BRMCC	CHMCC	CMC	CMCC	CNMCC	FMCC	HKMCC	IDMCC	INMCC
ALMCC	Nat. Pr.	USMCC	AUMCC	*SPMCC* ~~ALMCC~~	USMCC	USMCC	*SPMCC* ~~ALMCC~~	USMCC	JAMCC	*SPMCC* ~~ALMCC~~	JAMCC	AUMCC	CMC
ARMCC	*SPMCC* ~~USMCC~~	Nat. Pr.	AUMCC	*USMCC* ~~ARMCC~~	USMCC	*USMCC* ~~ARMCC~~	USMCC	USMCC	JAMCC	ARMCC	JAMCC	AUMCC	CMC
ASMCC	*SPMCC* ~~AUMCC~~	USMCC	Nat. Pr.	ASMCC	*USMCC* ~~AUMCC~~	*USMCC* ~~ASMCC~~	AUMCC	AUMCC	AUMCC	ASMCC	AUMCC	AUMCC	AUMCC
AUMCC	*SPMCC* ~~AUMCC~~	USMCC	AUMCC	Nat. Pr.	*USMCC* ~~AUMCC~~	USMCC	AUMCC	AUMCC	AUMCC	AUMCC	AUMCC	AUMCC	*CMC* ~~AUMCC~~
BRMCC	*SPMCC* ~~USMCC~~	*USMCC* ~~BRMCC~~	AUMCC	*USMCC* ~~BRMCC~~	Nat. Pr.	*USMCC* ~~BRMCC~~	USMCC	USMCC	JAMCC	BRMCC	JAMCC	AUMCC	CMC
CHMCC	*SPMCC* ~~USMCC~~	*USMCC* ~~CHMCC~~	AUMCC	*USMCC* ~~CHMCC~~	USMCC	Nat. Pr.	USMCC	USMCC	JAMCC	CHMCC	JAMCC	AUMCC	CMC
CMC	*SPMCC* ~~CMC~~	USMCC	AUMCC	CMC	USMCC	USMCC	Nat. Pr.	USMCC	JAMCC	CMC	JAMCC	AUMCC	CMC
CMCC	*SPMCC* ~~USMCC~~	USMCC	AUMCC	*USMCC* ~~CMCC~~	USMCC	USMCC	USMCC	Nat. Pr.	JAMCC	CMCC	JAMCC	AUMCC	*CMC* ~~CMCC~~
CNMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	*JAMCC* ~~CNMCC~~	USMCC	USMCC	JAMCC	USMCC	Nat. Pr.	CNMCC	JAMCC	AUMCC	CMC
FMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	FMCC	JAMCC	Nat. Pr.	JAMCC	FMCC	*CMC* ~~FMCC~~
HKMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	*JAMCC* ~~HKMCC~~	USMCC	USMCC	JAMCC	USMCC	HKMCC	HKMCC	Nat. Pr.	AUMCC	*CMC* ~~HKMCC~~
IDMCC	*SPMCC* ~~AUMCC~~	USMCC	AUMCC	IDMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	IDMCC	JAMCC	Nat. Pr.	*CMC* ~~IDMCC~~
INMCC	*SPMCC* ~~CMC~~	USMCC	AUMCC	INMCC	USMCC	USMCC	INMCC	USMCC	JAMCC	INMCC	JAMCC	AUMCC	Nat. Pr.
ITMCC	*SPMCC* ~~ITMCC~~	USMCC	AUMCC	*FMCC* ~~ITMCC~~	USMCC	USMCC	*FMCC* ~~ITMCC~~	USMCC	JAMCC	ITMCC	JAMCC	AUMCC	CMC
JAMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
KOMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	*JAMCC* ~~KOMCC~~	USMCC	USMCC	JAMCC	USMCC	JAMCC	KOMCC	JAMCC	AUMCC	CMC
NIMCC*	*SPMCC* ~~NIMCC~~	USMCC	AUMCC	*SPMCC* ~~NIMCC~~	USMCC	USMCC	*SPMCC* ~~NIMCC~~	USMCC	JAMCC	NIMCC	JAMCC	AUMCC	CMC
NMCC	*SPMCC* ~~NMCC~~	USMCC	AUMCC	*FMCC* ~~NMCC~~	USMCC	USMCC	*FMCC* ~~NMCC~~	USMCC	JAMCC	NMCC	JAMCC	AUMCC	CMC
PAMCC	*SPMCC* ~~CMC~~	USMCC	AUMCC	CMC	USMCC	USMCC	PAMCC	USMCC	JAMCC	PAMCC	JAMCC	AUMCC	CMC
PEMCC	*SPMCC* ~~USMCC~~	*USMCC* ~~PEMCC~~	AUMCC	*USMCC* ~~PEMCC~~	USMCC	*USMCC* ~~PEMCC~~	USMCC	USMCC	JAMCC	PEMCC	JAMCC	AUMCC	CMC
SAMCC	*SPMCC* ~~AUMCC~~	USMCC	AUMCC	SAMCC	AUMCC	USMCC	AUMCC	AUMCC	AUMCC	SAMCC	AUMCC	AUMCC	*CMC* ~~AUMCC~~
SIMCC	*SPMCC* ~~AUMCC~~	USMCC	AUMCC	SIMCC	*USMCC* ~~AUMCC~~	USMCC	*AUMCC* ~~USMCC~~	USMCC	JAMCC	SIMCC	JAMCC	AUMCC	*CMC* ~~SIMCC~~
SPMCC	SPMCC	USMCC	AUMCC	SPMCC	USMCC	USMCC	SPMCC	USMCC	JAMCC	SPMCC	JAMCC	AUMCC	*CMC* ~~SPMCC~~
TAMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	*JAMCC* ~~TAMCC~~	USMCC	USMCC	JAMCC	USMCC	JAMCC	TAMCC	JAMCC	AUMCC	CMC
THMCC	*SPMCC* ~~AUMCC~~	USMCC	AUMCC	THMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
TRMCC	*SPMCC* ~~*T.B.D.*~~	*USMCC* ~~*T.B.D.*~~	*AUMCC* ~~*T.B.D.*~~	*FMCC* ~~*T.B.D.*~~	*USMCC* ~~*T.B.D.*~~	*USMCC* ~~*T.B.D.*~~	*FMCC* ~~*T.B.D.*~~	*USMCC* ~~*T.B.D.*~~	*JAMCC* ~~*T.B.D.*~~	*TRMCC* ~~*T.B.D.*~~	*JAMCC* ~~*T.B.D.*~~	*AUMCC* ~~*T.B.D.*~~	*CMC* ~~*T.B.D.*~~
UKMCC	*SPMCC* ~~UKMCC~~	USMCC	AUMCC	*FMCC* ~~UKMCC~~	USMCC	USMCC	*FMCC* ~~UKMCC~~	UKMCC	JAMCC	UKMCC	JAMCC	AUMCC	*CMC* ~~UKMCC~~
USMCC	*SPMCC* ~~USMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	*CMC* ~~AUMCC~~
VNMCC	*SPMCC* ~~JAMCC~~	USMCC	AUMCC	*JAMCC* ~~VNMCC~~	USMCC	USMCC	JAMCC	USMCC	JAMCC	VNMCC	JAMCC	AUMCC	CMC

Figure III / B.9 : Routing Matrix for NOCR Messages (1/2)

Notes: Nat.Pr. - National Procedures. * - Under development.

Transmitting MCC: / **Receiving/ Support MCC**	**ITMCC**	**JAMCC**	**KOMCC**	**NIMCC***	**NMCC**	**PAMCC**	**PEMCC**	**SAMCC**	**SIMCC**	**SPMCC**	**TAMCC**	**THMCC**	***TRMCC***	**UKMCC**	**USMCC**	**VNMCC**
ALMCC	*FMCC* ~~ALMCC~~	*SPMCC* ~~ALMCC~~	JAMCC	*SPMCC* ~~ALMCC~~	*FMCC* ~~ALMCC~~	CMC	USMCC	*AUMCC* ~~ALMCC~~	AUMCC	ALMCC	JAMCC	AUMCC	*FMCC* ~~*ALMCC*~~	*FMCC* ~~ALMCC~~	*SPMCC* ~~ALMCC~~	JAMCC
ARMCC	*FMCC* ~~ARMCC~~	*USMCC* ~~ARMCC~~	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~USMCC~~	CMC	*USMCC* ~~ARMCC~~	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~USMCC~~	ARMCC	JAMCC
ASMCC	*FMCC* ~~AUMCC~~	AUMCC	*JAMCC* ~~AUMCC~~	*SPMCC* ~~AUMCC~~	*FMCC* ~~AUMCC~~	CMC	USMCC	AUMCC	AUMCC	AUMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~AUMCC~~	*AUMCC* ~~ASMCC~~	*JAMCC* ~~AUMCC~~
AUMCC	*FMCC* ~~AUMCC~~	AUMCC	*JAMCC* ~~AUMCC~~	*SPMCC* ~~AUMCC~~	*FMCC* ~~AUMCC~~	CMC	USMCC	AUMCC	AUMCC	AUMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~AUMCC~~	AUMCC	*JAMCC* ~~AUMCC~~
BRMCC	*FMCC* ~~BRMCC~~	*USMCC* ~~BRMCC~~	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~USMCC~~	CMC	*USMCC* ~~BRMCC~~	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~USMCC~~	BRMCC	JAMCC
CHMCC	*FMCC* ~~CHMCC~~	*USMCC* ~~CHMCC~~	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~USMCC~~	CMC	CHMCC	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~USMCC~~	CHMCC	JAMCC
CMC	*FMCC* ~~CMC~~	CMC	JAMCC	*SPMCC* ~~CMC~~	*FMCC* ~~CMC~~	CMC	USMCC	AUMCC	AUMCC	CMC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~CMC~~	CMC	JAMCC
CMCC	*FMCC* ~~CMCC~~	*USMCC* ~~CMCC~~	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~CMCC~~	CMC	USMCC	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	CMCC	CMCC	JAMCC
CNMCC	*FMCC* ~~CNMCC~~	CNMCC	JAMCC	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	*JAMCC* ~~CNMCC~~	JAMCC
FMCC	FMCC	FMCC	JAMCC	*SPMCC* ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	*AUMCC* ~~FMCC~~	FMCC	JAMCC	AUMCC	*FMCC*	FMCC	FMCC	JAMCC
HKMCC	*FMCC* ~~HKMCC~~	HKMCC	JAMCC	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	*JAMCC* ~~HKMCC~~	JAMCC
IDMCC	*FMCC* ~~IDMCC~~	*AUMCCI* ~~IDMCC~~	JAMCC	*SPMCC* ~~AUMCC~~	*FMCC* ~~AUMCC~~	CMC	USMCC	AUMCC	AUMCC	AUMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~AUMCC~~	*AUMCC* ~~IDMCC~~	JAMCC
INMCC	*FMCC* ~~INMCC~~	*CMC* ~~INMCC~~	JAMCC	*SPMCC* ~~CMC~~	*FMCC* ~~CMC~~	CMC	USMCC	AUMCC	AUMCC	CMC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~CMC~~	*CMC* ~~INMCC~~	JAMCC
ITMCC	Nat. Pr.	*FMCC* ~~ITMCC~~	JAMCC	*SPMCC* ~~ITMCC~~	ITMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~ITMCC~~	JAMCC	AUMCC	*ITMCC*	ITMCC	*FMCC* ~~ITMCC~~	JAMCC
JAMCC	*FMCC* ~~JAMCC~~	Nat. Pr.	JAMCC	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	JAMCC	JAMCC
KOMCC	*FMCC* ~~KOMCC~~	KOMCC	Nat. Pr.	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	*JAMCC* ~~KOMCC~~	JAMCC
NIMCC*	*FMCC* ~~NIMCC~~	*SPMCC* ~~NIMCC~~	JAMCC	Nat. Pr.	*FMCC* ~~NIMCC~~	CMC	USMCC	AUMCC	AUMCC	NIMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~NIMCC~~	*SPMCC* ~~NIMCC~~	JAMCC
NMCC	NMCC	*FMCC* ~~NMCC~~	JAMCC	*SPMCC* ~~NMCC~~	Nat. Pr.	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~NMCC~~	JAMCC	AUMCC	*NMCC*	NMCC	*FMCC* ~~NMCC~~	JAMCC
PAMCC	*FMCC* ~~PAMCC~~	*CMC* ~~PAMCC~~	JAMCC	*SPMCC* ~~CMC~~	*FMCC* ~~CMC~~	Nat. Pr.	USMCC	AUMCC	AUMCC	CMC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~CMC~~	*CMC* ~~PAMCC~~	JAMCC
PEMCC	*FMCC* ~~PEMCC~~	*USMCC* ~~PEMCC~~	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~USMCC~~	CMC	Nat. Pr.	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~USMCC~~	PEMCC	JAMCC
SAMCC	*FMCC* ~~AUMCC~~	AUMCC	*JAMCC* ~~AUMCC~~	*SPMCC* ~~AUMCC~~	*FMCC* ~~AUMCC~~	CMC	USMCC	Nat. Pr.	AUMCC	AUMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~AUMCC~~	*AUMCC* ~~SAMCC~~	*JAMCC* ~~AUMCC~~
SIMCC	*FMCC* ~~SIMCC~~	*AUMCC* ~~SIMCC~~	JAMCC	*SPMCC* ~~JAMCC~~	*AUMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	Nat. Pr.	AUMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~AUMCC~~	*AUMCC* ~~SIMCC~~	JAMCC
SPMCC	*FMCC* ~~SPMCC~~	*FMCC* ~~SPMCC~~	JAMCC	SPMCC	SPMCC	CMC	USMCC	AUMCC	AUMCC	Nat. Pr.	JAMCC	AUMCC	*FMCC*	*FMCC* ~~SPMCC~~	SPMCC	JAMCC
TAMCC	*FMCC* ~~TAMCC~~	TAMCC	JAMCC	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	Nat. Pr.	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	*AUMCC* ~~TAMCC~~	JAMCC
THMCC	*FMCC* ~~AUMCC~~	AUMCC	JAMCC	*SPMCC* ~~AUMCC~~	*FMCC* ~~AUMCC~~	CMC	USMCC	AUMCC	AUMCC	AUMCC	JAMCC	Nat. Pr.	*FMCC*	*FMCC* ~~AUMCC~~	*AUMCC* ~~THMCC~~	JAMCC
TRMCC	*TRMCC* ~~*T.B.D.*~~	*FMCC* ~~*T.B.D.*~~	*JAMCC* ~~*T.B.D.*~~	*SPMCC* ~~*T.B.D.*~~	*TRMCC* ~~*T.B.D.*~~	*CMC* ~~*T.B.D.*~~	*USMCC* ~~*T.B.D.*~~	*AUMCC* ~~*T.B.D.*~~	*AUMCC* ~~*T.B.D.*~~	*FMCC* ~~*T.B.D.*~~	*JAMCC* ~~*T.B.D.*~~	*AUMCC* ~~*T.B.D.*~~	*Nat. Pr.*	*TRMCC* ~~*T.B.D.*~~	*FMCC* ~~*T.B.D.*~~	*JAMCC* ~~*T.B.D.*~~
UKMCC	UKMCC	*FMCC* ~~UKMCC~~	JAMCC	*SPMCC* ~~UKMCC~~	UKMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~USMCC~~	JAMCC	AUMCC	*UKMCC*	Nat. Pr.	*FMCC* ~~UKMCC~~	JAMCC
USMCC	*FMCC* ~~USMCC~~	USMCC	JAMCC	*SPMCC* ~~USMCC~~	*FMCC* ~~USMCC~~	CMC	USMCC	AUMCC	AUMCC	USMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~USMCC~~	Nat. Pr.	JAMCC
VNMCC	*FMCC* ~~VNMCC~~	VNMCC	JAMCC	*SPMCC* ~~JAMCC~~	*FMCC* ~~JAMCC~~	CMC	USMCC	AUMCC	AUMCC	JAMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~JAMCC~~	*JAMCC* ~~VNMCC~~	Nat. Pr.

Figure III / B.9 : Routing Matrix for NOCR Messages (2/2)

Notes: Nat.Pr. - National Procedures. * - Under development.

Receiving MCC: / **MCC Serving the Flag State:**	**ALMCC**	**ARMCC**	**ASMCC**	**AUMCC**	**BRMCC**	**CHMCC**	**CMC**	**CMCC**	**CNMCC**	**FMCC**	**HKMCC**	**IDMCC**	**INMCC**
ALMCC	Cmp Ath	USMCC	AUMCC	*SPMCC* ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	*SPMCC* ~~ALMCC~~	JAMCC	AUMCC	CMC
ARMCC	*SPMCC* ~~FMCC~~	Cmp Ath	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
ASMCC	*SPMCC* ~~FMCC~~	USMCC	Cmp Ath	ASMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
AUMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	Cmp Ath	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	AUMCC
BRMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	Cmp Ath	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
CHMCC	*SPMCC*	USMCC	AUMCC	USMCC	USMCC	Cmp Ath	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
CMC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	CMC	USMCC	USMCC	Cmp Ath	USMCC	JAMCC	CMC	JAMCC	AUMCC	CMC
CMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	Cmp Ath	JAMCC	USMCC	JAMCC	AUMCC	CMC
CNMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	Cmp Ath	JAMCC	JAMCC	AUMCC	CMC
FMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	Cmp Ath	JAMCC	AUMCC	CMC
HKMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	Cmp Ath	AUMCC	CMC
IDMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	IDMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	Cmp Ath	CMC
INMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	INMCC	USMCC	USMCC	INMCC	USMCC	JAMCC	CMC	JAMCC	AUMCC	Nat. Pr.
ITMCC	*SPMCC* ~~ITMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	ITMCC	JAMCC	AUMCC	CMC
JAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
KOMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
NIMCC*	*SPMCC* ~~NIMCC~~	USMCC	AUMCC	*SPMCC* ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	*SPMCC* ~~NIMCC~~	JAMCC	AUMCC	CMC
NMCC	*SPMCC* ~~NMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	USMCC	JAMCC	NMCC	JAMCC	AUMCC	CMC
PAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	CMC	USMCC	USMCC	PAMCC	USMCC	JAMCC	CMC	JAMCC	AUMCC	CMC
PEMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
SAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	SAMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
SIMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	SIMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
SPMCC	SPMCC	USMCC	AUMCC	*SPMCC* ~~FMCC~~	USMCC	USMCC	*SPMCC* ~~FMCC~~	USMCC	JAMCC	SPMCC	JAMCC	AUMCC	CMC
TAMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC
THMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	THMCC	USMCC	USMCC	AUMCC	USMCC	JAMCC	AUMCC	JAMCC	AUMCC	CMC
TRMCC	SPMCC	*USMCC*	*AUMCC*	*FMCC*	*USMCC*	*USMCC*	*FMCC* ~~*USMCC*~~	*USMCC* ~~*JAMCC*~~	*JAMCC* ~~*FMCC*~~	*TRMCC*	*JAMCC*	*AUMCC*	*CMC*
UKMCC	*SPMCC* ~~UKMCC~~	USMCC	AUMCC	FMCC	USMCC	USMCC	FMCC	UKMCC	JAMCC	UKMCC	JAMCC	AUMCC	CMC
USMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	USMCC	USMCC	USMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	AUMCC	CMC
VNMCC	*SPMCC* ~~FMCC~~	USMCC	AUMCC	JAMCC	USMCC	USMCC	JAMCC	USMCC	JAMCC	JAMCC	JAMCC	AUMCC	CMC

Figure III / B.11 : Routing Matrix for Ship Security Alert Messages (1/2)

Notes: Cmp Ath - Competent Authority. * - Under development.

Receiving MCC: / MCC Serving the Flag State:	ITMCC	JAMCC	KOMCC	NIMCC*	NMCC	PAMCC	PEMCC	SAMCC	SIMCC	SPMCC	TAMCC	THMCC	*TRMCC*	UKMCC	USMCC	VNMCC
ALMCC	*FMCC* ~~ALMCC~~	*SPMCC* ~~FMCC~~	JAMCC	*SPMCC* ~~ALMCC~~	*FMCC* ~~ALMCC~~	CMC	USMCC	AUMCC	AUMCC	ALMCC	JAMCC	AUMCC	*FMCC*	*FMCC* ~~ALMCC~~	*SPMCC* ~~FMCC~~	JAMCC
ARMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~USMCC~~	FMCC	ARMCC	JAMCC
ASMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~AUMCC~~	FMCC	AUMCC	JAMCC
AUMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	AUMCC	JAMCC
BRMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~USMCC~~	FMCC	BRMCC	JAMCC
CHMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~USMCC~~	FMCC	CHMCC	JAMCC
CMC	FMCC	*CMC*	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
CMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~USMCC~~	CMCC	CMCC	JAMCC
CNMCC	FMCC	CNMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~JAMCC~~	FMCC	JAMCC	JAMCC
FMCC	FMCC	*FMCC*	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	FMCC	JAMCC	AUMCC	*FMCC*	FMCC	FMCC	JAMCC
HKMCC	FMCC	HKMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~JAMCC~~	FMCC	JAMCC	JAMCC
IDMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~AUMCC~~	FMCC	AUMCC	JAMCC
INMCC	FMCC	*CMC*	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
ITMCC	Cmp Ath	*FMCC*	JAMCC	SPMCC ~~FMCC~~	ITMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~ITMCC~~	JAMCC	AUMCC	*ITMCC*	ITMCC	FMCC	JAMCC
JAMCC	FMCC	Cmp Ath	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	JAMCC	JAMCC
KOMCC	FMCC	KOMCC	Cmp Ath	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~AUMCC~~	FMCC	JAMCC	JAMCC
NIMCC*	*FMCC* ~~NIMCC~~	*SPMCC* ~~FMCC~~	JAMCC	Cmp Ath	FMCC	CMC	USMCC	AUMCC	AUMCC	NIMCC	AUMCC	AUMCC	*FMCC* ~~NIMCC~~	*FMCC* ~~NIMCC~~	*SPMCC* ~~JAMCC~~	JAMCC
NMCC	NMCC	*FMCC*	JAMCC	SPMCC ~~NMCC~~	Cmp Ath	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~NMCC~~	JAMCC	AUMCC	*NMCC* ~~FMCC~~	NMCC	FMCC	JAMCC
PAMCC	FMCC	*CMC*	JAMCC	SPMCC ~~FMCC~~	FMCC	Cmp Ath	USMCC	AUMCC	AUMCC	*CMC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	CMC	JAMCC
PEMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	Cmp Ath	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~USMCC~~	FMCC	PEMCC	JAMCC
SAMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	Cmp Ath	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~AUMCC~~	FMCC	AUMCC	JAMCC
SIMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	Cmp Ath	*AUMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~AUMCC~~	FMCC	AUMCC	JAMCC
SPMCC	*FMCC* ~~SPMCC~~	*SPMCC* ~~FMCC~~	JAMCC	SPMCC ~~FMCC~~	*FMCC* ~~SPMCC~~	CMC	USMCC	AUMCC	AUMCC	Cmp Ath	JAMCC	AUMCC	*FMCC*	*FMCC* ~~SPMCC~~	*SPMCC* ~~FMCC~~	JAMCC
TAMCC	FMCC	TAMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	Cmp Ath	AUMCC	*FMCC* ~~JAMCC~~	FMCC	JAMCC	JAMCC
THMCC	FMCC	AUMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*AUMCC* ~~FMCC~~	JAMCC	Cmp Ath	*FMCC* ~~AUMCC~~	FMCC	AUMCC	JAMCC
TRMCC	*TRMCC* ~~ITMCC~~	*FMCC*	*JAMCC*	*SPMCC*	*TRMCC*	*CMC*	*USMCC*	*AUMCC*	*AUMCC*	*FMCC*	*JAMCC*	*AUMCC*	*Cmp Ath*	*TRMCC*	*FMCC*	*JAMCC*
UKMCC	UKMCC	*FMCC*	JAMCC	SPMCC ~~UKMCC~~	UKMCC	CMC	USMCC	AUMCC	AUMCC	*FMCC* ~~UKMCC~~	JAMCC	AUMCC	*UKMCC*	Cmp Ath	FMCC	JAMCC
USMCC	FMCC	USMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*USMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC*	FMCC	Cmp Ath	JAMCC
VNMCC	FMCC	VNMCC	JAMCC	SPMCC ~~FMCC~~	FMCC	CMC	USMCC	AUMCC	AUMCC	*JAMCC* ~~FMCC~~	JAMCC	AUMCC	*FMCC* ~~JAMCC~~	FMCC	JAMCC	Cmp Ath

Figure III / B.11 : Routing Matrix for Ship Security Alert Messages (2/2)

Notes: Cmp Ath - Competent Authority. * - Under development.

- END OF ANNEX III / B -

ANNEX III / D

ORBIT VECTOR UPDATE METHOD

There are three methods for LUT 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 III / D.1 provides guidelines for each satellite with the update methods listed such that the preferred method is number 1.

Table III / D.1 : Orbit Vector Update Method

Satellite	Orbit Vector Update Method
Sarsat-6	1. MCC Provided Orbit Vectors 2. Orbitography 3. Downlink
Cospas-9	1. MCC Provided Orbit Vectors 2. Downlink
Sarsat-7, Sarsat-8, Sarsat-9, *Sarsat-10* and Cospas-4	1. Orbitography 2. MCC Provided Orbit Vectors 3. Downlink

- END OF ANNEX III / D -

- END OF PART III -

- END OF DOCUMENT –

ANNEX 5

DRAFT AMENDMENTS TO DOCUMENT

"COSPAS-SARSAT MISSION CONTROL CENTRES STANDARD INTERFACE DESCRIPTION"

C/S A.002
Issue 4 - Draft Revision 9

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S A.002 for submission to Council for approval.

45. Message Type

For a ship security alert, the message type begins with "SHIP SECURITY COSPAS-SARSAT …", otherwise, the message type begins with "DISTRESS COSPAS-SARSAT …".

Indicates type of alert message, for example:

- DISTRESS COSPAS-SARSAT POSITION RESOLVED ALERT
- DISTRESS COSPAS-SARSAT POSITION RESOLVED UPDATE ALERT
- DISTRESS COSPAS-SARSAT POSITION CONFLICT ALERT
- DISTRESS COSPAS-SARSAT INITIAL ALERT
- DISTRESS COSPAS-SARSAT NOTIFICATION OF COUNTRY OF BEACON REGISTRATION ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION RESOLVED ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION RESOLVED UPDATE ALERT
- SHIP SECURITY COSPAS-SARSAT POSITION CONFLICT ALERT
- SHIP SECURITY COSPAS-SARSAT INITIAL ALERT

46. Current Message Number

The message number assigned to this message by the transmitting MCC.

47. MCC Reference

This reference is a unique designator supplied by the MCC to identify all messages sent for that beacon.

48. Detection Time & Spacecraft ID

The detection time is TCA (as defined at MF#14) and abbreviation for months is as per table below. The time is followed on the same line by the identity of the satellite which provided the alert data.

Abbreviation	**Month**	**Abbreviation**	**Month**
JAN	January	JUL	July
FEB	February	AUG	August
MAR	March	SEP	September
APR	April	OCT	October
MAY	May	NOV	November
JUN	June	DEC	December

49. Detection Frequency

If the beacon is transmitting on more than one frequency, i.e. 121.5 and 243 or 406 MHz, then both frequencies may be entered successively on the same line.

Actual values will be used when available. If actual values are not available, then the values 121.5 MHz, 243 MHz or 406 MHz will be used, as appropriate.

50. Country of Beacon Registration

Three numeric characters of the Country Code followed by the ten character abbreviation of the country where the detected beacon is registered as defined in System document C/S A.001 "Cospas-Sarsat Data Distribution Plan".

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

51. User Class of Beacon

User class information as per table below and produced from beacon information by the MCC. Protocols with encoded position should be identified by appending the words "WITH ENCODED POSITION" after the user class, for example, "AVIATION WITH ENCODED POSITION".

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

406 MHz Beacon Protocol	**User Class in RCC Message**
Aviation	Aviation
Maritime	Maritime
Radio Call Sign	Maritime
Ship Security	Ship Security
Spare	Unknown
Test	Test
Serial:	Serial followed by:
(a) Aviation	Aviation
(b) Maritime (Float-Free)	Maritime
(c) Maritime (Non Float-Free)	Maritime
(d) Personal Locator Beacon	Personal
(e) Aircraft 24-Bit Address	Aircraft 24-Bit Address
(f) Aircraft Operator Designator	Aircraft Operator Designator
(g) Not assigned	Unknown

52. Identification

The identification information as described in the Cospas-Sarsat beacon specifications. Represent each unidentified modified-Baudot code character in the identification portion of the maritime, radio call sign and aviation user protocols with a "?" (question mark).

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

53. Emergency Code

The emergency code as indicated by the beacon coding as described in the Cospas-Sarsat beacon specification.

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001 section III/B.1.1.3.*

54. Position Information

The position information associated with the resolved position, A&B Doppler positions, and the encoded position as appropriate.

54a. Resolved Position

Latitude and longitude of resolved position.

54b. A Position & Probability

The latitude and longitude of the A Doppler Position and the percentage probability that the A Position is the actual position of the incident.

54c. B Position & Probability

Same as MF#54b above but for B Position.

54d. Encoded Position and Time of Update

Latitude and longitude of encoded position. Time of update is UNKNOWN.

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

55. Source of Encoded Position Data

This indicates whether the encoded position data was provided to the beacon by an internal or external device. *Enter* "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

56. Next Pass Times

The predicted time (predicted Loss of Signal – LOS) at which the next beacon event (in local mode) for the position being reported will occur.

56a. Next Time of Visibility of Resolved Position

Optional information indicating the next time of visibility for the resolved position; "UNKNOWN" if the information is not available.

56b. Next Time of Visibility A Doppler Position

Same as MF#56a above but for A Position.

56c. Next Time of Visibility B Doppler Position

Same as MF#56a above but for B Position.

56d. Next Time of Visibility of Encoded Position

Same as for MF#56a but for the Encoded Position.

57. Beacon HEX ID & Homing Signal

Fifteen character hexadecimal representation of beacon identification code and type of homing signal as per table below. Information is taken from the 406 MHz Message (reference MF#23) by the MCC. *If the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3, then the fifteen character hexadecimal representation shall be based on bits 26 - 85 of the beacon 406 MHz Beacon Message with no bits defaulted.*

Homing Signal Interpretation

Term	Meaning
NIL	no homing transmitter
121.5	121.5 MHz ELT/EPIRB signal in addition to 406 MHz
Maritime	9 GHz Search and Rescue Radar Transponder (SART) in addition to 406 MHz
Other	a nationally assigned signal has been included in the beacon.

58. Activation Type

Type of beacon activation for USER protocols only (non-location protocols).

MANUAL	IF BIT 108 IS SET TO 0
AUTOMATIC OR MANUAL ~~UNKNOWN~~	IF BIT 108 IS SET TO 1

For Ship Security (Standard Location Protocol), enter MANUAL.

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

59. Beacon Number

Beacon number on the vessel or aircraft. Information is determined by decoding the 406 MHz message.

Enter "NIL" *if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3.*

60. Other Encoded Information

Other information decoded from the 406 MHz message as determined by the servicing MCC. Could include such information as Cospas-Sarsat certificate number, accuracy increment of the encoded position data, or data according to national assignment.

Enter 'NIL' if no other encoded information is available *or if the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3*.

For protocol containing the aircraft 24-bit address, the country which assigned the 24-bit address will be indicated. If the country that assigned the 24-bit address is unknown, this value will be set to "UNKNOWN". If the registration marking corresponding to the 24-bit address is known, it will be given. If the registration marking is unknown, the full 24-bit address will be given as a 6 character hexadecimal number.

61. Operational Information

Operational information obtained separately from encoded beacon information such as:

- reliability indicator for encoded or 406 MHz Doppler position data *
- 406 MHz database registry information
- people on board
- 'NIL' if not available.

The statement, "THE [A|B] POSITION IS LIKELY TO BE AN IMAGE POSITION." shall be included, as appropriate, per the "406 MHz LEOSAR Image Position Determination" algorithm in Appendix B.2 to Annex B. Determining that a position is an image prior to ambiguity resolution is optional.

Note *1*: * The warning "RELIABILITY OF DOPPLER POSITION DATA - SUSPECT" for 406 MHz solutions shall be included on the SIT 185 message when at least one of the following criteria from the alert data values is satisfied:

- Window factor ≥ 3, or
- Bias standard deviation > 20 Hz, or
- The absolute value of the cross track angle is < 1 or > 22, or
- Position calculated from < 4-point solution.

This warning is only included in messages before ambiguity resolution.

*Note 2: * The warning "RELIABILITY OF DOPPLER POSITION DATA - SUSPECT DUE TO SATELLITE MANOEUVRE." shall be included in the SIT 185 message during the 24-hour period after the manoeuvre, when the maximum expected error in Doppler location* *exceeds 10 kilometres within 24 hours of the manoeuvre. See C/S A.001, section 3.7.5.*

If the 406 MHz Beacon Message is invalid per C/S A.001, section III/B.1.1.3 then the warning "DATA DECODED FROM THE BEACON ID IS NOT RELIABLE" shall be included in SIT 185 message.

62. Remarks

Heading for the variable length section of the message. Additional information may be provided at the discretion of the originating MCC as illustrated in the sample alert messages. 'NIL' if no Remarks are available.

For ship security alerts the following should be included: "THIS IS A SHIP SECURITY ALERT. PROCESS THIS ALERT ACCORDING TO RELEVANT SECURITY REQUIREMENTS."

63. End of Message

To indicate to the message recipient that no more information is to come on this message.

64. 406 MHz SARR Frequency Calibration Offset

Difference (in Hz) between the computed frequency produced by the calibration LEOLUT and the known transmit frequency of a reference beacon.

The 406 MHz SARR frequency calibration offset prepared for distribution to other MCCs shall be based on the average of a minimum of twenty satellite passes, each of which includes at least ten data measurements and each of which is associated with a computed location which is accurate to within three kilometres.

65. 406 MHz SARR Frequency Calibration Drift

Drift (in Hz/day) of the 406 MHz SARR frequency provided by the LEO satellite.

66. Time of 406 MHz SARR Frequency Calibration Determination

Time when a 406 MHz SARR frequency calibration offset for a given LEO satellite was determined through the procedure described for MF # 64.

F.2.6 Message Directory Path

The path of the directory into which message files shall be written. <MCCname> indicates that each MCC will put messages in a sub-directory per MCC, where the sub-directory name is the name of the sending MCC, per Table B.2.

Table F.1: MCC FTP Data Description

Receiving MCC	Host Name / IP Address	Password	User Name	Message Directory Path
ARMCC	*200.5.125.0* ~~*T.B.D.*~~	***	*Sending MCC name* ~~*T.B.D.*~~	*No specific directory - place message in directory logged into* ~~*T.B.D.*~~
AUMCC	**OPERATIONAL:** mcc-ftp.amsa.gov.au 203.2.242.20 **TEST:** drpmcc-ftp.amsa.gov.au 203.2.243.80	***	Anonymous	No specific directory - place message in directory logged into
CMC	**OPERATIONAL:** *cmc-ftp.morflot.ru* 195.28.55.247 *82.149.132.100* ~~62.117.93.107~~ **TEST:** *cmc-ftp1.morflot.ru* *195.28.55.248* ~~195.210.138.248~~ 62.117.93.108	***	Sending MCC name	In\
CMCC	***	***	***	Incoming
INMCC	ftp.inmcc.org 202.54.38.130			
JAMCC	210.230.175.26	***	JAMCC	
KOMCC	210.123.195.170	***	KOMCC	No specific directory - place message in directory logged into
THMCC	*210.246.145.38* ~~203.172.99.118~~	***		
TRMCC	*212.174.143.80*	***	*T.B.D.*	*T.B.D.*
USMCC	usmcc.nesdis.noaa.gov	***	Sending MCC name	MccInputOps\ <MCCname>

*** - value is provided on a need to know basis.
<MCCname> - label to be defined on a bilateral basis.

SYMBOL	NAME
*	ASTERIX
) (	CLOSE PARENTHESES
( )	OPEN PARENTHESES
`	APOSTROPHE
-	HYPHEN
“	QUOTATION
/	VIRGULE

F.3.2 Access

Access permissions on all directories and files on the FTP server shall follow the principle of “least permissions” to ensure that no unauthorized access is allowed. “Least permissions” means that each user is granted the minimum access required to perform their assigned tasks.

MCCs shall check IP addresses to limit server access only to authorized users.

MCCs shall allow access to their FTP servers only through ports 20 and 21. All other ports that are not being used shall be closed.

F.3.3 Anonymous FTP

MCCs shall not use anonymous FTP.

F.3.4 Encryption of Critical Information

MCCs shall implement methodologies to encrypt FTP login names (userids) and passwords during file transmission to prevent unauthorized disclosure. These methodologies include FTP over Internet VPN. Standards for the use of hardware VPN are contained in Annex G.

F.3.5 Monitoring for a Potential Security Breach

MCCs shall monitor the FTP servers for abnormal activity. If a breach of security is found, MCCs shall notify all FTP correspondents as soon as possible to minimize exposure.

Examples of items that should be monitored on a FTP server include:

Event logs
- Should be set and checked for failed login attempts
- Gaps in time and date stamps
- Attempts to elevate privileges

Disk Space
- Unexplained loss of disk space
- Unexplained disk access

ANNEX G

COSPAS-SARSAT STANDARD FOR THE TRANSMISSION OF SIT MESSAGES VIA HARDWARE VPN

G.1 INTRODUCTION

A Virtual Private Network (VPN) provides a secure method to transmit information over the Internet. A tunnelling technology such as Internet Protocol IPSec is used to set up private connections between separate sites. A tunnel provides a means for forwarding data across a network from one site to another, as if they were directly connected.

G.2 STANDARDS

G.2.1 Tunnelling

MCCs that use VPN to transmit data via the Internet shall use IPSec. IPSec is a framework of open standards developed by the Internet Engineering Task Force (IETF). IPSec provides security *for* ~~from~~ transmission of sensitive information over the Internet. IPSec acts at the network layer, protecting and authenticating IP packets between participating IPSec devices ("peers"), such as Cisco routers.

IPSec provides the following network security services:

- Data Confidentiality – The IPSec sender can encrypt packets before transmitting them across a network.
- Data Integrity – The IPSec receiver can authenticate packets sent by the IPSec sender to ensure that the data has not been altered during transmission.
- Data Origin Authentication – The IPSec receiver can authenticate the source of the IPSec packets sent. This service is dependent upon the data integrity service.
- Anti-Replay – The IPSec receiver can detect and reject replayed packets.

G.2.2 Mutual Confirmation Method

This step performs the function of a negotiator. It will allow two IPSec nodes to decide which algorithms they will use for authentication and encryption, as well as how long this session will last. The Cospas-Sarsat standard is the PreShared Key Internet Key Exchange (IKE) method.

G.2.3 Code Algorithm (Crypto Algorithm)

This step applies a mathematical formula to the information to be encrypted. MCCs should implement the highest level of encryption that is available on a bilateral basis. Possible choices include:

I.2.3 Schedule

<u>Notes</u>: FTPV = FTP over Internet VPN
AFTN = Aeronautical Fixed Telecommunication Network
SMTPV = SMTP over Internet VPN

Table I.1: Nodal to Nodal Communications Activation/Verification Check List

MCC	CMC	FMCC	JAMCC	USMCC	SPMCC
AUMCC	AFTN (in place)	AFTN *Sept 2005* ~~(in place)~~	FTPV *Sept 2005* ~~01 Mar 2005~~	AFTN *(in place)* ~~01 Aug 2004~~	AFTN (in place)
	FTPV *Sept 2005* ~~T.B.D.~~	FTPV *Sept 2005* ~~T.B.D.~~	AFTN *01 Apr 2007* ~~01 April 2006~~	FTPV *01 Aug 2005* ~~01 Feb 2005~~	FTPV *01 Sept 2005* ~~T.B.D.~~
		SMTPV *T.B.D.* ~~01 Mar 2005~~			
CMC		AFTN (in place)	FTPV *01 Jan 2006*	AFTN *(in place)* ~~01 Oct 2004~~	AFTN (in place)
		FTPV *01 Jan 2006* ~~01 Sep 2005~~	AFTN *01 April 2007* ~~01 Apr 2006~~	FTPV *01 Jan 2006* ~~01 Apr 2005~~	FTPV *01 Jan 2006* ~~01 Jun 2005~~
FMCC			FTPV *(in place)* ~~01 Apr 2005~~	AFTN *(in place)* ~~01 Sep 2004~~	AFTN (in place)
			AFTN *01 April 2007* ~~01 Apr 2006~~	FTPV *(in place)* ~~01 Apr 2005~~	FTPV *(in place)* ~~01 Feb 2005~~
JAMCC				FTPV *(in place)* ~~01 Oct 2004~~	FTPV *(in place)* ~~01 May 2005~~
				AFTN *01 April 2007* ~~01 Apr 2006~~	AFTN 01 Apr *2007* ~~2006~~
USMCC					AFTN (in place)
					FTPV *(in place)* ~~01 Apr 2005~~

Table I.2: Target Implementation Dates for Nodal MCC Communications

MCC	AFTN	FTPV
AUMCC	In place	*Aug 2005* ~~01 Feb 2005~~
CMC	In place	*01 Jan 2006* ~~01 Apr 2005~~
FMCC	In place	*In place* ~~01 Feb 2005~~
JAMCC	*01 Apr 2007* ~~(01 Apr 2006)~~	*In place* ~~01 Oct 2004~~
SPMCC	In place	*In place* ~~01 Feb 2005~~
USMCC	In place	*In place* ~~01 Oct 2004~~

Table I.3 - Phase III: Western DDR Communications Activation/Verification Check List

ARMCC	AFTN – In Place
	FTPV – *In Place* ~~01 October 2004~~
	Link 3 – N/A
BRMCC	AFTN – In Place
	FTPV – T.B.D.
	Link 3 - N/A
CHMCC	AFTN – In Place
	FTPV – *T.B.D.* ~~End 2004~~
	Link 3 – N/A
CMCC	AFTN – *In Place* ~~TBD~~
	FTPV – *In Place* ~~TBD~~
	Link 3 – N/A
PEMCC	FTPV – *T.B.D.* ~~December 2004~~
	Link2 dd mmm
	Link3 dd mmm

1. All Link3 entries are optional.

Table I.4 - Phase III: Central DDR Communications Activation/Verification Check List

MCC	~~ALMCC~~	ITMCC	~~NIMCC~~	NMCC	~~SPMCC~~	*TRMCC*	UKMCC
FMCC	~~AFTN (in place)~~	AFTN (in place)	~~AFTN April 2005~~	AFTN (in place)	~~AFTN (in place)~~	*AFTN (in place)*	AFTN (in place)
	~~FTPV April 2005~~	FTPV *T.B.D.* ~~April 2005~~	~~FTPV April 2005~~	FTPV *August 2005* ~~April 2005~~	~~FTPV April 2005~~	*FTPV Jun 2005*	FTPV *T.B.D.* ~~April 2005~~
	~~Link3[1] dd mmm~~	Link3 dd mmm	~~Link3 dd mmm~~	Link3 dd mmm	~~Link3 dd mmm~~	*X.25 (in place)*	Link3 dd mmm
~~**ALMCC**~~		~~AFTN (in place)~~	~~Link1 dd mmm~~	~~AFTN (in place)~~	~~AFTN (in place)~~		~~AFTN (in place)~~
		~~FTPV April 2005~~	~~Link2 dd mmm~~	~~FTPV April 2005~~	~~FTPV April 2005~~		~~FTPV April 2005~~
		~~Link3 dd mmm~~	~~Link3 dd mmm~~	~~Link3 dd mmm~~	~~Link3 dd mmm~~		~~Link3 dd mmm~~
ITMCC			~~Link1 dd mmm~~	AFTN (in place)	~~AFTN (in place)~~	*AFTN Aug 2005*	AFTN (in place)
			~~Link2 dd mmm~~	FTPV *August 2005* ~~April 2005~~	~~FTPV April 2005~~	*FTPV Aug 2005*	FTPV *T.B.D.* ~~April 2005~~
			~~Link3 dd mmm~~	Link3 dd mmm	~~Link3 dd mmm~~	*X.25 Aug 2005*	Link3 dd mmm

MCC	~~**ALMCC**~~	**ITMCC**	~~**NIMCC**~~	**NMCC**	~~**SPMCC**~~	***TRMCC***	**UKMCC**
~~**NIMCC**~~				~~Link1 dd mmm~~	~~Link1 dd mmm~~		~~Link1 dd mmm~~
				~~Link2 dd mmm~~	~~Link2 dd mmm~~		~~Link2 dd mmm~~
				~~Link3 dd mmm~~	~~Link3 dd mmm~~		~~Link3 dd mmm~~
NMCC					~~AFTN (in place)~~	*AFTN Aug 2005*	AFTN (in place)
					~~FTPV April 2005~~	*FTPV Aug 2005*	FTPV *August 2005* ~~April 2005~~
					~~Link3 dd mmm~~	*X.25 Aug 2005*	Link3 dd mmm
~~**SPMCC**~~			~~AFTN April 2005~~				~~AFTN (in place)~~
			~~FTPV April 2005~~				~~FTPV April 2005~~
			~~Link3 dd mmm~~				~~Link3 dd mmm~~
TRMCC							*T.B.D.*
							T.B.D.
							T.B.D.

1. All Link3 entries are optional.

Table I.5 - Phase III: Eastern DDR Communications Activation/Verification Check List

INMCC	AFTN (in place)
	FTPV *01 Jan 2006* ~~April 2005~~
	Link3[1] dd mmm
PAMCC	Link1 dd mmm
	Link2 dd mmm
	Link3 dd mmm

1. All Link3 entries are optional.

Table I.6 – Phase III: Southwest Pacific DDR Communications Activation/Verification Check List

ASMCC	FTPV *October 2005* ~~February 2005~~
	AFTN (in place)
	Link3[1] dd mmm
IDMCC	AFTN December 2005
	FTPV December 2005
	Link3 dd mmm
SAMCC	AFTN (in place)
	FTPV December 2005
	Link3 dd mmm
SIMCC	AFTN (in place)
	FTPV*(in place)* ~~March 2005~~
	Link3 dd mmm
THMCC	AFTN (in place)
	FTPV *December* ~~April~~ 2005
	Link3 dd mmm

1. All Link3 entries are optional.

Table I.7 – Phase III: Northwest Pacific DDR Communications Activation/Verification Check List

CNMCC	*T.B.D.* ~~FTPV 2005~~
	AFTN (in place)
	Link3[1] dd mmm
HKMCC	FTPV *(in place)* ~~1 Dec 04~~
	AFTN (in place)
	Link3 dd mmm
KOMCC	FTPV *1 Jul 05* ~~1 May 05~~
	AFTN after *1 Apr 07* ~~1 Oct 05~~
	Link3 dd mmm
TAMCC	FTPV *(in place)* ~~T.B.D.~~
	AFTN (in place)
	Link3 dd mmm
VNMCC	FTPV (in place) AFTN after *1 Apr 07* ~~1 Oct 05~~ Link3 dd mmm

1. All Link3 entries are optional.

Table I.8 - Phase III: South Central DDR Communications Activation/Verification Check List

MCC	*ALMCC*	*NIMCC*
SPMCC	*AFTN* *(in place)*	*AFTN* ~~*(in place)*~~ *01 Sep 2005*
	FTPV ~~*(in place)*~~ *01 Sep 2005*	*FTPV* ~~*(in place)*~~ *01 Sep 2005*
	Link3[1] *dd mmm*	*Link3*[1] *dd mmm*
~~***ALMCC***~~		~~*Link1*~~ ~~*dd mmm*~~
		~~*Link2*~~ ~~*dd mmm*~~
		~~*Link3*[1]~~ ~~*dd mmm*~~

1. All Link3 entries are optional.

- END OF ANNEX I -

ANNEX 6

DRAFT AMENDMENTS TO DOCUMENT

**"COSPAS-SARSAT
SYSTEM MONITORING AND REPORTING"**

**C/S A.003
Issue 1 - Draft Revision 12**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S A.003 for submission to Council for approval.

1.3 Distress beacons *

1.3.1 Evaluation of 406 MHz beacon population:

Registered EPIRBs ________

Registered ELTs ________

Registered PLBs ________

Registered SSAS beacons ________

Registered Tests ________

Evaluation of new beacons used as a replacement _______

Evaluation of non-registered beacons (where possible) _______

1.3.2 Evaluation of 121.5 MHz beacon population:

ELTs ________

EPIRBs ________

PLBs ________

Tests ________

1.3.3 Changes of regulatory status

1.3.4 Updates of beacon populations forecast:

Year	2010		2015	
Frequency / Beacons	406 MHz	121.5 MHz	406 MHz	121.5 MHz
ELTs				
EPIRBs				
PLBs				
SSAS beacons				

Note: * - To be provided by all Cospas-Sarsat participants, including User States.

1.4 Status of Implementation of System Changes

Change ID (Council Report Reference) (a)	*Description of Change (Including Type) (b)*	*Criticality (c)*	*Implementation Date*	*Date Completed*	*Estimated Completion Date*

(a) - Defined in the Council Report
(b) - Corrective, Adaptive, Enhancement
(c) - Routine, Critical

II. SYSTEM OPERATIONS

2.1 Number of 406 MHz beacon activations reported to RCCs/SPOCs within the MCC service area

Alert Classifications	**EPIRB [1]**	**ELT [1]**	**PLB [1]**	**Sub-Total**	**Total**
Distress alerts					
False alerts					
Unfiltered processing anomalies					
Operational false alerts (beacon activations)					
Beacon mishandling [2]					
Beacon malfunction [2]					
Mounting failure [2]					
Environmental conditions [2]					
Unknown [2]					
Undetermined					
Total					

Note 1: Optional information.

Note 2: See Appendix B.1 for classifications of Cospas-Sarsat alerts and Appendix B.2 for examples of operational false alerts associated with each classification.

ANNEX C

406 MHz INTERFERENCE MONITORING AND REPORTING

C.1 STATUS OF LEOLUT MONITORING CAPABILITIES

The following Cospas-Sarsat LEOLUTs are capable of monitoring 406 MHz interference, using special equipment in the LEOLUT, in conjunction with the 406 MHz repeater on Sarsat satellites. The coverage area of LEOLUTs performing 406 MHz routine interference monitoring is shown at Figure C.1.

LEOLUTs		**COMMENTS** *
Algeria:	Ouargla	Routine monitoring
	Algiers	*Routine monitoring*
Argentina:	Parana	Available
	Rio Grande	Available
Australia:	Albany	Routine monitoring
	Bundaberg	Routine monitoring
Brazil:	Brasilia	*Available* ~~T.B.D.~~
	Manaus	*Available* ~~*T.B.D.*~~
	Recife	*Available* ~~T.B.D.~~
Canada:	Churchill	Routine monitoring
	Edmonton	Routine monitoring
	Goose Bay	Routine monitoring
	Ottawa (Test facility)	*Available* ~~T.B.D.~~
Chile:	Easter Island	Available
	Punta Arenas	Available
	Santiago	Routine monitoring
China (P.R.):	Beijing	Available
France:	Toulouse	Routine monitoring
Hong Kong, China:	Hong Kong	Routine monitoring
India:	Bangalore	Routine monitoring
	Lucknow	Routine monitoring
Indonesia:	Jakarta	Periodic monitoring
Italy:	Bari	Routine monitoring
ITDC:	Keelung	Available
Japan:	Yokohama	Routine monitoring
Korea (Rep.of):	Daejeon	Routine monitoring
New Zealand:	Wellington	Routine monitoring
Norway:	Spitsbergen	Available
	Tromsoe	Routine monitoring
Pakistan:	Lahore	Periodic monitoring
Peru:	Callao	Routine monitoring

LEOLUTs		COMMENTS *
Russia:	Moscow	Periodic monitoring
Saudi Arabia:	Jeddah	Routine monitoring
Singapore:	Singapore	Periodic monitoring
South Africa:	Cape Town	*Periodic monitoring* ~~T.B.D.~~
Spain:	Maspalomas	Routine monitoring
Turkey:	*Ankara*	*Routine monitoring* ~~*T.B.D.*~~
Thailand:	Bangkok	*Routine monitoring* ~~T.B.D.~~
UK:	Combe Martin	Routine monitoring
USA:	Alaska California Florida Guam Hawaii ~~Maryland (OSE)~~ Maryland (LSE) ~~Texas~~ ~~Maryland~~	Routine monitoring Routine monitoring Routine monitoring Routine monitoring Routine monitoring ~~Periodic monitoring~~ Periodic monitoring ~~Routine monitoring~~ ~~T.B.D.~~
Vietnam:	Haiphong	T.B.D.

Note: * Periodic monitoring: the LEOLUT can be set by the MCC operator to a special operating mode to check for 406 MHz interference periodically as needed.

Routine monitoring: the LEOLUT automatically monitors each scheduled Sarsat satellite pass above 5° for 406 MHz interference.

~~OSE Operational Support Equipment (located at Suitland, Maryland).~~

LSE LEOSAR Support Equipment (located at Suitland, Maryland).

T.B.D. To be determined.

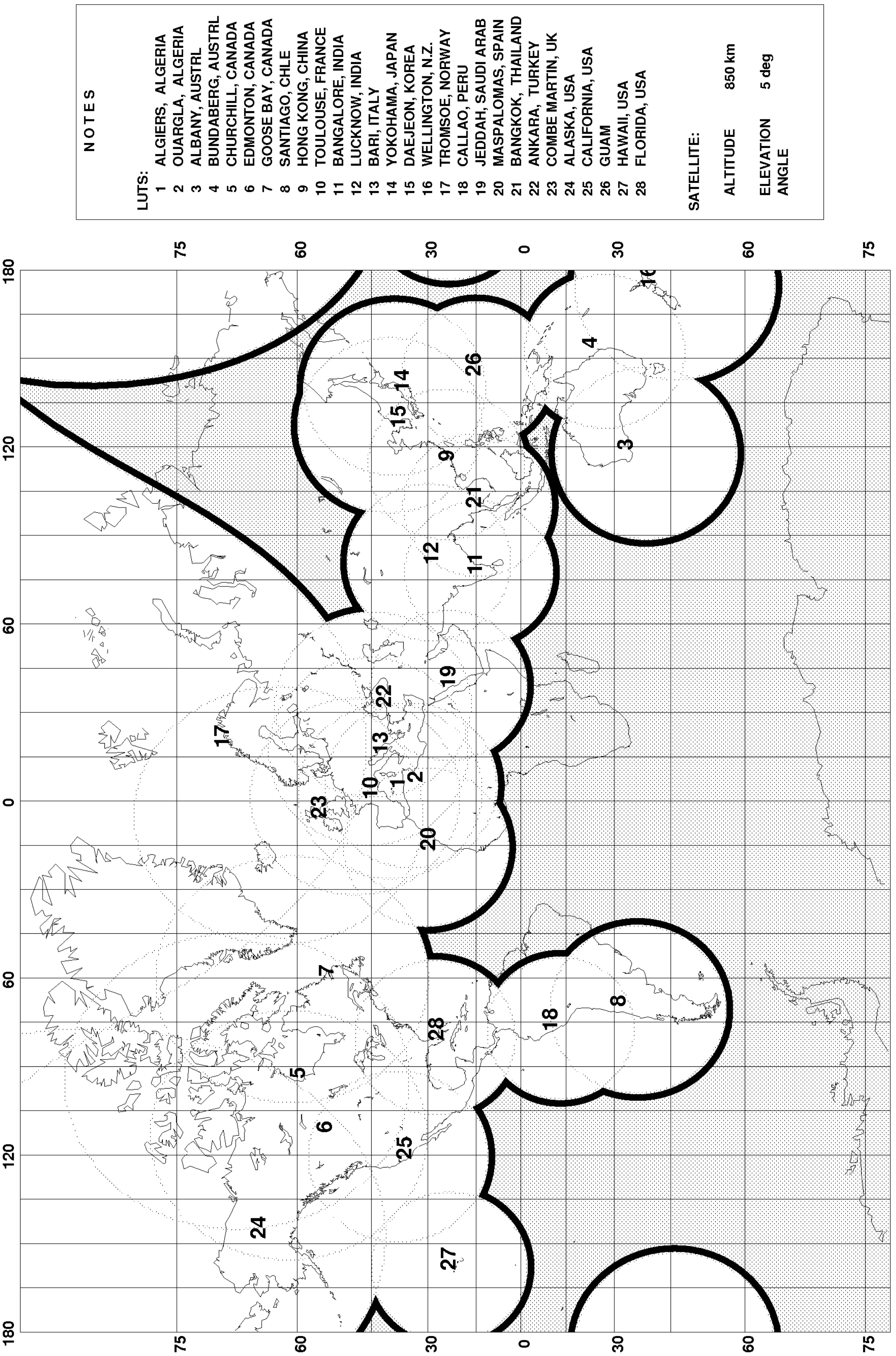


Figure C.1: Coverage Area of LEOLUTs Performing 406 MHz Routine Interference Monitoring

ANNEX G

GUIDELINES FOR DETECTING AND REPORTING ON LARGE LOCATION ERRORS (DOPPLER PROCESSING ANOMALIES)

1. Detecting Large Errors at an MCC

The main sources of information for an MCC are:

i) SPOCs/RCCs or other SAR organisations;
ii) Other Cospas-Sarsat MCCs; and
iii) MCC's data file, by comparison to the complete set of locations received for each operational beacon.

2. Data Items to Be Reported

2.1 By SPOCs/RCCs:

The following data items (as available) should be collected by the reporting SPOC/RCC and forwarded to its associated MCC, no later than two weeks after the incident:

a) Beacon ID;
b) Actual location;
c) How actual location was determined;
d) ID of beacon carrier;
e) Beacon type;
f) Beacon manufacturer/model/serial number;
g) MCC that sent the alert message to the SPOC/RCC;
h) Message sequence number(s) from reporting MCC;
i) Reason for activation; and
j) Narrative description of incident to include amplifying details not specifically requested above.

2.2 By MCCs to another MCC:

a) Message numbers exchanged on suspect location; and
b) Any additional information that may assist the MCC to identify and resolve the problem.

2.3 By MCCs to the Cospas-Sarsat Secretariat:

MCCs should *digitally* forward to the Cospas-Sarsat Secretariat ~~the form G.1 (provided at page G-4), completed as appropriate, or provide the required data using an equivalent format.~~ *a quarterly report of large location errors using a Microsoft Access Large Location Error Database and associated entry form (form G.1). The* *database format and entry form are available digitally from the Secretariat, upon request.*

MCCs are encouraged to make every effort to determine the true location of the source and not rely on the MCC merged positions. This may result in each MCC only reporting large location errors in which the actual location is confirmed, likely in their own service areas.

2.3.1 The following conditions should be considered in identifying the causes of large location errors:

a) Marginal conditions

low number of points

extreme CTA

TCA not bracketed by data points

b) Interference

c) Equipment faults

MCC not performing to specification

LEOLUT/GEOLUT not performing to specification

satellite payload instruments not performing to specification

beacon not performing to specification

d) Processing error

incorrect orbit vectors at LEOLUTs

poor SARP calibration (incorrect time or frequency calibration parameters used by LEOLUT)

satellite clock rollover

transposition of data fields (Doppler processing used a data point to calculate the location that did not come from the same beacon event)

e) Beacon activation during satellite pass.

2.3.2 Identifying the cause of large location errors (when it is not obvious) is easier if the following set of data is available:

a) All information received on suspect locations: from directly connected LUTs or from other MCCs (SIT 125, 135);

b) All information received from SAR sources, particularly the beacon ACTUAL POSITION, even if not very accurate;

c) Location summary for this particular beacon (attach summary); and

d) Whenever possible, the time/frequency measurements for the set of data points.

2.4 If the actual position is known (other Cospas-Sarsat locations or SAR sources), MCCs should:

a) Calculate the satellite pass prediction table for this position and period of time; and
   i) Compare actual CTA and location calculated CTA;
   ii) Compare actual TCA and location calculated TCA; and
   iii) Compare actual AOS, LOS and dates of first and last points;

b) Calculate the ratio of received/expected points using Table D.4; and

c) ~~Fill the form G.1 (see page G-4).~~*Add an entry to the MS Access Large Location Error table using the data entry form provided by the Secretariat.*

2.5 Along with the data ~~contained in Form G.1~~*documented in the MS Access Large Location Error data entry form*, the following data may be useful in analysing large location errors:

a) Orbit vectors used by the LEOLUT at the time

b) LEOLUT SARP calibration data (if SARP data points were used)

c) GEOLUT/LEOLUT calibration data (if GEOSAR data was used)

d) LUT solution data, including time, frequency of data points used

e) Dot plots

f) Beacon information

   beacon manufacturer and model

   beacon transmit frequency

   beacon EIRP and antenna characteristics

g) Characterisation data/analysis conducted on interferers and the event.

Note: For large location errors, location calculated CTA and SDV are no more accurate than the calculated positions. Hence they are of little help to identify large errors.

Form G.1: Report on Doppler Processing Anomalies (Large Location Errors over 120 km)

ORIGINATING MCC: ____________________

Decoded Beacon ID: ____________________
(Country / Protocol / Carrier ID or Serial No.)

Actual Values: ______ AOS ______ TCA ______ LOS

Beacon ID (15 Hex): ____________________

Actual Values: ______ CTA ______ Max. elev. Angle

Actual Date/Time of Large Location Error: ____________________

Actual Position: ____________________
(Lat. / Long.)

Time of Data Points: ______ First ______ Last

How was Position Determined: ____________________

Closest DA0 Time (Sarsat only): ____________________

Reason for Beacon Activation: ____________________

Cospas-Sarsat Solution Data

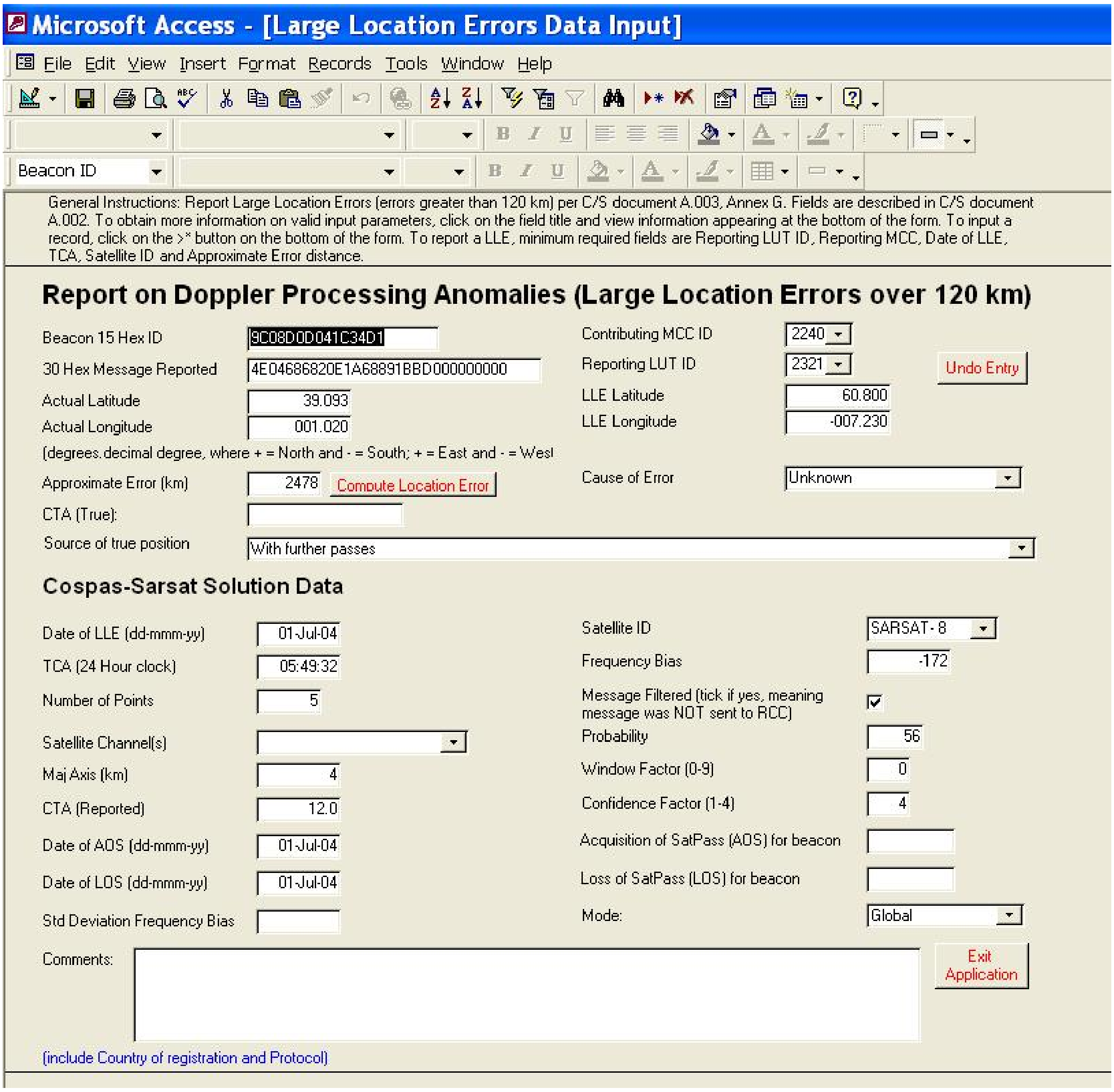
TCA	Sat.	Bias	Pts	Expect. Number of Points	Message Filtered (Yes/No)	Channel(s) SARR/ SARP/ GEOSAR	Lat. (xx.x)	Long. (xxx.x)	Prob.	Maj. Axis	Error Approx.	CTA	WF	SDV	CF	LUT ID	AOS / LOS of Sat. Pass

Cause of Error: ____________________ Probable ☐ Certain ☐ Unknown ☐ (√)

- END OF ANNEX G -

Form G.1: Report on Large Location Errors

(Digital Version Available from the Secretariat)



Microsoft Access - [Large Location Errors Data Input]

File Edit View Insert Format Records Tools Window Help

Beacon ID

General Instructions: Report Large Location Errors (errors greater than 120 km) per C/S document A.003, Annex G. Fields are described in C/S document A.002. To obtain more information on valid input parameters, click on the field title and view information appearing at the bottom of the form. To input a record, click on the >* button on the bottom of the form. To report a LLE, minimum required fields are Reporting LUT ID, Reporting MCC, Date of LLE, TCA, Satellite ID and Approximate Error distance.

Report on Doppler Processing Anomalies (Large Location Errors over 120 km)

Beacon 15 Hex ID: 9C08D0D041C34D1

30 Hex Message Reported: 4E04686820E1A68891BBD000000000

Actual Latitude: 39.093

Actual Longitude: 001.020

(degrees.decimal degree, where + = North and - = South; + = East and - = West

Approximate Error (km): 2478 Compute Location Error

CTA (True):

Source of true position: With further passes

Contributing MCC ID: 2240

Reporting LUT ID: 2321

Undo Entry

LLE Latitude: 60.800

LLE Longitude: -007.230

Cause of Error: Unknown

Cospas-Sarsat Solution Data

Date of LLE (dd-mmm-yy): 01-Jul-04

TCA (24 Hour clock): 05:49:32

Number of Points: 5

Satellite Channel(s):

Maj Axis (km): 4

CTA (Reported): 12.0

Date of AOS (dd-mmm-yy): 01-Jul-04

Date of LOS (dd-mmm-yy): 01-Jul-04

Std Deviation Frequency Bias:

Satellite ID: SARSAT - 8

Frequency Bias: -172

Message Filtered (tick if yes, meaning message was NOT sent to RCC): ☑

Probability: 56

Window Factor (0-9): 0

Confidence Factor (1-4): 4

Acquisition of SatPass (AOS) for beacon:

Loss of SatPass (LOS) for beacon:

Mode: Global

Comments:

Exit Application

(include Country of registration and Protocol)

- END OF ANNEX G -

Ref. Num Test Bcn	(Pass) Date/ Time	Transmitted 30 Hex Code; Default 15 Hex Id, bits 26-85 (9 bit Frame Synchronisation)	Number of Bursts; Transmit Freq.	Comments
21	(1) TBD	96EB02EE3487571F73683781000D6D 2DD605DC3F81FE0	1 406.027	Test Objective: LUT beacon message processing, Doppler processing with bad frequency. MCC distribution based on encoded position. USA National Location Protocol PLB with encoded position (-82.100, -87.100).
		96EB02EE3487571F73683781000D6D 2DD605DC3F81FE0	1 406.025	Same Id as above. Frequency changed.
		96EB02EE3487571F73683781000D6D 2DD605DC3F81FE0	1 406.029	Same Id as above. Frequency changed.
		96EB02EE3487571F73683781000D6D 2DD605DC3F81FE0	1 406.026	Same Id as above. Frequency changed.
22 USA	(1)	BFC0270F000002CA2F4015FFFFFFFE 7F804E1E0000059	5 406.022	Test Objective: MCC beacon message validation. Doppler position in Greenbelt. Multiple invalid beacon messages which decode as an orbitography beacon.
23 *France*	(1) *TBD*	*93CCF423F0A1C2575597369F400819* *2799E847E0FFBBFF*	*6* *406.037*	*Test Objective: SSAS Processing –Canada Country Code -Doppler position in Toulouse, encoded position in South Africa (-33.881, 18.500)*
24 *France*	(1) *TBD*	*A37C5161502B4036D69136CA420129* *46F8A2C2A0FFBBFF*	*6* *406.037*	*Test Objective: SSAS Processing – Thailand Country Code - Doppler position in Toulouse, encoded location in Toulouse*
25 *France*	(1) *TBD*	*9B8CBDE3102BC034DE2AF630822F69* *37197BC620FFBBFF*	*6* *406.037*	*Test Objective: SSAS Processing – South Korea Country Code – Doppler Position in Toulouse, encoded location in the Toulouse*
26 *USA*	(1) *TBD*	*8E0CA2C2A098D30C9C48B681E9B0B3* *1C19458540FFBBFF*	*6* *406.037*	*Test Objective: SSAS Processing –Spain Country Code - Doppler in USA, encoded location in Australia (-24.758, 152.412)*
27 *USA*	(1) *TBD*	*901C87A23026E99A244476BAE6A5B7* *20390F4460FFBBFF*	*6* *406.037*	*Test Objective: SSAS Processing – Norway Country Code - Doppler Position in USA, encoded location in USA*
28 *USA*	(1) *TBD*	*9A3C00001026E998877AF6962589FE* *3478000020FFBF*	*6* *406.037*	*Test Objective: SSAS Processing –India Country Code - Doppler Position in USA, encoded location in USA*

TABLE J.2: Expected LEOLUT and MCC Processing for System Level Test

Ref. Num	Message to be Transmitted by LUT (Default 15 Hex Id, bits 26-85)	Doppler Position	Encoded Position	Comments
1	CC7469A69A69A68C0D498FFFFFFFFF (98E8D34D34D34D1)	n/a	n/a	LEOLUT corrects two bit errors and sends corrected message to MCC. Bits 113 to 144 are set to all “1" because PDF-2 is not confirmed. MCC Action code: Sw0 + Invalid Data -> AW0. MCC suppresses message distribution because the country code is invalid and there is only one burst (DDP, Table III/B.4).
2	96E9B93089C14CDE5215B7FFFFFFFF (2DD372613F81FE0)	n/a	39.000 N 76.900 W	LEOLUT sends unconfirmed complete message with bits 113 - 144 all set to 1 to MCC. MCC Action code: Sw0 + Invalid Data -> AW0. MCC suppresses message distribution due to spare protocol code (DDP, Table III/B.4)
3	96EA0000D8894D7CAD91F79F3C0010 (2DD40001BF81FE0)	38.995 N 76.851 W	98.123 N 77.500 W	LEOLUT sends confirmed complete message to MCC. MCC Action code: Sw0 + I2 -> AW2. MCC sends SIT 125 alert based on the “A” and “B” Doppler positions. Even though the encoded position is invalid there are two or more points available for processing (DDP, Table III/B.4 and Table III/B.5)
4	56E30E1A4324920310DBC0FFFFFFFF (ADC61C348649240)	38.995 N 76.851 W	n/a	LEOLUT sends invalid confirmed message with bits 113 - 144 all set to 1 to MCC. MCC ignores bits beyond short message. MCC Action code: Sw0 + I2 -> AW2. MCC sends SIT 125 alert based on the “A” and “B” Doppler positions. Even though there are 4 bit errors in the message there are two or more matching points available for processing (DDP, Table III/B.3).
5	96E20000007FDFFC4AE03783E0F66C (2DC4000000FFBFF)	38.995 N 76.851 W	n/a	LEOLUT sends confirmed complete message to MCC. MCC Action code: Sw0 + I2 -> AW2. MCC sends SIT 125 alert based on the “A” and “B” Doppler positions.
6	96E20000002B803713C8F78E010D07 (2DC4000000FFBFF)	n/a	43.559 N 1.483 E	LEOLUT sends confirmed complete message to MCC. Frequency difference between the two points prevents combined LEO/GEO LUT processing. MCC Action code: Sw2 + I3 -> AW4. MCC sends SIT 123 alert based on the encoded position (DDP, Figure III/B.2 and Figure III/B.3).
7	96E2000000272998994637012 61BF1 (2DC4000000FFBFF)	n/a	38.995 N 76.851 W	LEOLUT sends confirmed complete message to MCC. MCC Action code: Sw4 + I3 -> AW7. MCC sends SIT 124 alert based on the match of the encoded position and previous Doppler position. (DDP, Figure III/B.2 and Figure III/B.3).
8	96E200000026A99CDA28B780230987 (2DC4000000FFBFF)	n/a	38.500 N 76.800 W	LEOLUT sends confirmed complete message to MCC. MCC Action code: Sw7 + I3 -> Ct0. MCC filters this alert because ambiguity has been resolved.(DDP, Figure III/B.2 and Figure III/B.3). MCC should also note the position conflict to previous locations.
9	8E340000002B803231B3F68E011E5C (1C68000000FFBFF)	43.559 N 1.482 E	43.559 N 1.482 E	LEOLUT sends updated, confirmed complete message for Standard Location Protocol beacon to MCC. MCC Action code: Sw0 + I7 -> AW7. MCC sends SIT 127 alert based on the match of the encoded and Doppler positions (DDP, Figure III/B.2 and Figure III/B.3)

Ref. Num	Message to be Transmitted by LUT (Default 15 Hex Id, bits 26-85)	Doppler Position	Encoded Position	Comments
20	n/a	n/a	n/a	LEOLUT suppresses beacon messages due to the inverted frame synchronization.
21	96EB02EE3487571F73683781000D6D (2DD605DC3F81FE0)	n/a	-82.100 -87.100	LEOLUT sends confirmed complete message to MCC. No Doppler location is calculated due to bad frequency. <u>MCC Action code</u>: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the encoded position (DDP, Figure III/A.7, Figure III/B.2 and Figure III/B.3).
22	BFC0270F000002CA2F4015FFFFFFFF 7F804E1E0000059	38.995 N 76.851 W	N/A	LEOLUT performs invalid beacon message processing, and provides Doppler location at Greenbelt. Ground segment equipment should not suppress the alert. <u>MCC Action code</u>: Sw0 + I2 -> AW2. MCC sends SIT 125 alert based on the "A" and "B" Doppler positions; even though there are uncorrectable bit errors in the PDF-1 there are two or more matching points available for processing (DDP, Table III/B.3). Due to uncorrectable bit errors in PDF-1, no processing is based on beacon message.
23	*93CCF423F0A1C2575597369F400819* *2799E847E0FFBFF*	*43.559 N* *1.482 E*	*33.881S* *18.500E*	*LEOLUT sends the first message (only complete confirmed message) to MCC and computes Doppler position.* *MCC Action code: Sw0 + I4 -> AW4. MCC sends SIT 126 alert based on the routing procedures for SSAS alerts*
24	*A37C5161502B4036D69136CA420129* *46F8A2C2A0FFBFF*	*43.559 N* *1.482 E*	*43.560N* *1.467E*	*LEOLUT sends updated, confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I7 -> AW7. MCC sends SIT 127 alert based on the routing procedures for SSAS alerts*
25	*9B8CBDE3102BC034DE2AF630822F69* *37197BC620FFBFF*	*43.559 N* *1.482 E*	*43.548N* *1.464E*	*LEOLUT sends updated, confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I7 -> AW7. MCC sends SIT 127 alert based on the routing procedures for SSAS alerts*
26	*8E0CA2C2A098D30C9C48B681E9B0B3* *1C19458540FFBFF*	*38.995 N* *76.851 W*	*24.758S* *152.412E*	*LEOLUT sends the first message (only complete confirmed message) to MCC and computes Doppler position.* *MCC Action code: Sw0 + I4 -> AW4. MCC sends SIT 126 alert based on the routing procedure for SSAS alerts*
27	*901C87A23026E99A244476BAE6A5B7* *20390F4460FFBFF*	*38.995 N* *76.851 W*	*38.996N* *76.861W*	*LEOLUT sends updated, confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I7 -> AW7. MCC sends SIT 127 alert based on the routing procedures for SSAS alerts*
28	*9A3C00001026E998877AF6962589FE* *3478000020FFBF*	*38.995 N* *76.851 W*	*38.842N* *76.842W*	*LEOLUT sends updated, confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I7 -> AW7. MCC sends SIT 127 alert based on the routing procedures for SSAS alerts*

Ref. Num	Message to be Transmitted by LUT (Default 15 Hex Id, bits 26-85)	Encoded Position	Comments
16	96E8000007815201C84BB4810007CB or 96E8000007815201C84BB4810F0255 (2DD000003F81FE0)	30.000 N 82.000 W or 30.000 N 82.003 W	GEOLUT sends, if confirmed, the updated complete message to MCC. MCC Action code: Sw3 + I3 -> AW0. MCC sends no alert. (DDP, Figure III/B.2 and Figure III/B.3).
17	D6E10E1A4324920458B9D555555555 (ADC21C348649240)	n/a	GEOLUT sends orbitography beacon message without correcting the long message. MCC suppresses message distribution because beacon type is orbitography.
18	n/a	n/a	GEOLUT suppresses beacon alert because no valid message exists.
19	n/a	n/a	GEOLUT suppresses beacon alert because message has 3 bit errors and is not confirmed.
20	n/a	n/a	GEOLUT suppresses beacon messages due to the inverted frame synchronization.
21	96EB02EE3487571F736837FFFFFFFF or 96EB02EE3487571F73683781000D6D (2DD605DC3F81FE0)	82.100 S 87.100 W	GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message to MCC. MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 based on the encoded position (DDP, Figure III/A.7, Figure III/B.2 and Figure III/B.3).
22	n/a	n/a	GEOLUT does not generate an alert due to uncorrectable PDF-1 bit errors.
23	*93CCF423F0A1C2575597369F400819* *or* *93CCF423F0A1C257559736FFFFFFFF*	*33.881S* *18.500E*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*
24	*A37C5161502B4036D69136CA420129* *or* *A37C5161502B4036D69136FFFFFFFF*	*43.560N* *1.467E*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*
25	*9B8CBDE3102BC034DE2AF630822F69* *or* *9B8CBDE3102BC034DE2AF6FFFFFFFF*	*43.548N* *1.464E*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*

Ref. Num	Message to be Transmitted by LUT (Default 15 Hex Id, bits 26-85)	Encoded Position	Comments
26	*8E0CA2C2A098D30C9C48B681E9B0B3* *or* *8E0CA2C2A098D30C9C48B6FFFFFFFF*	*24.758S* *152.412E*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*
27	*901C87A23026E99A244476BAE6A5B7* *or* *901C87A23026E99A244476FFFFFFFF*	*38.996N* *76.861W*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*
28	*9A3C00001026E998877AF6962589FE* *or* *9A3C00001026E998877AF6FFFFFFFF*	*38.842N* *76.842W*	*GEOLUT sends unconfirmed message with bits 113 - 144 all set to 1 or confirmed complete message for Standard Location Protocol beacon to MCC.* *MCC Action code: Sw0 + I3 -> AW3. MCC sends SIT 122 alert based on the country code (SSAS procedure)*

TABLE J.4: Specific MCC Processing for Messages Transmitted in System Level Test

Receiving MCC	Destination MCC/SIT Number					
	Test Reference Number					
	23	24	25	26	27	28
ALMCC	*SPMCC/126*	*SPMCC/127*	*SPMCC/127*	*SPMCC/126*	*SPMCC/127*	*SPMCC/127*
ARMCC	*USMCC/126*	*USMCC/127*	*USMCC/127*	*USMCC/126*	*USMCC/127*	*USMCC/127*
ASMCC	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*
AUMCC	*USMCC/126*	*THMCC/127*	*JAMCC/127*	*SPMCC/126*	*FMCC/127*	*CMC/127*
BRMCC	*USMCC/126*	*USMCC/127*	*USMCC/127*	*USMCC/126*	*USMCC/127*	*USMCC/127*
CHMCC	*USMCC/126*	*USMCC/127*	*USMCC/127*	*USMCC/126*	*USMCC/127*	*USMCC/127*
CMC	*USMCC/126*	*AUMCC/127*	*JAMCC/127*	*SPMCC/126*	*FMCC/127*	*INCC/127*
CMCC	*Natl Proc*	*USMCC/127*	*USMCC/127*	*USMCC/126*	*USMCC/127*	*USMCC/127*
CNMCC	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*
FMCC	*USMCC/126*	*AUMCC/127*	*JAMCC/127*	*SPMCC/126*	*NMCC/127*	*CMC/127*
HKMCC	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*
IDMCC	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*
INMCC	*CMC/126*	*CMC/127*	*CMC/127*	*CMC/126*	*CMC/127*	*Natl Proc*
ITMCC	*FMCC/126*	*FMCC/127*	*FMCC/127*	*FMCC/126*	*FMCC/127*	*FMCC/127*
JAMCC	*USMCC/126*	*AUMCC/127*	*KOMCC/127*	*SPMCC/126*	*FMCC/127*	*CMC/127*
KOMCC	*JAMCC/126*	*JAMCC/127*	*Natl Proc*	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*
NMCC	*FMCC/126*	*FMCC/127*	*FMCC/127*	*FMCC/126*	*Natl Proc*	*FMCC/127*
PAMCC	*CMC/126*	*CMC/127*	*CMC/127*	*CMC/126*	*CMC/127*	*CMC/127*
PEMCC	*USMCC/126*	*USMCC/127*	*USMCC/127*	*USMCC/126*	*USMCC/127*	*USMCC/127*
SAMCC	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*
SIMCC	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*
SPMCC	*USMCC/126*	*AUMCC/127*	*JAMCC/127*	*Natl Proc*	*FMCC/127*	*CMC/127*
TAMCC	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*	*JAMCC/126*	*JAMCC/127*	*JAMCC/127*
THMCC	*AUMCC/126*	*Natl Proc*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*
UKMCC	*FMCC/126*	*FMCC/127*	*FMCC/127*	*FMCC/126*	*FMCC/127*	*FMCC/127*
USMCC	*CMCC/126*	*AUMCC/127*	*JAMCC/127*	*SPMCC/126*	*FMCC/127*	*CMC/127*
VNMCC	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*	*AUMCC/126*	*AUMCC/127*	*AUMCC/127*

(Insert the following paragraph at the end of the first page of Annex J)

The Test Coordinator may change the country codes used to test SSAS beacons, provided that:

- *there is at least one country represented from each Data Distribution Region (DDR)*
- *both the countries that are affected by the change and their host nodal MCC agree in advance to the proposed change during the test planning phase*
- *all MCCs are notified of the changes prior to the test and are provided with a list of the new 406 beacon messages that will be used, and*
- *all MCCs are provided with changes to Table J.4 that apply for that test.*

- END OF ANNEX J –

- END OF DOCUMENT –

ANNEX 7

DRAFT AMENDMENTS TO DOCUMENT

**"COSPAS-SARSAT
MISSION CONTROL CENTRE (MCC)
PERFORMANCE SPECIFICATION
AND DESIGN GUIDELINES"**

**C/S A.005
Issue 3 - Draft Revision 3**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S A.005 for submission to Council for approval.

4. FUNCTIONAL REQUIREMENTS

Document C/S A.001 (DDP) contains detailed information on data distribution procedures. These procedures are part of the functional requirements imposed on Cospas-Sarsat MCCs. The basic functional and processing requirements, which are further described in the sections below, of an MCC are to:

a. receive data from its associated LUTs and other MCCs;

b. validate alert messages based on format and content;

c. selectively process data;

d. match distress alert signals emanating from the same beacon source;

e. resolve Doppler ambiguity;

f. geographically sort distress alert data to determine the appropriate recipient of the alert data;

g. filter redundant distress alert data;~~ and~~

h. provide notification of country of beacon registration (NOCR) for 406 MHz beacons as required*; and*

i. process ship security alerts.

4.1 Data Acquisition

An MCC shall be capable of receiving, without any loss of data, all uncorrupted messages sent by Cospas-Sarsat LUTs and MCCs and by SAR authorities via any of the networks to which it is connected. Incoming data shall be time tagged with the time of receipt (co-ordinated universal time (UTC)) and stored. Data received electronically shall be stored electronically. In all cases, incoming data shall be accessible to the operator for the period specified in section 5. All MCCs shall be able to receive multi-SIT messages as defined in C/S A.002.

4.2 Data Validation

4.2.1 MCCs shall validate received SIT messages for proper data format and consistency using the guidelines provided in documents C/S A.001 (DDP) and C/S A.002 (SID). An MCC shall be capable of requesting retransmission of any message that is believed to be in error.

4.2.2 An MCC shall validate 406 MHz alert data received from LUTs and MCCs according to Annex III/B of document C/S A.001 (DDP) to ensure that alert data transmitted by the MCC corresponds to a real transmission, and to ensure

4.5.2 An MCC shall resolve 121.5 MHz Doppler ambiguity according to national procedures for matching.

4.5.3 Typically, MCCs do not exchange data after ambiguity is resolved. However, in certain instances it is necessary to continue forwarding alert data to an MCC. In order to support this requirement, an MCC shall have the capability to continue transmission of alert data for selected beacons.

4.5.4 Ambiguity at a national level may also be resolved, subject to confirmation by SAR forces, using any additional information such as a request for assistance with indication of a probable search area, relation of locations to a 406 MHz beacon message, overflight reports, correlation of land/sea positions with beacon type (i.e., ELT/EPIRB/PLB), overdue reports, etc.

4.6 Geographic Sorting of Alert Data

An MCC shall maintain the capability to geographically sort beacon locations for its service area and those areas required by its communication links as described C/S A.001 (DDP). Each MCC service area shall be sub-divided into Cospas-Sarsat SPOC service areas, as required for application of national procedures.

4.7 Filtering Redundant Alert Data

Redundant alert data for the same beacon event is filtered at an MCC. An MCC shall filter 121.5 MHz alert data from its associated LUTs and from other MCCs according to its own criteria. MCCs shall filter 406 MHz alert data according to criteria defined in Annex III/B of document C/S A.001 (DDP). Additionally, 406 MHz alert data shall follow the procedures for determining better quality alert data for the same beacon event as contained in the DDP.

4.8 Notification of Country of Beacon Registration (NOCR)

In addition to the distribution of alert data, MCCs shall provide notification of a 406 MHz distress alert within its service area to States that have requested the service. MCCs shall follow the procedures contained at Annex III/B of document C/S A.001 (DDP).

4.9 Ship Security Alert

MCCs shall process ship security alerts according to the logic in Annex III/B of document C/S A.001 (DDP). Routing of ship security alerts shall be based on the country code contained in the beacon message. Ship security alerts shall be exchanged using the formats and data content for 406 MHz alert messages as contained in document C/S A.002 (SID).

- END OF SECTION 4 -

ANNEX 8

DRAFT AMENDMENTS TO DOCUMENT

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

**C/S A.006
Issue 3 – Draft Revision 1**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S A.006 for submission to Council for approval.

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* ~~shall be capable of the following functions~~:

a. ~~to~~ receive, process and forward alert data and System information in accordance with document C/S A.001 (DDP);

b. ~~to~~ selectively report or suppress transmission of alert data for a particular beacon when requested;

c. ~~to~~ re-transmit a specified message;

d. ~~to~~ respond to direct requests for information from other MCCs or SPOCs;

e. ~~to~~ retrieve information on request;

f. ~~to~~ generate a "notification of country of beacon registration" (NOCR) message;

g. ~~to~~ use all identified communication links;

h. ~~to~~ switch to back-up procedures identified by the DMCC in Annex II / C of document C/S A.001;

i. ~~to~~ process unlocated 406 MHz alerts~~; and~~

j. process ship security alerts; and

~~j.~~k. ~~to~~ 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.

C. Alert Data Summary Database

Field	Description	Detailed Format	Remarks
1	MCC identifier	nnnn	Note 2
2	Beacon location	AAAAAAAAAAA	Nearest town or sea area
3	Beacon identifier	AAAAAAAAAAAAAAA	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	nnn	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*
2~~5~~*6*	Comments	AAAAAAAA	

Notes:

1) 15 character default hex identifier, leave blank for 121.5/243 MHz beacons.

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)

Paragraph in C/S A.005	Requirement or Test	Pass Criteria	Result	Pass/ Fail	Method of Compliance	Declaration/ Verification or Comments
4.5.4	Use of other means at national level to resolve ambiguity				D	Provide short description
4.6 Geographic Sorting of Alert Data						
4.6	Geographically sort beacon locations				V	
4.7 Filtering Redundant Alert Data						
4.7	Filter 121.5 MHz solutions				D	
	Filter 406 MHz 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
4.8 Notification of Country of Beacon Registration (NOCR)						
4.8	Provide NOCR messages to States that have requested	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.

ANNEX 9

DRAFT AMENDMENTS TO DOCUMENT

"SPECIFICATION FOR COSPAS-SARSAT 406 MHz DISTRESS BEACONS"

C/S T.001
Issue 3 - Draft Revision 7

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S T.001 for submission to Council for approval.

- position data in the short message with a resolution of either 15 minutes or 2 minutes, together with a subset of the beacon identification methods (i.e. with shortened identification data).

Operation or failure of an internal or external navigation device providing position data to the beacon shall not degrade beacon performance.

4.5.5.2 Message Content and Timing

Position data shall be encoded into the beacon message according to one of the methods specified in Annex A. The identification data and encoded position data are protected by a BCH error-correcting code. A 21-bit BCH code protects the data of the first protected field (PDF-1 and BCH-1) and a 12-bit BCH code protects the data of the second protected field (PDF-2 and BCH-2). The BCH codes shall always match the message content. The beacon shall recompute these codes each time the message content is changed.

The beacon shall commence transmissions upon activation even if no valid position data are available. Until valid data is available, the content of the encoded position data field of the message shall be the default values specified in Annex A. The first input of position data into the beacon message shall occur as soon as valid data is available. If the beacon has the capability to provide updated position data, subsequent transmissions of the updated position shall not occur more frequently than every 20 minutes.

If, after providing valid data, the navigation input fails or is not available, the beacon message shall retain the last valid position for 4 hours (± 5 min) after the last valid position data input. After 4 hours the encoded position shall be set to the default values specified in Annex A.

When the beacon radiates a 406 MHz signal in the self-test mode, the content of the encoded position of the self-test message shall be set to the default values specified in Annex A.

4.5.5.3 Internal Navigation Device Performance

An internal navigation device shall be capable of global operation and shall conform to an applicable international standard. An internal navigation device shall incorporate self-check features to ensure that erroneous position data is not encoded into the beacon message. The self-check features shall prevent position data from being encoded into the beacon message unless minimum performance criteria are met. These criteria could include the proper internal functioning of the device, the presence of a sufficient number of navigation signals, sufficient quality of the signals, and sufficiently low geometric dilution of precision.

The distance between the position provided by the navigation device, at the time of the position update, and the true beacon position shall not exceed ~~5 km~~ *500 m for beacons transmitting the Standard or National location protocols, or 5.25 km for beacons* *transmitting the User-Location protocol. The encoded position data shall be provided in the WGS 84 or GTRF geodetic reference systems.*

The internal navigation device shall provide valid data within ~~30~~ *10* minutes after its activation.

Internal navigation device cold start shall be forced at every beacon activation. Cold start refers to the absence of time dependent or position dependent data in memory, which might affect the acquisition of the GNSS position.

4.5.5.4 External Navigation Device Input

It is recommended that beacons, which are designed to accept data from an external navigation device, be compatible with an applicable international standard, such as the IEC Standard on Digital Interfaces (IEC Publication *6*1162).

Features should be provided to ensure that erroneous position data is not encoded into the beacon message.

For a beacon designed to operate with an external navigation device, if appropriate navigation data input is present, the beacon shall produce a digital message with the properly encoded position data and BCH code(s) within 1 minute after its activation.

If a beacon is designed to accept position data from an external navigation device prior to beacon activation, navigation data input should be provided at intervals not longer than:

- 20 minutes for EPIRBs and PLBs; or
- 1 minute for ELTs.

4.5.6 Beacon Activation

The beacon should be designed to prevent inadvertent activation.

After activation, the beacon shall not transmit a 406 MHz distress message until at least one repetition period (as defined in section 2.2.1) has elapsed.

- END OF SECTION 4 -

A2.9 Non-Protected Data Field

The non-protected data field consists of bits 107 to 112, which can be encoded with emergency code / national use data as described below. However, when neither the emergency code nor the national use data have been implemented, nor such data entered, the following default coding should be used for bits 107 to 112:

000000: for beacons that can be activated only manually, i.e. bit 108 = 0 (see below)

010000: for beacons that can be activated both manually and automatically, i.e. bit 108 = 1 (see below).

Bit 107 is a flag bit that should be automatically set to (=1) if emergency code data has been entered in bits 109 to 112, as defined below.

Bit 108 indicates the method of activation *(the switching mechanism)* that has been built into the beacon:

bit 108 set to (=0) indicates that *a switch must be manually set to “on” after the time of the distress to activate* the beacon ~~is the type that can be activated only manually~~;

bit 108 set to (=1) indicates that the beacon ~~is the type that~~ can be activated ~~both~~ *either* manually ~~and~~*or* automatically.

A float-free beacon shall have bit 108 set to 1.

A2.9.1 Maritime Emergency code

The emergency code is an optional feature that may be incorporated in a beacon to permit the user to enter data in the emergency code field (bits 109-112) after beacon activation of any maritime protocol (i.e. maritime user protocol, maritime serial user protocols, and radio call sign user protocol). If data is entered in bits 109 to 112 after activation, then bit 107 should be automatically set to (=1) and bits 109 to 112 should be set to an appropriate maritime emergency code shown in Table A4. If a beacon is pre-programmed, bits 109 to 112 should be coded as "unspecified distress" (i.e. 0000).

A2.9.2 Non-Maritime Emergency code

The emergency code is an optional feature that may be incorporated in a beacon to permit the user to enter data in the emergency code field (bits 109-112) of any non-maritime protocol (i.e. aviation user protocol, serial user aviation and personal protocols, or other spare protocols). If data is entered in bits 109 to 112, then bit 107 should be automatically set to (=1) and bits 109 to 112 should be set to an appropriate non-maritime emergency code shown in Table A5.

Figure A4: Summary of User Protocols Coding Options

b 25:	Message format flag:	0 = short message, 1 = long message
b 26:	Protocol flag:	1 = User protocols
b 27 - b 36:	Country code number:	3 digits, as listed in Appendix 43 of the ITU Radio Regulations
b 37 - b 39:	User protocol code:	000 = Orbitography 001 = Aviation 010 = Maritime 011 = Serial 110 = Radio call sign 111 = Test 100 = National 101 = Spare

b 37 - b 39: 010 = Maritime user	110 = Radio call sign user	011 = Serial user	001 = Aviation user	100 = National User
b 40 - b 75: Trailing 6 digits of MMSI or radio call sign (modified-Baudot)	b 40 - b 63: First four characters (modified-Baudot)	b 40 - 42: Beacon type 000 = Aviation 001 = Aircraft Operator 011 = Aircraft Address 010 = Maritime (float free) 100 = Maritime (non float free) 110 = Personal b 43: C/S Certificate flag	b 40 - b 81: Aircraft Registration Marking (modified - Baudot)	b 40 - 85: National use
	b 64 - b 75: Last three characters (binary coded decimal)	b 44 - b 73: Serial No. and other data		
b 76 - b 81: Specific beacon (modified-Baudot)	b 76 - b 81: Specific beacon (modified-Baudot)	b 74 - b 83: C/S Cert. No. or National use		
b 82 - b 83: 00 = Spare	b 82 - b 83: 00 = Spare		b 82 - b 83: 00 = Spare	
b 84 - 85: Auxiliary radio-locating device type(s):	00 = No Auxiliary radio-locating device 01 = 121.5 MHz 10 = Maritime locating: 9 GHz SART 11 = Other auxiliary radio-locating device(s)			

b 86 - b 106:	BCH code:	21-bit error-correcting code for bits 25 to 85	
b 107:	Emergency code use of b 109 - b 112:	0 = National use, undefined (default = 0) 1 = Emergency code flag	b 107 - 112: National use
b 108:	Activation type:	0 = Manual activation only ~~type of beacon~~ 1 = Automatic and manual activation ~~type of beacon~~	
b 109 - b 112:	Nature of distress:	Maritime emergency codes (see Table A.4) (default = 0000) Non-maritime emergency codes (see Table A5) (default = 0000)	

ANNEX 10

DRAFT AMENDMENTS TO DOCUMENT

"COSPAS-SARSAT LEOLUT PERFORMANCE SPECIFICATION AND DESIGN GUIDELINES"

C/S T.002
Issue 3 - Draft Revision 4

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S T.002 for submission to Council for approval.

The LEOLUT shall maintain a throughput rate of at least 75% for all beacons satisfying C/S T.001 requirements when calculated between the first and last beacon messages for beacon events meeting the criteria for nominal solutions described in section 5.1 above.

5.3.3 Probability of Doppler Location

The LEOLUT shall be able to obtain beacon messages and locate 406 MHz beacons within the LEOLUT's coverage area when there is 4 minutes of mutual visibility between the LEOLUT, satellite and beacon, with the satellite at an elevation angle greater than 5 degrees with respect to the LEOLUT and the beacon. In these cases the LEOLUT shall be able to calculate Doppler locations with a probability of 95%.

5.3.4 Time and Frequency Calculation

The LEOLUT processing of 406 MHz SARR channel data must perform validity checks to prevent invalid time and frequency values being used in Doppler processing as described in section ~~5~~ *4*.2.7. The LEOLUT shall measure the time and frequency of data points, as received, to an accuracy better than 10 ms and 350 millihertz respectively. The frequency measurement accuracy excludes frequency bias that is constant over a period of 20 minutes.

5.3.5 Beacon Capacity

The LEOLUT must be able to detect and process at least ten active beacons within the field of view of the satellite.

5.3.6 Location Accuracy

At least ninety five percent (95%) of nominal solutions shall be accurate to within five (5) km, and ninety eight (98%) of locations accurate to within ten (10) km.

For marginal solutions, a minimum of sixty percent (60%) of locations shall be accurate to within (5) km, and eighty percent (80%) of locations accurate to within twenty (20) km.

These accuracy requirements apply for beacons that meet the requirements of document C/S T.001 (406 MHz beacon specification).

5.3.7 Ambiguity Resolution

For nominal solutions, the ambiguity resolution shall be correct for at least ninety percent (90%) of the solutions. For marginal solutions, the ambiguity resolution shall be correct at least 60% of the time. This specification applies for beacons satisfying the specifications for Cospas-Sarsat 406 MHz distress beacons as detailed in document C/S T.001.

ANNEX 11

DRAFT NEW ISSUE OF DOCUMENT

**"COSPAS-SARSAT
406 MHz DISTRESS BEACON
TYPE APPROVAL STANDARD"**

**C/S T.007
Draft Issue 4**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft new issue of System document C/S T.007 for submission to Council for approval.

1. INTRODUCTION

1.1 Scope

This document defines the Cospas-Sarsat policy on type approval of 406 MHz distress beacons and describes:

a. the procedure to apply for Cospas-Sarsat type approval of a 406 MHz distress beacon; and

b. the type approval test methods.

1.2 Reference Documents

a. Cospas-Sarsat Document C/S T.001, "Specification for Cospas-Sarsat 406 MHz Distress Beacons".

b. Cospas-Sarsat Document C/S T.008, "Cospas-Sarsat Acceptance of 406 MHz Beacon Type Approval Test Facilities".

c. Cospas-Sarsat Document C/S T.012, “Cospas-Sarsat 406 MHz Frequency Management Plan”.

d. ITU-R M.633, "Transmission characteristics of a satellite emergency position-indicating radio beacon (satellite EPIRB) system operating through a satellite system in the 406 MHz band".

-END OF SECTION 1-

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2. COSPAS-SARSAT TYPE APPROVAL

2.1 Policy

The issuing of performance requirements, carriage regulations and the testing and type approval of 406 MHz distress beacons are the responsibilities of national authorities.

However, to ensure beacon compatibility with Cospas-Sarsat receiving and processing equipment, it is essential that beacons meet specified Cospas-Sarsat performance requirements. Compliance with these requirements provides assurance that the tested beacon performance is compatible with, and will not degrade, the Cospas-Sarsat system. A 406 MHz beacon with an integrated navigation system will be considered as a single integral unit for type approval testing.

Therefore, it is recommended that national authorities and search and rescue agencies require manufacturers to comply with the provisions of this document.

2.2 Testing

The Cospas-Sarsat tests described in this document are limited to ensure that:

a. beacon signals are compatible with System receiving and processing equipment;

b. beacons to be deployed do not degrade nominal System performance; and

c. beacons encoded position data is correct.

These tests will determine if beacons comply with this document, with the "Specification for Cospas-Sarsat 406 MHz Distress Beacons" (C/S T.001), and with the document “Cospas-Sarsat 406 MHz Frequency Management Plan” (C/S T.012).

Tests conducted in beacon manufacturing facilities during development of new beacon models or production unit testing must not cause harmful interference to the operational Cospas-Sarsat system. The level of 406 MHz emissions from beacon manufacturing facilities should be less than -51 dBW in an area immediately external to the manufacturers’ facility. The -51 dBW is equivalent to a power flux density of -37.4 dB (W/m^2) or a field intensity of -11.6 dB (v/m).

2.3 Type Approval Certificate

A Cospas-Sarsat Type Approval Certificate (see sample in Annex M) will be issued by the Cospas-Sarsat Secretariat, on behalf of the Cospas-Sarsat Council (CSC), to the manufacturer of each 406 MHz distress beacon model that is successfully tested at an accepted Cospas-Sarsat test facility. All manufacturers are encouraged to obtain a Cospas-Sarsat Type Approval Certificate for each of their beacon models. The Secretariat will treat manufacturer's proprietary information in confidence.

The Cospas-Sarsat Type Approval Certificate itself does not authorize the operation or sale of 406 MHz beacons. National type acceptance and/or authorization may be required in countries where the manufacturer intends to distribute beacons.

The Certificate is subject to revocation by the Cospas-Sarsat Council should the beacon type for which it was issued cease to meet the Cospas-Sarsat specification.

- END OF SECTION 2 -

3. TESTING LABORATORIES

3.1 Testing

The tests described in this document consist of a series of laboratory technical tests and an outdoor functional test of the beacon transmitting to the satellite. Manufacturers are encouraged to conduct preliminary laboratory tests on their beacons, but are cautioned not to radiate signals to the satellite. If open air radiation of 406 MHz signals should be necessary, the manufacturer must coordinate and receive approval for the test from the appropriate national or regional MCC. Any such radiation must use the test protocol of the appropriate type and format. For example, test user-location protocol shall be used for testing of beacons intended to be encoded with user-location protocol.

All type approval tests shall be conducted by an accepted test facility unless specifically stated otherwise in this document.

3.2 Cospas-Sarsat Accepted Test Facilities

Certain test facilities are accepted by Cospas-Sarsat to perform Cospas-Sarsat type approval tests, as described in document C/S T.008. Accepted test facilities are entitled to perform tests on any 406 MHz distress beacon for the purpose of having a Cospas-Sarsat Type Approval Certificate issued by the Secretariat. A list of Cospas-Sarsat accepted test facilities is maintained by the Cospas-Sarsat Secretariat.

Following successful testing of a beacon, the technical information listed in section 5 of this document should be submitted to the Cospas-Sarsat Secretariat, so that a Cospas-Sarsat Type Approval Certificate can be issued to the beacon manufacturer.

3.3 Testing of ELT Antennas Separated from Beacons

Although the Cospas-Sarsat type approval policy is to consider only the complete beacon with its antenna (i.e. Cospas-Sarsat does not type approve specific beacon components), this policy is not strictly applicable to ELTs which can be approved for use with different aircraft antennas.

In respect of antenna testing requirements provided in Annex B to this documents, testing ELT antenna at a reputable and independent test facility specialised in antenna measurements is acceptable subject to prior agreement by Cospas-Sarsat and provided that the test facility is accredited by recognised standardisation bodies responsible for type approval of electronic and electrical equipment.

In such case, the testing application package shall also include:

a. written confirmation by the Cospas-Sarsat Representative of the country where the facility is located (see Annex J) of the independence of the antenna testing facility from the beacon manufacturer;

b. a letter from the test facility briefly describing their capability in respect of ELT antenna testing to the requirements specified in applicable Cospas-Sarsat documents; and

c. the reference of the test facility accreditation by recognised standardisation bodies responsible for type approval of electronic and electrical equipment in the facility's country.

In all cases, the testing of the aircraft antenna, as described above, shall be completed with:

i. VSWR measurement as described at Annex B,

ii. the calculated EIRP values in the format provided at Tables F-B.1 and F-B.2;

iii. the calculations for EIRP minimum and maximum at beacon end of operational life ($EIRP_{minEOL}$ and $EIRP_{maxEOL}$) in the format provided at Table F-B.1; and

iv. satellite qualitative tests using a type approved ELT or the ELT submitted for type approval as described at Annex A, and reported as per Appendix A to Annex F.

- END OF SECTION 3 -

4. COSPAS-SARSAT TESTING PROCEDURE

4.1 Sequence of Events

Typical steps to obtain a Cospas-Sarsat Type Approval Certificate for a new beacon are:

a. manufacturer develops a beacon;

b. manufacturer conducts preliminary testing in his laboratory;

c. manufacturer schedules testing at a Cospas-Sarsat accepted test facility;

d. test facility conducts[1] type approval tests;

e. manufacturer and/or test facility (as coordinated by the manufacturer) submits to the Cospas-Sarsat Secretariat the information listed in section 5 of this document;

f. Secretariat and Cospas-Sarsat Parties review the test results and technical data; and

g. Cospas-Sarsat Secretariat provides results of review to the manufacturer within approximately 30 days, and if approved, a Cospas-Sarsat Type Approval Certificate is subsequently issued.

4.2 Initial Request

An initial request to a test facility might need to be made several weeks prior to the desired testing date. Since the manufacturer may wish to send a representative to witness the tests and provide assistance in operating the beacon, proper clearances should be made with the test facility well in advance. The manufacturer should be prepared to provide the test facility with:

a. two beacons for testing purposes;

b. replacement batteries.

4.3 Test Units

If the beacon has a 121.5 MHz homer, the homer transmitter of the test beacon shall be tuned to the frequency nearest to 121.5 MHz allowed by the national administration for type approval testing, but under no circumstances should this frequency be greater than 121.65 MHz.

[1] The cost of the testing is to be borne by the manufacturer.

One test unit shall be a fully packaged beacon, similar to the proposed production beacons, operating on its normal power source and equipped with its proper antenna.

The second beacon shall be configured such that the antenna port can be connected to the test equipment by a coaxial cable terminated by a 50-Ohm load. All necessary signal or control devices shall be provided by the beacon manufacturer to simulate nominal operation of all ancillary devices of the beacon, such as external navigation input signals and manual control, in accordance with A.3.7, while in an environmental test chamber. The means to operate these devices in an automated and programmable way shall be also provided by the manufacturer.

The test units shall be coded with the test protocol of appropriate type and format and shall meet the requirements of C/S T.001. It should be noted that:

a. The test unit subjected to the Cospas-Sarsat tests remains the property of the manufacturer. All information marked as proprietary shall be treated as such.

b. The organization performing the Cospas-Sarsat tests bears no responsibility for either the manufacturer's personnel or equipment.

c. The manufacturer shall certify that the units submitted for test contain no hazardous components. The testing organization may choose not to test units that it regards as hazardous.

If a beacon is to receive certification for additional location protocol types, means of changing the protocol type shall be provided. Alternatively, this can be satisfied with additional test units.

If a beacon is to receive certification for standard location protocol and/or the national location protocol, the unit used for the tests listed in A.2 shall be coded with one of these protocols.

4.4 Test Conditions

Tests shall be conducted by facilities accepted by Cospas-Sarsat. It is advisable that the manufacturer, or his representative, witness the tests.

The tests shall be carried out on the test beacon with its own power source. Test results shall be presented on the forms shown in Annex F of this document, along with additional graphs as necessary. Tests shall demonstrate compliance with C/S T.001 and comprise the following elements:

a. operating life and performance measurements at the beacon's minimum specified operating temperature;

b. performance measurements at room ambient temperature;

c. performance measurements at the beacon's maximum specified operating temperature;

d. performance measurements during the thermal gradient;

e. performance measurements beginning 15 minutes after thermal shock and activation;

f. antenna measurements; and

g. a qualitative performance test through the satellites.

At the discretion of the test authority, the manufacturer may be required to replace the batteries between these phases. However, no other modifications to the beacon will be allowed during the test period without a full re-test.

Beacons with multiple operator selectable and / or automatic modes of operation (e.g. voice transceivers, internal GNSS receivers, homers, etc.) shall undergo testing by the manufacturer to determine:

i. the mode that draws maximum battery energy;

ii. the modes that exhibit pulse loads greater than in (i) above.

The results of the manufacturer testing shall be included in the technical data submitted to the Cospas-Sarsat Secretariat.

The mode that draws the maximum battery energy shall be tested to the full range of the test requirements by the test laboratory. Operating modes that exhibit a pulse load greater than the mode that draws maximum battery energy shall undergo the operating lifetime at minimum temperature test.

Approved measurement methods are described in Annexes A, B, C, D and E of this document, although other appropriate methods may be used by the testing authority to perform the measurements. These shall be fully documented in a technical report along with the test results.

4.5 Test Configuration

The type approval tests required by Cospas-Sarsat are identical for all types of 406 MHz beacons, with the exception of the tests identified below:

a. satellite qualitative test (Annex A section A.2.5);

b. antenna characteristics (Annex A section A.2.6); and

c. position acquisition time and position accuracy (Annex A section A.3.8.2).

The test configurations for evaluating the beacon antenna characteristics are a function of the beacon type and the operational environments supported by the beacon, as declared by the manufacturer. The applicable test configurations for the beacon antenna testing are summarised below in Figure 4.1.

	Operational Environment: Beacon used while:	**Configuration 1 (Fig: B.4)** **"Water" ground plane**	**Configuration 2 (Fig: B.3)** **Antenna fixed to ground plane**	**Configuration 3 (Fig: B.2)** **Beacon sitting on ground plane**	**Configuration 4 (Fig: B.5)** **Beacon above ground plane**
EPIRB (*)	Floating in water, in safety raft or on deck of vessel	**X**			**X**
PLB	On ground and above ground			**X**	**X**
PLB	As above plus floating in water	**X**			**X**
ELT Survival	On ground and above ground			**X**	**X**
ELT Survival	As above plus floating in water	**X**			**X**
ELT Auto. Fixed	Fixed ELT with external antenna		**X**		
ELT Auto. Portable	On aircraft with external antenna		**X**		
	Outside of aircraft with own antenna attached			**X**	**X**
ELT Auto. Deployable	Released with attached antenna, assumed to be self righting in water	**X**		**X (**)**	**X**

* As configurations 1 and 4 cover the two extremes, configuration 3 is not required.

** For possible landing configuration not covered in Test Configuration 1, i.e. upside down.

Figure 4.1: Antenna Test Configuration Requirements

4.6 Test Procedure for Beacon with Operator Controlled Ancillary Devices

A unique test procedure may need to be defined for beacons with operator controlled ancillary devices to characterise the possible impact of these devices on the beacon performance. Such test procedure shall follow the guidelines provided at section A.3.7.2. A typical procedure for a beacon with a voice transceiver is provided at Annex E as an example of the guidelines implementation.

Unique test procedures for beacons with operator controlled ancillary device shall be:

a. coordinated between the beacon manufacturer and a Cospas-Sarsat type approval facility;

b. submitted to the Cospas-Sarsat Secretariat for review prior to type approval testing at the Cospas-Sarsat type approval facility; and

c. approved by the Cospas-Sarsat Parties as appropriate.

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5. TECHNICAL DATA

The technical data submitted to the Cospas-Sarsat Secretariat shall include the following:

a. an application form (Annex G) for a Cospas-Sarsat Type Approval Certificate, signed by the Cospas-Sarsat accepted test facility confirming that the beacon was tested in accordance with C/S T.007 and complies with C/S T.001, and signed by the manufacturer to confirm the technical details of the beacon, including:

   i. the list of operational configurations supported,

   ii. details of the beacon battery and battery pack,

   iii. details on the special features of the beacon (e.g. homer, strobe light, etc),

   iv. information on the beacon navigation system where appropriate (i.e. navigation device manufacturer, navigation interface specifications, etc.),

   v. a description of the beacon self-test characteristics;

b. a summary of the beacon and antenna test results , with supporting test data, graphs and tables, as designated in Annexes A, B and F, including:

   i. satellite qualitative test results as per Appendix A to Annex F,

   ii. beacon antenna test results as per Appendix B to Annex F,

   iii. navigation system test results as per Appendix C to Annex F,

   iv. sample messages generated by the beacon coding software for each coding option applicable to the beacon model as per Appendix D to Annex F[1];

c. analysis and calculations from the manufacturer that support the pre-test battery discharge figures required for the operating lifetime at minimum temperature test;

d. for beacons with multiple operator selectable and / or automatic modes of operation (e.g. voice transceivers, internal GNSS receivers, homers, etc.), analysis supported by test results that identifies:

   i. the operating mode that draws the maximum battery energy,

   ii. operating modes that have pulse loads greater than in i. above;

e. beacon operating instructions and a technical data sheet;

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1 Type approval will not be granted to beacons that use the short format variants of location protocols.

f. brochure and photographs of the beacon, with its antenna deployed whilst in all manufacturer declared configurations (e.g. floating in water, resting on ground, held by operator, etc.);

g. the technical data sheet for the battery cells used in the beacon and the electric diagram of the beacon's battery pack;

h. a copy of the beacon label;

i. the technical data sheet of the reference oscillator, including oscillator type and specifications;

j. descriptions, complete with diagrams as necessary, to demonstrate that the design:

   i. provides protection against continuous transmission (see section A.3.4),

   ii. meets the frequency stability requirements over 5 years (see section A.3.5),

   iii. provides protection from repetitive self-test mode transmissions (see section A.3.6);

k. a technical description and analysis of the matching network supplied for testing purposes per section A.1, or for cases where a matching network is not required, information shall be provided that confirms that the nominal output impedance of the beacon power amplifier is 50 Ohms and the beacon antenna VSWR measured relative to 50 Ohms is within a ratio of 1.5:1;

l. for ELT separated antennas, a statement of the beacon manufacturer if they do not want to have their own antenna included on the Secretariat-maintained list of accepted ELT antennas (for antennas of their own design and having their own part number, see Annex K);

m. the beacon quality assurance plan (see Annex L).

For separated ELT antennas, the antenna test results requested under (b) above may be replaced by a reference to the proper entry in the Secretariat-maintained list of accepted antennas[1], along with:

- test laboratory VSWR measurements conducted in the appropriate configuration(s), as per Annex B; and

---

[1] The measurement of parameters for antennas included in the Secretariat list are kept on file at the Cospas-Sarsat Secretariat and are available upon request.

- a completed Table F-B.1 that includes the calculated EIRP levels for each azimuth and elevation, and the calculated maximum and minimum EIRP levels at the end of life taking into account the beacon power and $EIRP_{LOSS}$ figure measured by the test laboratory.

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6. COSPAS-SARSAT CERTIFICATION

6.1 Approval of Results

To receive a Cospas-Sarsat Type Approval Certificate, a beacon shall have been demonstrated to meet the requirements of C/S T.001. The technical data and test results will be reviewed by the Cospas-Sarsat Secretariat and then, if found satisfactory, submitted to the Cospas-Sarsat Parties for approval. The results of this process will be conveyed to the manufacturer within approximately 30 days.

If the unit is deemed to have passed the tests, the Secretariat will subsequently issue a Cospas-Sarsat Type Approval Certificate on behalf of the Cospas-Sarsat Council. The technical data and test results will be retained on file at the Secretariat.

6.2 Changes to Type Approved Beacons

The manufacturer must advise the Cospas-Sarsat Secretariat (see Annex H) of any changes to the design or production of the beacon or power source, which might affect beacon electrical performance. All tests for demonstrating the performance of modified beacons shall be conducted at a Cospas-Sarsat accepted test facility unless specifically stated otherwise in this document.

The manufacturer shall provide a statement clarifying whether the modification changed the beacon physical characteristics (e.g. weight, dimensions, centre of gravity, floatation characteristics, etc.). If the physical characteristics of the beacon have changed, the manufacturer shall provide photographs of the beacon in its operational configurations and submit an analysis regarding the possible impact on beacon electrical performance.

For minor modifications to the beacon, factory test results provided to the Secretariat by the manufacturer can be considered on a case-by-case basis. These test results will be reviewed by the Secretariat, in consultation with the test facility which conducted the original type approval tests on the beacon, and the manufacturer will be advised if there is a need for further testing.

Once a beacon incorporating a particular type of battery has been successfully tested at a Cospas-Sarsat test facility and type approved by Cospas-Sarsat, subsequent upgrades to that battery are permitted without further type approval testing at a Cospas-Sarsat test facility, provided the beacon manufacturer demonstrates that the changes do not degrade the performance of the 406 MHz beacon, as described below.

If a beacon manufacturer wishes to make changes to the type of battery after the beacon has been Cospas-Sarsat type approved, the change notice form in Annex H shall be completed and submitted to the Secretariat, together with factory test data confirming that the substitute battery is at least technically equivalent to that used when the beacon was type approved, and a summary of the required test results provided as per Table F.1.

The Cospas-Sarsat type approval certificate will not be amended to include the alternative battery in such cases, unless the beacon was partially retested at a Cospas-Sarsat type approval test facility.

6.3 Alternative Batteries

6.3.1 Batteries Not Used in Beacons Tested at an Approved Facility

The factory tests to be performed on the 406 MHz beacon with a type of battery that has not been used in previous models tested at a Cospas-Sarsat type approval facility shall include:

a. electrical tests at the three constant temperatures (maximum, minimum and ambient), excluding spurious output, VSWR and self-test (section A.2.1);

b. thermal shock test (section A.2.2);

c. operating lifetime at minimum temperature (section A.2.3); and

d. satellite qualitative test (section A.2.5), in a single configuration only.

The beacon manufacturer shall also submit technical data sheets describing the new battery.

6.3.2 Batteries Used in Two Beacons Tested at an Approved Facility

If the alternative battery has been previously used in at least two beacon models for testing at a Cospas-Sarsat type approval test facility, the factory tests to be performed on the 406 MHz beacon with the alternative batteries shall include:

a. electrical tests at ambient temperature excluding digital message, digital message generator, modulation, spurious output, VSWR check, self-test mode (section A.2.1);

b. operating lifetime at minimum temperature, excluding digital message (section A.2.3); and

c. satellite qualitative test (section A2.5), in a single configuration only.

6.4 Internal Navigation Device

6.4.1 Inclusion or Removal of an Internal Navigation Device

A type approved beacon modified to include an internal navigation device shall be completely retested at a facility accepted by Cospas-Sarsat.

A type approved beacon modified to remove an internal navigation device shall undergo the satellite qualitative test (C/S T.007, A.2.5) and spurious output test (C/S T.007, A.3.2.2.4) at a Cospas-Sarsat accepted facility. This shall be supported by the beacon coding software test (C/S T.007, A.2.8), which may be performed either by the manufacturer or the accepted test facility.

In cases of new beacon models that have variants both with and without an internal navigation device, the variant with the internal navigation device shall be completely tested at a facility accepted by Cospas-Sarsat. The variant without an internal navigation device shall undergo the satellite qualitative test, spurious output test, and beacon coding software test at a Cospas-Sarsat accepted facility.

6.4.2 Change to Internal Navigation Device

For changes to the internal navigation device of a type approved beacon which might affect the beacon electrical performance, the tests identified below shall be conducted at a Cospas-Sarsat accepted facility:

a. position acquisition time and position accuracy (section A.3.8.2); and

b. satellite qualitative test (section A.2.5).

In addition, the manufacturer shall provide the results and analysis of tests conducted at the manufacturer's facilities that demonstrate that the load on the beacon battery is not greater than the load measured for the approved beacon model prior to the change of the internal navigation device.

If the change of internal navigation device results in higher battery loads, or might affect aspects of the beacon performance other than the position acquisition time and position accuracy, the scope of testing shall be determined by Cospas-Sarsat after reviewing a description of the proposed change provided by the manufacturer.

6.5 Interface to External Navigation Device

6.5.1 Modifications to Include Encoded Position Data from an External Navigation Device

A type approved beacon modified to accept position data from an external navigation device shall be tested with the test protocol of appropriate type and format at a Cospas-Sarsat type approval facility. The tests to be performed shall consist of:

a. electrical tests at ambient and maximum temperatures but excluding modulation, spurious output, and VSWR check (section A.2.1);

b. operating lifetime at minimum temperature (section A.2.3);

c. navigation system test (section A.2.7);

d. beacon coding software (section A.2.8); and

e. satellite qualitative test (section A.2.5).

In addition, the beacon manufacturer shall also provide technical data sheets describing the navigation interface unit.

6.5.2 Modifications to Interface to External Navigation Device

For a subsequent change to the beacon navigation interface unit that might affect the beacon electrical performance, the tests identified below shall be conducted at a Cospas-Sarsat accepted facility:

a. navigation system tests (section A.2.7); and

b. satellite qualitative tests (section A.2.5).

In addition, the manufacturer shall provide the results and analysis of tests conducted at the manufacturer’s facilities that demonstrate that the load on the beacon battery is not greater than the load measured for the approved beacon model prior to the change of the external navigation device.

For a change to the navigation interface that might affect aspects of beacon performance beyond the processing of encoded location information from the external navigation device, the scope of testing will be determined by Cospas-Sarsat after reviewing a description of the proposed changes provided by the manufacturer.

6.6 Changes to Frequency Generation

6.6.1 Minor Changes to Frequency Generation

In the case of oscillator replacement by an identical oscillator (on the basis of oscillator manufacturer data and written assurance) and when no other changes are required to beacon electronics or firmware, or in the case of a change of frequency of the beacon when this is achieved by modification of the oscillator (tuning or replacement of the oscillator crystal by a crystal of the same type) which does not involve significant changes to the oscillator performance, or in the case of a type approved beacon using a frequency synthesiser, the modification of the beacon can be considered as minor.

Factory tests verifying the beacon performance can be accepted after consideration by the Secretariat on a case-by-case basis.

6.6.1.1 In the case of a change of frequency, if the modification of the oscillator is limited to the replacement of the crystal by a crystal of the same type, or tuning the oscillator by the oscillator manufacturer, or reprogramming of the frequency synthesiser, the factory testing shall include:

a. measurement of absolute value of the beacon 406 MHz transmitted carrier frequency at ambient temperature; and

b. satellite qualitative test (section A.2.5).

6.6.1.2 In the case of oscillator replacement with an identical oscillator[1] and no other changes are required to the beacon electronics, or in the case of a change of frequency if the modification includes changes to circuits external to the frequency oscillator/synthesiser (e.g., an external trimmer), the factory tests shall include:

a. transmitted frequency (section A.3.2.1) at minimum, ambient and maximum temperature;

b. thermal shock (section A.2.2) excluding transmitted power and digital message;

c. frequency stability with temperature gradient (section A.2.4) excluding transmitted power and digital message; and

d. satellite qualitative test (section A.2.5).

6.6.1.3 In both cases (6.6.1.1 and 6.6.1.2 above) the technical file shall be submitted to the Secretariat including at least the following:

a. a change notice form (Annex H) specifying the details of frequency generation change;

b. the measurement results of required tests; and

c. a technical data sheet describing the oscillator, including:

i. oscillator type,

ii. oscillator specifications,

[1] For the purpose of the Cospas-Sarsat type approval a replacement oscillator can be considered to be identical to the original oscillator if they have the same circuitry, packaging, physical dimensions and firmware (as applicable) and the replacement reference oscillator has electrical and mechanical parameters that are equal to, or better than, those of the original oscillator.

iii. assurance of oscillator manufacturer that the specification of the old and new oscillators are identical, except for the frequency, as appropriate, in the form of a detailed statement.

6.6.2 Changes to Frequency Generation which Might Affect Beacon Performance

If the alternative oscillator has different parameters, or alternative technology is used to generate the RF frequency (e.g. frequency synthesiser), or additional changes are required to the beacon electronics or firmware, the modified beacon shall be re-tested at a Cospas-Sarsat accepted facility.

The testing shall include:

a. transmitted frequency (section A.3.2.1) at minimum, ambient and maximum temperature;

b. thermal shock (section A.2.2);

c. operating lifetime at minimum temperature (section A.2.3);

d. frequency stability with temperature gradient (section A.2.4) excluding transmitted power and digital message;

e. oscillator aging (section A.3.5); and

f. satellite qualitative test (section A.2.5).

The technical data submitted to the Cospas-Sarsat Secretariat shall include at least the following:

i. a change notice form (Annex H) specifying the details of frequency generation change;

ii. beacon technical data sheet;

iii. statement of the specified operating temperature range of the beacon (maximum and minimum temperatures);

iv. descriptions, complete with diagrams as necessary, to demonstrate that the design meets the long term frequency stability requirement;

v. the measurement results as specified above; and

vi. technical data sheet describing the oscillator, including

- oscillator type,
- oscillator specifications.

6.7 Alternative Names for a Type Approved Beacon

If a beacon manufacturer wishes to have the type approved beacon designated under alternative names (e.g., agent/distributor's name and model number), Annex I of this document shall be completed and sent to the Secretariat.

6.8 Beacon Hardware or Software Modifications

Any change to the beacon hardware or software which might affect the beacon electrical performance not specifically addressed above shall also be supported by a change notice form (Annex H) and testing as appropriate. The scope of the testing and reporting requirements will be determined by Cospas-Sarsat after a review of the modifications. As a minimum all changes must be supported by satellite qualitative tests (A.2.5).

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ANNEXES
TO THE COSPAS-SARSAT
406 MHz DISTRESS BEACON
TYPE APPROVAL STANDARD

ANNEX A

BEACON MEASUREMENT SPECIFICATIONS

A.1 GENERAL

The tests required by Cospas-Sarsat for 406 MHz beacon type approval are described in this Annex and Annexes B, C, D and E, giving details on the parameters, defined in C/S T.001, which must be measured during the tests.

All measurements shall be performed with equipment and instrumentation which is in a known state of calibration, and with measurement traceability to National Standards. The measurement accuracy requirements for Cospas-Sarsat accepted test facilities are given in Annex A of C/S T.008. These measurement accuracies may be added to the beacon specification limits of C/S T.001 (thereby allowing a slight extra margin) when considering test results which are near the specification limit.

All measurement methods used by Cospas-Sarsat accepted test facilities (as defined in C/S T.007) must be approved by Cospas-Sarsat to ensure the validity and repeatability of test data.

In general, the test equipment used shall be capable of:

a. measuring the power that would be accepted by the antenna while the power is directed to a 50 Ohm load. An impedance matching network is to be provided for the test period by the beacon manufacturer. The matching network shall present a 50 Ohm impedance to the dummy load and shall present to the beacon power amplifier output the same impedance as would be present if the antenna were in place (the matching network is not required if the beacon power amplifier nominal output impedance is 50 Ohm and the beacon antenna VSWR measured relative to 50 Ohm is within the 1.5:1 ratio);

b. determining the instantaneous phase of the output signal and making amplitude and timing measurements of the phase waveform;

c. interpreting the phase modulation to determine the value of the encoded data bits;

d. measuring the frequency of the output signal;

e. producing gating signals synchronized with various features of the signal modulation;

f. maintaining the beacon under test at specified temperatures and temperature gradients while performing all other functions stated;

g. providing appropriate navigation input signals, if applicable; and

h. measuring the radiated power level, as described in Annex B.

A suggested sequence for performing the tests described herein is shown in Table F.1 of Annex F, but the tests may be performed in any other convenient sequence. The test results are to be summarized and reported as shown in Annex F, with appropriate graphs attached as indicated.

A.2 TESTS REQUIRED

A.2.1 Electrical and Functional Tests at Constant Temperature (test no. 1 to 8 in Table F.1)

The tests specified in para. A.3.1 through para. A.3.3 (except A.3.2.2.3, antenna tests) are performed after the beacon under test, while turned off, has stabilized for a minimum of 2 hours at laboratory ambient temperature, at the specified minimum operating temperature, and at the maximum operating temperature. The beacon is then allowed to operate for 15 minutes before measurements are started to measure the following parameters at each of the three constant temperatures:

a. transmitter power output, per para. A.3.2.2 (except A.3.2.2.3 antenna tests);

b. digital message, per para. A.3.1.4;

c. digital message generator, per para. A.3.1, A.3.1.1, A.3.1.2 and A.3.1.3;

d. modulation, per para. A.3.2.3;

e. transmitted frequency, per para. A.3.2.1;

f. spurious output, per para. A.3.2.2.4;

g. VSWR check, per para. A.3.3; and

h. self-test mode, per para. A.3.6.

A.2.2 Thermal Shock Test (test no. 9 in Table F.1)

The beacon under test, while turned off, is to stabilize at a selected temperature in its operating range. The beacon is then simultaneously placed into an environment held at 30 degrees C offset from the initial temperature and turned on. The beacon is then allowed to operate for 15 minutes before measurements are started to measure the following parameters:

a. transmitted frequency, per para. A.3.2.1;

b. transmitter power output, per para. A.3.2.2.1; and

c. digital message, per para. A.3.1.4.

Frequency measurements are made continually for two hours. Stability analysis is performed for these frequency samples as in para. A.3.2.1. The 18-sample analysis window of the stability calculations is advanced in time through the period such that each succeeding data set includes the latest frequency sample and drops the earliest one. Power output per para. A.3.2.2.1 and digital message checks per para. A.3.1.4 shall also be made continually throughout the two-hour period.

A.2.3 Operating Lifetime at Minimum Temperature (test no. 10 in Table F.1)

The beacon under test is operated at its minimum operating temperature for its rated life. During this period, the following parameters are measured on each transmission:

a. transmitted frequency, per para. A.3.2.1;

b. transmitter power output, per para. A.3.2.2.1; and

c. digital message, per para. A.3.1.4.

The 18-sample analysis window of the stability calculations is advanced in time through the period such that each succeeding data set includes the latest frequency sample and drops the earliest one.

If beacon is intended to be encoded with short or long format messages, this test shall be performed with a long format message. If the beacon includes an internal GNSS receiver, this test shall be performed in an environment that ensures that the GNSS receiver draws the maximum energy from the battery (e.g. ensuring that any GNSS receiver sleep time is minimised over the test duration).

The operational lifetime test is intended to establish, with reasonable confidence, that the beacon will function at its minimum operating temperature for its rated life using a battery that has reached its expiration date[1]. To accomplish this, the lifetime test of a beacon with its circuits powered from the beacon battery prior to beacon activation shall be performed with a fresh battery pack which has been discharged to take into account:

i. the depletion in battery power resulting from normal battery loss of energy due to battery ageing over the rated life of the battery pack;

ii. the average current drain resulting from constant operation of the circuits powered from the beacon battery prior to beacon activation over the rated life of the battery pack;

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[1] The beacon manufacturer shall provide data necessary to discharge a fresh battery pack at room temperature to account for current drain over the battery pack rated life time. The battery discharge figures provided by the beacon manufacturer shall be measured by the testing laboratory.

iii. the number of self-tests, as recommended by the beacon manufacturer over the rated life of the battery pack (the beacon manufacturer shall substantiate the method used to determine the corresponding current drain); and

iv. correction coefficient of 1.65 (applied to item (ii) and item (iii)) to account for differences between battery to battery, beacon to beacon and the possibility of exceeding the battery replacement time.

After the battery pack has been appropriately discharged, the beacon is tested at its minimum operating temperature for its rated life as indicated above. Discharge of the battery may be replaced by the equivalent extension of the operating lifetime test.

A.2.4 Frequency Stability Test with Temperature Gradient (test no. 11 in Table F.1)

The beacon under test, while turned off, is to stabilize for 2 hours at the minimum specified operating temperature. It is then turned on and subjected to temperature gradient specified in Figure A.1, during which time the following tests are performed continually on each burst:

a. transmitted frequency, per para. A.3.2.1;

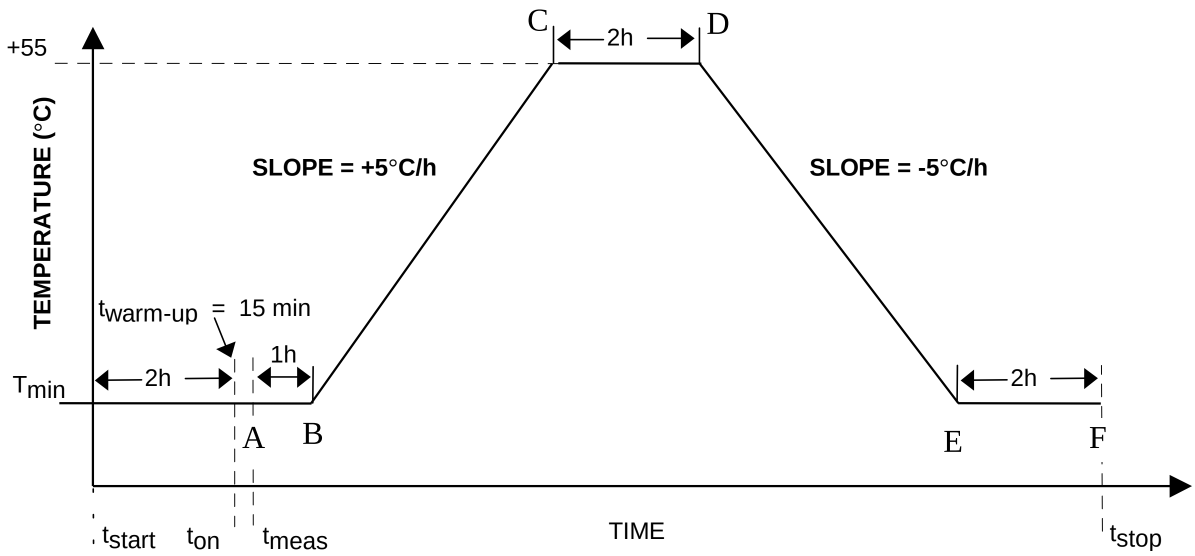
b. transmitter power output, per para. A.3.2.2.1; and

c. digital message, per para. A.3.1.4.

The 18-sample analysis window of the stability calculations is advanced in time through the period such that each succeeding data set includes the latest frequency sample and drops the earliest one.

When a battery replacement is required, two separate tests shall be performed. The up-ramp test is from t_{start} to point D (see Figure A.1) and the down-ramp test is from point C to t_{stop}. Before point C of the down-ramp, the beacon under test, while turned off, is to stabilize for 2 hours at +55°C and is then turned on and allowed a 15 minute warm-up period.

Figure A.1: Temperature Gradient Test Profile



NOTES:

T_{min}	=	- 40°C (Class 1 beacon)
T_{min}	=	- 20°C (Class 2 beacon)
t_{on}	=	beacon turn-on time after 2 hour "cold soak"
t_{meas}	=	start time of frequency stability measurement (t_{on} + 15 min)

Table A.1: Medium-Term Frequency Stability Criteria During Temperature Gradient Test

Points in Figure A.1	Requirements
During warm-up	No Requirement
A to B	$1x10^{-9}$
B to C+15 minutes	$2.0x10^{-9}$
C+15 minutes to D	$1x10^{-9}$
D to E+15 minutes	$2.0x10^{-9}$
E+15 minutes to F	$1x10^{-9}$

A.2.5 Satellite Qualitative Test (test no. 14 in Table F.1)

This test is to be performed only in coordination with the cognizant Cospas-Sarsat Mission Control Centre (MCC) and local authorities. The beacon should operate in its nominal configuration, if possible. However, if the beacon includes a homing transmitter operating on a distress frequency (e.g. 121.5 MHz or 243 MHz), this transmitter may need to be disabled or offset from the distress frequency for this test, as per the national requirements of the test facility.

This test shall be performed in environment(s) which approximate, as closely as practicable, the intended use of the beacon. If the beacon is designed to operate in multiple configurations (e.g. floating in water, resting on dry ground, above ground, etc.) the satellite qualitative test shall be performed for each configuration.

The test beacon shall have its own antenna connected and shall be coded with a test protocol of appropriate type and format (see sections 4.3 and A.3.1.4). The beacon shall be turned on for 15 minutes prior to the start of this test and then operated in the open for at least 5 LEOSAR satellite passes characterised by cross track angles between 1 and 21 degrees, and with bursts that bracket the satellite time of closest approach (TCA) to the beacon.

The pass/fail criteria are as follows:

a. LEOLUT solutions producing the correct beacon 15 hexadecimal identification must be provided for all satellite passes with cross track angles between 1 and 21 degrees; and

b. at least 80% of the LEOLUT Doppler locations, associated with satellite passes with cross track angles between 1 and 21 degrees and with bursts that bracket TCA, must be accurate to within 5 km.

Successful completion of this test shall be indicated by a "√" in Table F.1, and a “Satellite Qualitative Test Summary Report (Appendix A to Annex F) shall be provided for each operational configuration tested. The “Satellite Qualitative Test Summary Reports” shall indicate all LEOSAR satellite passes with cross track angles between 1 and 21 degrees for the period of the testing, even if a solution was not produced by the LEOLUT.

A.2.6 Beacon Antenna Test (test no. 15 in Table F.1)

The beacon antenna test, described in section A.3.2.2.3 and Annex B, shall be performed at the ambient temperature of the test facility and a correction factor shall be applied to the data to calculate the radiated power at minimum temperature at the end of the operating lifetime. This test shall be performed using the non-modified test beacon, including the navigation antenna, if applicable.

A.2.7 Navigation System Test, if Applicable (test no. 17 in Table F.1)

For beacons incorporating the optional capability to transmit encoded position data, some additional tests, described in section A.3.8, are required to verify the beacon output message, including the correct position data, BCH error-correcting code(s), default values, and update rates, if applicable. With the exception of the Position Data Encoding test (A.3.8.7) the navigation input system shall be operating for the duration of all tests to ensure that it does not affect the 406 MHz signal and that the beacon can operate for the required operating lifetime. The beacon output digital message shall be monitored during all tests, as described in section A.3.1.4.

If the beacon has a homer transmitter or ancillary devices, the transmitter shall be operated and all ancillary devices shall be active for all navigation system tests.

Unless stated otherwise:

a. navigation tests do not have to be repeated for each message protocol supported by the beacon;

b. simulators shall not be used to replicate signals from GNSS satellites; and

c. in the case of beacons that interface with external navigation devices, a simulated data stream provided in the format/protocol of the navigation interface may be used in lieu of an actual GNSS receiver.

A.2.8 Beacon Coding Software (test no. 16 in Table F.1)

The digital message for each beacon message protocol supported by the beacon shall be verified at ambient temperature according to A.3.1.4. This test shall evaluate both the real and self-test modes for each beacon message protocol. For the purpose of validating specific beacon message protocols, the beacon shall be programmed in accordance with the guidance provided at Annex C.

For location protocols, verification of 2 messages with encoded position data is required, the second message shall be provided with encoded position at least 500 metres from the first position for the National and Standard location protocols or 10 km for the User-Location protocol. The verification of the digital message does not require a change of location of the beacon.

The content of the complete digital message for both real and self-test transmissions (including bits 1-24) shall be included in the test report as per Appendix D to Annex F.

This test can be conducted either by the test laboratory or by the beacon manufacturer. If performed by the beacon manufacturer, the manufacturer shall provide the test laboratory with the required information for inclusion in the test report.

Type approval will not be granted for beacons to use the short format variants of location protocols.

A.3 MEASUREMENT METHODS

A.3.1 Message Format and Structure

The repetition period T_R and the duration of the unmodulated carrier T_1 are illustrated in Figure A.2. (Note: many of the following measurements can be performed on the same set of 18 bursts).

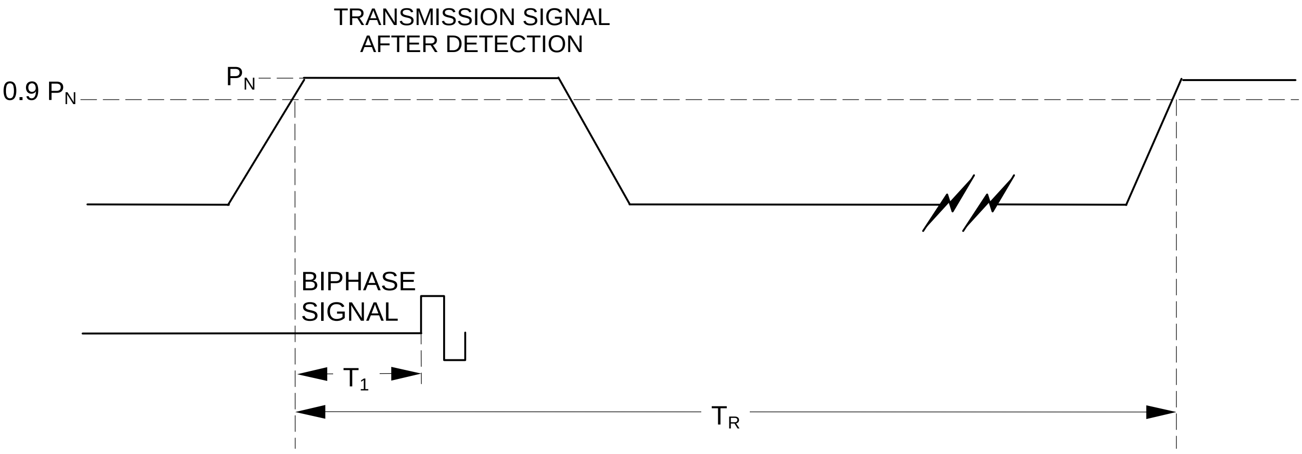


Figure A.2: Transmission Timing

A.3.1.1 Repetition Period

The repetition period, T_R , between the beginnings of two successive transmissions (see Figure A.2) shall be randomised over the range of 47.5 to 52.5 seconds. 18 successive measurements shall be made and the difference between the maximum and minimum repetition periods shall be more than 4 seconds. The average repetition period shall be 50s ± 1.5s. The standard deviation of the 18 values of T_R shall be between 0.5 and 2.0 seconds. The minimum value of T_R observed shall be between 47.5 and 48.0 seconds, the maximum value of T_R observed shall be between 52.0 and 52.5 seconds. The standard deviation, average, maximum and minimum values of T_R shall be recorded in Table F.1.

In the event that the testing does not demonstrate conformance to the minimum or maximum $T_{R,}$ requirements, the test may be repeated a maximum of three times. If the test is repeated, the results for each shall be recorded in Table F.1.

A.3.1.2 Duration of the Unmodulated Carrier

The unmodulated carrier duration, T_1, between the beginning of a transmission and the beginning of the data modulation (see Figure A.2) shall satisfy the following requirement, where the values are derived from 18 successive measurements:

$$158.4 \text{ ms} \leq T_1 \leq 161.6 \text{ ms}$$

The maximum and minimum values of T_1 are to be recorded in Table F.1.

A.3.1.3 Bit Rate and Stability

The bit rate, f_b , in bits per second (bps) which is measured over at least the first 15 bits of one transmission, shall satisfy the following requirement, where the values of f_b are provided from 18 successive measurements:

$$396 \text{ bps} \leq \text{fb} \leq 404 \text{ bps}$$

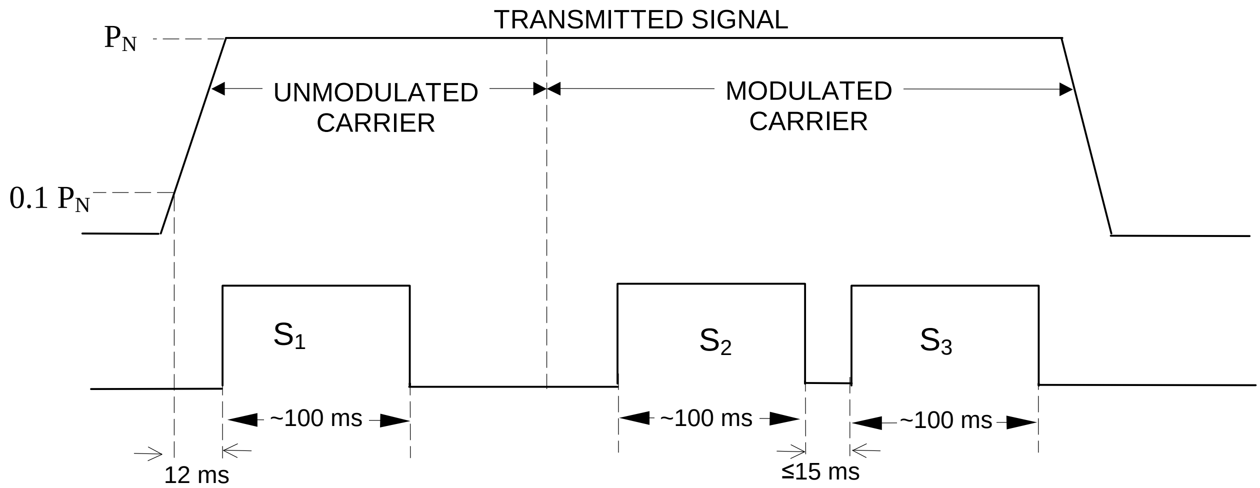
The maximum and minimum values of f_b are to be recorded in Table F.1.

A.3.1.4 Message Coding

The content of the demodulated digital message shall be checked for validity and compliance with the format for each data field, bit by bit, and the BCH error correcting code(s) shall be checked for correctness.

The content of the digital message shall be monitored during all tests. Note that protocols that support encoded location information (e.g. User-Location, Standard Location and National Location) shall only be used in beacons that are designed to accept location information from a navigation system.

A.3.2 Modulator and 406 MHz Transmitter



The S_1 pulse starts 12 ms after the beginning of the unmodulated carrier.
The S_2 pulse starts at the beginning of bit 23.
The S_3 pulse starts not later than 15 ms after the end of S_2.

Figure A.3 : Definition of Measurement Intervals

A.3.2.1 Transmitted Frequency

Frequency measurements shall be made during each transmission, either directly at 406 MHz or at a stable downconverted frequency, during various intervals of approximately 100 milliseconds, as shown in Figure A.3.

The various frequency and frequency stability computations defined hereunder can all be made using data collected from the same set of 18 transmissions.

A.3.2.1.1 Nominal Value

The mean transmission frequency, f_0, shall be determined from 18 measurements of $f_i^{(1)}$ made during the interval S_1 during 18 successive transmissions, as follows:

$$f_0 = f^{(1)} = \frac{1}{n}\sum_{i=1}^{n} f_i^{(1)}$$

where n=18

A.3.2.1.2 Short-Term Stability

The short-term frequency stability shall be derived from measurements[1] of $f_i^{(2)}$ and $f_i^{(3)}$ made during the intervals S_2 and S_3 during 18 successive transmissions, as follows:

$$s_{100ms} = \left\{ \frac{1}{2n} \sum_{i=1}^{n} \left(\frac{f_i^{(2)} - f_i^{(3)}}{f_i^{(2)}} \right)^2 \right\}^{1/2}$$

where n=18

The above relationship corresponds to the Allan variance. The measurement conditions used here are different (i.e. dead time between two measurements). Experience, however, has shown that the results obtained are very close to those achieved under the normal measurement conditions for the Allan variance.

A.3.2.1.3 Medium-Term Stability

The medium-term frequency stability shall be derived from measurements of $f_i^{(2)}$ made over 18 successive transmissions at instants t_i (see Figure A.4).

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[1] To correctly measure the short-term frequency stability, it is essential that an equal number of positive and negative phase transitions are included in the gating intervals defined as S_2 and S_3 in Figure A.3, hence these intervals are only approximately 100 ms duration.

For a set of n measurements[1], the medium-term frequency stability is defined by the mean slope of the least-squares straight line and the residual frequency variation about that line.

The mean slope is given by:

$$A = \frac{n\sum_{i=1}^{n} t_i f_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n} f_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2}$$

where n=18

The ordinate at the origin of the least-squares straight line is given by:

$$B = \frac{\sum_{i=1}^{n} f_i \sum_{i=1}^{n} t_i^2 - \sum_{i=1}^{n} t_i \sum_{i=1}^{n} t_i f_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2}$$

where n=18

The residual frequency variation is given by:

$$s = \left\{ \frac{1}{n} \sum_{i=1}^{n} \left(f_i - At_i - B \right)^2 \right\}^{1/2}$$

where n=18

1 With a transmission repetition period of approximately 50 seconds, there will be 18 measurements during an approximate 15 minute period (i.e. n=18).

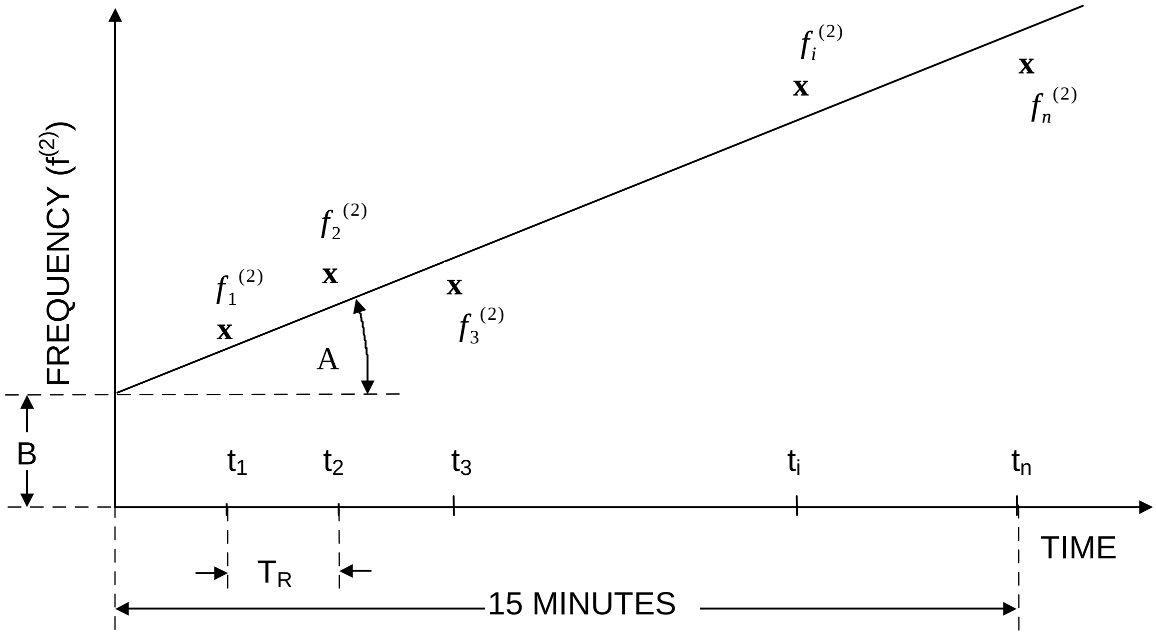

Figure A.4: Medium-Term Frequency Stability Measurement (not to scale)

A.3.2.2 Transmitter Power Output

A.3.2.2.1 Transmitter Power Output Level

The transmitter power output level shall be measured at the transmitter output. During output power measurement, the antenna shall be replaced by a dummy load that presents to the transmitter an impedance equal to that of the antenna under normal operation conditions. The RF losses of any impedance matching network which is connected to the beacon only for test purposes shall be accounted for in the power output measurement.

A.3.2.2.2 Transmitter Power Output Rise Time

The transmitter power output rise time may be determined on an oscilloscope by measuring the rise time of the burst envelope from the 10% power point to the 90% power point.

The power output level, measured 1 millisecond before the 10% power point, shall be less than -10 dBm. (Note: this can be measured using a spectrum analyzer in its "zero span" mode, with a wide resolution bandwidth (e.g ≥3 kHz), with the beacon output signal activating the video trigger to start a sweep.)

A.3.2.2.3 Antenna Characteristics

The antenna characteristics test procedure is given in Annex B of this document. Successful completion of these tests is sufficient to show that the beacon meets the antenna and radiated output requirements for Cospas-Sarsat Type Approval. Alternative procedures may also be used to provide equivalent information, but these procedures must be agreed by the Cospas-Sarsat Secretariat in advance.

For antennas tested separately from beacons, either the procedures of Annex B (with "Beacon Under Test" replaced by "Antenna Under Test" where appropriate), or equivalent conventional antenna range test procedures may be used to demonstrate the antenna radiation pattern. In any case, the test results shall demonstrate that the antenna, when receiving an input power level of 37 dBm, would produce EIRP within the limits 34 dBm to 41 dBm for at least 90 % of the measurement coordinates of Annex B.

A.3.2.2.4 Spurious Output

This measurement shall be performed with the beacon operating into 50 Ohms. The resolution bandwidth for the measurement of the spurious emission levels shall be 100 Hz or less. If this measurement is made on a spectrum analyzer, the spectrum analyzer display shall be used on a maximum hold for a period which is long enough to integrate the entire frequency spectral response. The 406 MHz beacon type approval test report shall include spectral plots depicting the complete 406.0 MHz to 406.1 MHz band.

A.3.2.3 Data Encoding and Modulation

The data encoding, the modulation sense, the modulation index, the modulation rise and fall times, and the modulation symmetry of the bi-phase demodulated signal may be checked with an oscilloscope.

The modulation rise and fall times, t_R and t_F, and the modulation symmetry are defined in C/S T.001.

The modulation index measurement[1] shall be performed during the first 15 bits of the modulated portion of the transmission and average values determined for the positive

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[1] Any overshoot observed in the modulation index (as illustrated in Figure 2.5 of C/S T.001) can be disregarded if its amplitude does not exceed 10% of the specification limit and its duration does not exceed 10% of a half-bit period.

This means that the overshoot can be ignored if the absolute value of the modulation index remains within these limits. That is, the modulation index may go out of the specification limits (1.0 to 1.2 radians) momentarily following the phase transition, provided the absolute value of the modulation index remains between 0.90 radians and 1.32 radians (1.0 - 10% and 1.2 + 10%), and returns to the normal specification in less than 0.125 ms (10% of the half-bit period of 1.25 ms) after it departed from those limits.

Any overshoots shall be analysed by the test laboratory and a statement regarding whether they can be disregarded shall be provided as comments to items 4 or 7 of Table F.1.

and negative phase deviations. It is recommended to display or monitor the complete demodulated transmission.

A.3.3 Voltage Standing-Wave Ratio

The transmitter shall be operated into an open circuit for a minimum period of 5 minutes, and then into a short circuit for a minimum period of 5 minutes. Afterwards, the transmitter shall be operated into a load having a VSWR of 3:1 (pure resistive load R < 50 Ohm i.e. R=17 Ohm), during which time the following parameters shall be measured:

a. transmitter nominal frequency, as per para. A.3.2.1.1;

b. digital message content, as per para. A.3.1.4; and

c. the modulation parameters, as per para. A.3.2.3.

This sequence of transmitter loads and measurements shall be performed at maximum, minimum and ambient temperatures.

A.3.4 Protection Against Continuous Transmission

If possible, the protection against continuous transmission shall be checked by inducing a continuous transmission from the beacon under test. However, if the beacon manufacturer has determined that this test is not feasible for his beacon, he must provide a technical explanation which demonstrates that his design complies with the specification.

A.3.5 Oscillator Aging

Long-term frequency stability shall be demonstrated by data (e.g. oscillator manufacturer's test data) provided by the beacon manufacturer to the test facility.

For oscillators which require compensation over the operating temperature range, measurement results and a technical analysis shall also be provided to substantiate that short and medium-term stability would remain within specification after five years.

A.3.6 Self-test Mode

The manufacturer shall provide a list of the parameters that are monitored in the self-test mode (see Annex G).

Self-test operation shall not cause any operational mode transmissions.

The duration of the 406 MHz burst shall be measured, the frame synchronization pattern shall be checked and, if applicable, the encoded location checked for correct default code. The format flag bit shall be reported. The self-test mode shall be tested to verify that any transmission is limited to one self-test burst only.

Design data shall be provided on protection against repetitive self-test mode transmissions.

A.3.7 Ancillary Electrical Devices in the Beacon

It is recommended that all graphs and tables which make reference to beacon burst characteristics be annotated in a manner that identifies the times at which ancillary devices are in operation, or when operating modes are changed.

A.3.7.1 Automatically Controlled Ancillary Devices

Automatically controlled ancillary devices in the beacon (e.g. homing transmitter, Search and Rescue Radar Transponder (SART), strobe light, etc.) must be operating for the duration of the tests in the laboratory to ensure that they do not affect the 406 MHz signal and that the battery can operate the full load for the required operating lifetime. (Note that for beacon tests through the satellite, any homing transmitter may need to be turned off or offset from the distress frequency, as per the national requirements of the test facility.)

A.3.7.2 Operator Controlled Ancillary Devices

Type approval testing of beacons with ancillary devices under operator control shall be designed to confirm that the ancillary devices do not degrade beacon transmission characteristics, including frequency stability, timing, and modulation. This may be accomplished by causing the ancillary devices that are under operator control to be activated periodically during the measurement of these characteristics.

The timing of the periodic activation of ancillary devices shall be such that the instants of activation and deactivation occur over the full range of times relative to the beacon transmission burst, with the intent of detecting any effects of the activations or deactivations on the signal characteristics. The activation-deactivation regime shall be carried out for selected intervals spaced out over the duration of the long term tests (i.e. thermal shock, temperature gradient) to characterise the performance of the beacon over the entire range of operating conditions.

The test procedure shall include the operating life tests with the ancillary devices set in the operating mode that draws maximum battery energy. During this test the activation deactivation regime shall be carried out at suitable intervals. An example of test procedure for a beacon with an operator controlled voice transceiver function is provided at Annex G.

A.3.8 Navigation System (if applicable)

Except for the position data encoding test (section A.3.8.7), the navigation input system must be operating for the duration of all tests to ensure that it does not affect the 406 MHz signal and that the beacon can operate for the required operating lifetime. For a beacon operating with an external navigation device, navigation data input shall be provided in the same way as it would be by an operational navigation device.

All the tests specified below shall be performed at ambient temperature. A check for valid BCH code shall be performed throughout these tests, and any examples where the encoded BCH was not correct shall be specifically identified in the test report and an annotation provided at item 17 of Table F.1.

A.3.8.1 Position Data Default Values

If valid navigation data is not available in the beacon memory at the time the beacon transmits a 406 MHz message, the message shall contain default values for position data bits as specified in C/S T.001. To test this, ensure that no navigation input is present for at least 4 hours and 5 minutes (i.e. remove the appropriate navigation signal or navigation data input to the beacon), then activate and operate the test beacon for 30 minutes. Verify that the default values for position data are present in the digital message throughout this period. Deactivate the beacon. Record the results with a pass/fail indication at item 17 of Table F.1.

A.3.8.2 Position Acquisition Time and Position Accuracy

A.3.8.2.1 At a known location, apply the appropriate navigation signal or navigation data input to the beacon. Activate the beacon and verify that the position is acquired and entered in the digital message within the specified time interval (1 min for external navigation device, 10 min for internal navigation device). Check that the encoded data is correct within 500 metres for beacons with Standard or National Location protocols or 5.25 km for beacons with User-Location protocols. Deactivate the beacon.

A.3.8.2.2 Change navigation data input or the navigation signal (by using GNSS RF simulator or by moving the beacon) by more than 5 km with respect to the position of A.3.8.2.1. Activate the beacon and verify that the new position is acquired and encoded into the digital message within the specified time interval (1 min for external navigation device, 10 min for internal navigation device). Check that the encoded data is correct within 500 metres for beacons with Standard or National Location protocols or 5.25 km for beacons with User-Location protocols. Deactivate the beacon.

Record the results to A.3.8.2.1 and A.3.8.2.2 with a pass/fail indication at item 17 of Table F.1, and the measured values in Table F-C.4 or Table F-C.5 as appropriate. If the test had to be repeated because initial test results failed to meet requirements, the failed tests shall also be reported and an explanation for the failure included in the report. In such circumstances the tests shall be repeated and reported at least 5 times in the configuration that failed.

In the case of beacons with internal navigation devices:

a. test A.3.8.2.1 shall be conducted at a location where the beacon has clear visibility to the available GNSS satellites; and

b. tests A.3.8.2.1 and A.3.8.2.2 shall be conducted with the beacon in all the configurations declared by the manufacturer in the application form (Annex G) consistent with the manufacturers operational instructions and in accordance with the guidance provided below.

   Floating. The beacon shall be completely submerged in salt water [composition 5% salt solution by weight], activated while submerged, and allowed to float to the surface under its own buoyancy.

Resting on Ground. The beacon shall be placed on dry ground in the orientation described in the manufacturer’s instructions.

A.3.8.3 Encoded Position Data Update Interval

If the beacon is capable of updating the encoded position data, apply the appropriate navigation signal or navigation data input to the beacon which should cause the encoded position data to update and verify that the beacon does not update the digital message within 20 minutes after the time of the last update. For beacons with internal navigation devices, the test can be performed either by changing the beacon position or with a GNSS RF simulator to emulate the GNSS satellite downlinks. Verify that the beacon updates the digital message in accordance with the manufacturer's design. If the beacon design does not allow encoded position data updates, verify that the encoded position data in the digital message does not change when the appropriate navigation signal, or navigation data input to the beacon, are applied. Record the first measured position data update interval at item 17 of Table F.1.

This test can be conducted in a configuration determined between the beacon manufacturer and the test laboratory. Unlike A.3.8.2.1 and A.3.8.2.2 this test does not have to be repeated for each operational configuration.

A.3.8.4 Position Clearance after Deactivation

After the test A.3.8.3 deactivate and reactivate the beacon, with no navigation signal or navigation data input to the beacon, to verify that the previous position data has been cleared and that the correct default values are encoded in the message. Record the results with a pass/fail indication at item 17 of Table F.1.

A.3.8.5 Position Data Input Update Interval

If a beacon is designed to accept position data from an external navigation device prior to beacon activation, navigation data input should be provided and stored in the beacon memory at intervals not longer than 20 minutes for EPIRBs and PLBs, or 1 minute for ELTs. To test this, deactivate the beacon, change the initial position data, allow for the appropriate time interval (20 min (–0/+10 min) or 1 min (–0/+0.5 min)) for the changed position to be accepted. Remove the navigation data input to the beacon. Activate the beacon. Verify that the encoded position data is correct. A GNSS RF simulator may be used to simulate the GNSS satellite downlinks. Identify in Table F.1 the applicable time interval for this test, and record the results with a pass/fail indication at item 17 of Table F.1.

A.3.8.6 Last Valid Position

Remove the appropriate navigation signals or the navigation input and verify that the last valid position data before the loss of navigation signal is retained in the 406 MHz beacon digital message for 4 hours (± 5 min) from the last valid position data input. Check that position data has been cleared and that the correct default values are encoded in the message after 4 hours (± 5 min). Identify in Table F.1 the duration for which the last valid position data continued to be transmitted by the beacon, and also that the correct default values were transmitted afterwards.

A.3.8.7 Position Data Encoding

This test is conducted by substituting the output of the navigation device with test scripts which replicate the location information provided in Table D.1 for the User-Location protocol, Table D.2 for the Standard Location Protocol, and Table D.3 for the National Location protocol.

This test may be conducted either by the test laboratory or the manufacturer. The results shall be provided in the formal report as per Appendix C to Annex F. The test laboratory shall annotate Table F.1 with "√" if the beacon performed as required for all the scripts tested.

- END OF ANNEX A -

ANNEX B

ANTENNA CHARACTERISTICS

B.1 SCOPE

This Annex describes the measurement procedure to verify the antenna characteristics of 406 MHz distress beacons defined in document C/S T.001. Alternative procedures, including the use of a shielded anechoic room, are acceptable if they provide equivalent information and have minimal impact on Cospas-Sarsat operations.

B.2 GENERAL TEST CONFIGURATION

B.2.1 The antenna characteristics of the Beacon Under Test (BUT) shall be measured in an open field test site or a shielded anechoic room. In accordance with the guidance provided at Section 4.5, the beacon shall be tested in configuration(s) that simulate the ground conditions in which the beacon might be expected to operate.

A measuring antenna located at a horizontal distance of 3 metres from the BUT shall be used to measure the emitted field strength. In order to make measurements at all the required azimuths the BUT will have to be rotated through 360°, and to make measurements at the required elevation angles the measuring antenna will have to be moved vertically. The BUT shall be equipped with a fresh battery and the test shall be performed at ambient temperature.

B.2.2 Prior to each open field test site transmission, the appropriate national authorities responsible for Cospas-Sarsat and radio emissions shall be notified.

In order to keep the potential disturbance to the Cospas-Sarsat System to a minimum, these antenna tests shall be conducted using a beacon operating at its nominal repetition rate and coded with the test protocol of the appropriate type and format. Transmission of any continuous wave (CW) signal from a signal generator in the 406.0 - 406.1 MHz band is strictly forbidden.

B.3 TEST SITE

B.3.1 The test site shall be an area clear of any obstruction such as trees, bushes or metal fences within an elliptical boundary of dimensions shown in Figure B.1. Objects outside this boundary may still affect the measurements and care shall be taken to choose a site as far as possible from large objects or metallic objects of any kind.

B.3.2 The terrain at an outdoor test site shall be flat. Any conducting object inside the area of the ellipse shall be limited to dimensions less than 7 cm. A metal ground plane or wire mesh enclosing at least the area of the ellipse and keeping the same major and minor axis as indicated in Figure B.1 is preferred (indicated as ground plane “A” in figures B.2 through B.5). If this is not practical then a surface of homogeneous good soil (not sand or rock) is satisfactory. All electrical wires and cables shall be run underground or under the ground plane. The antenna cable shall be extended behind the measuring antenna along the major axis of the test site for a distance of at least 1.5 metres from the dipole elements before being routed down to ground level.

B.3.3 All precautions shall be taken to ensure that reflections from surrounding structures are minimized. No personnel shall be within 6 metres of the BUT during actual measurements. Test reports shall include a detailed description of the test environment. Reports shall specifically indicate what precautions were taken to minimize reflections.

B.3.4 Weather protection enclosures may be constructed either partially or entirely over the site. Fibreglass, plastics, treated wood or fabric are suitable materials for construction of an enclosure. Alternatively, the use of an anechoic enclosure is acceptable.

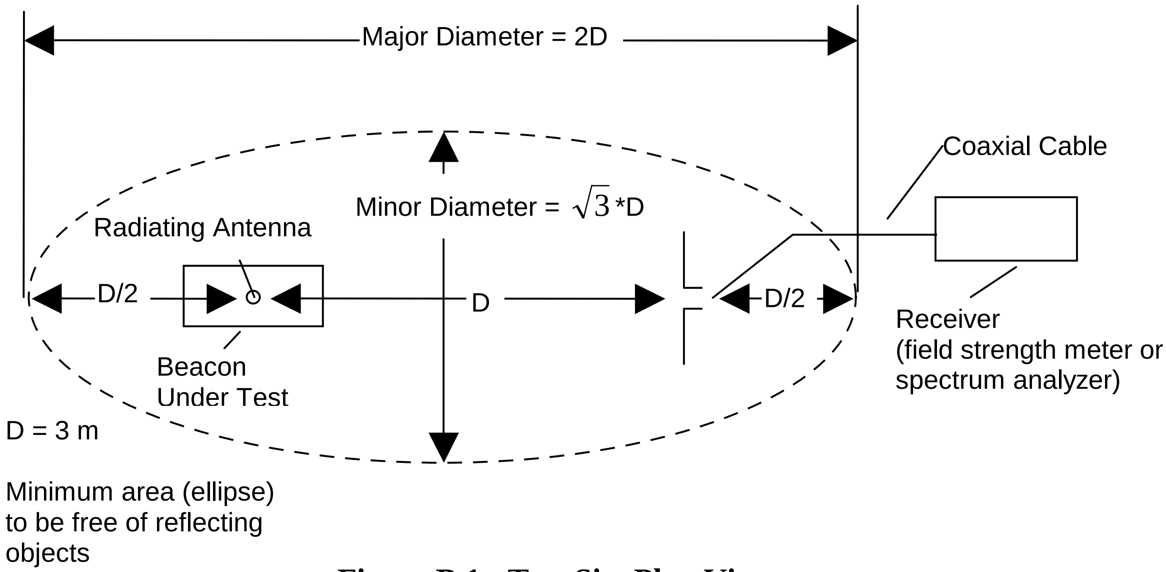


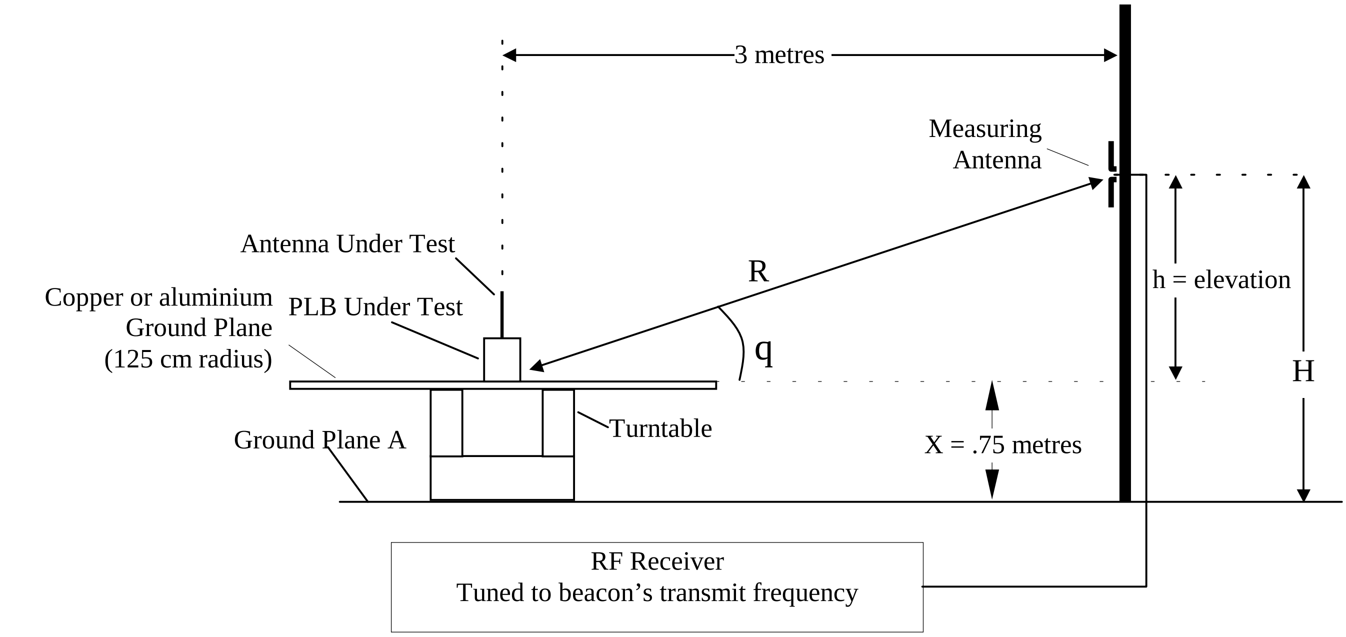
Figure B.1: Test Site Plan View

B.4 GROUND PLANE AND BEACON INSTALLATION

B.4.1 In accordance with the guidance provided at Section 4.5 the beacon shall be tested in the configurations that simulate the ground conditions in which the beacon might be expected to operate (see Figure 4.1). Descriptions of the test configurations are provided at Figures B.2 through B.5.

B.4.2 The applicable ground plane configurations, as described in Figures B.2 through B.5, will be decided by Cospas-Sarsat on the basis of technical considerations relevant to the beacon operation and information provided by the manufacturer. If there is any doubt in respect of the test configurations that must be tested, the beacon manufacturer and the type approval facility shall contact the Cospas-Sarsat Secretariat prior to the start of testing.

Figure B.2: Test Configuration for "PLB-like" Devices
(e.g. PLB, survival ELT, automatic portable ELT)



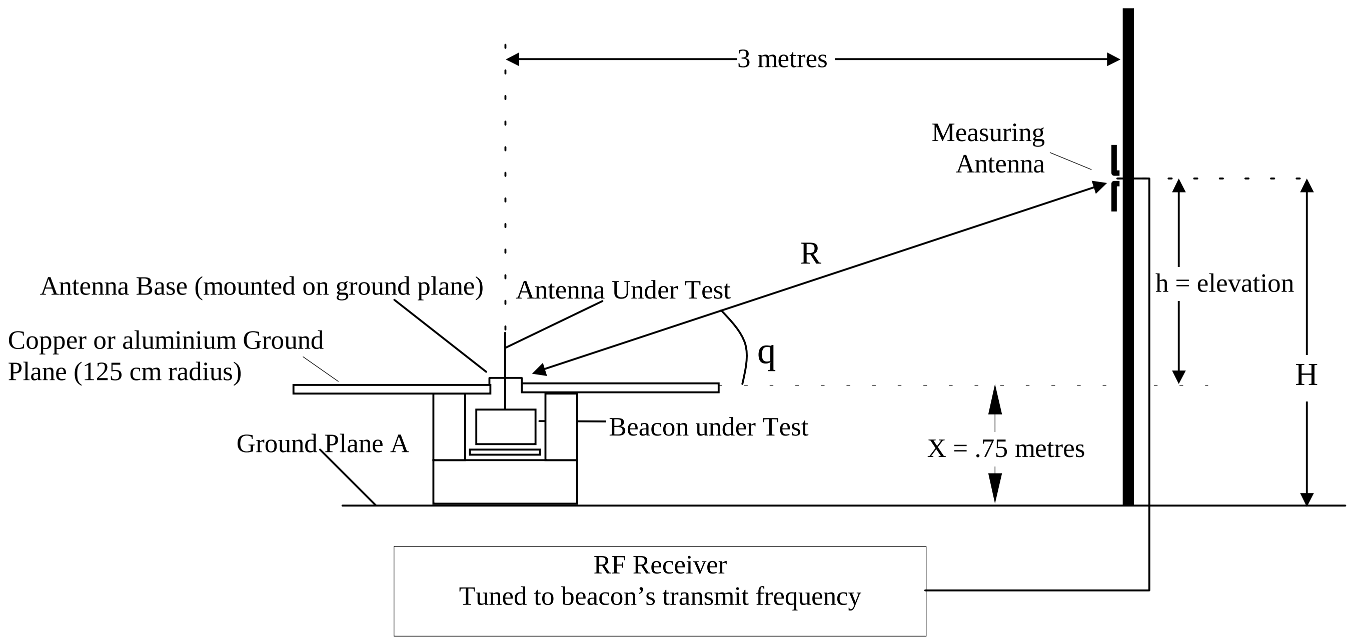
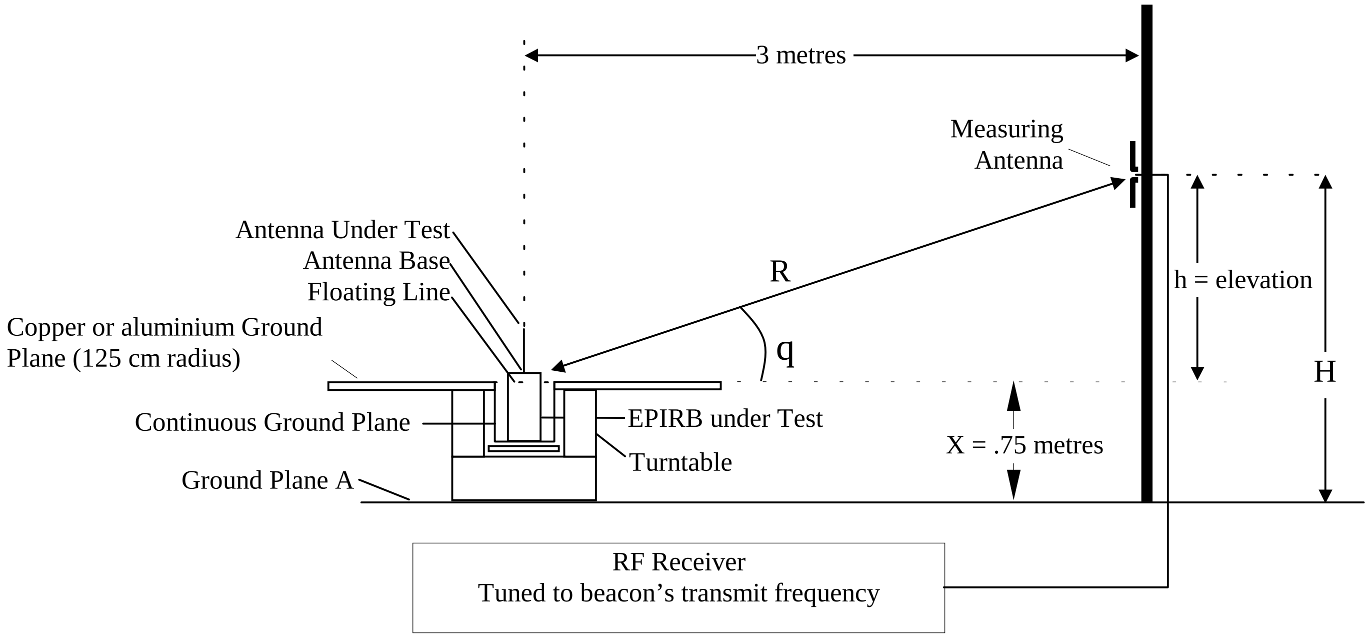


Figure B.3: Test Configuration for "Fixed ELT-like" Devices
(i.e. beacon with an antenna designed to be mounted on a metal surface)

Figure B.4: Test Configuration for "EPIRB-like" Devices (i.e. beacons designed to operate while floating in water)



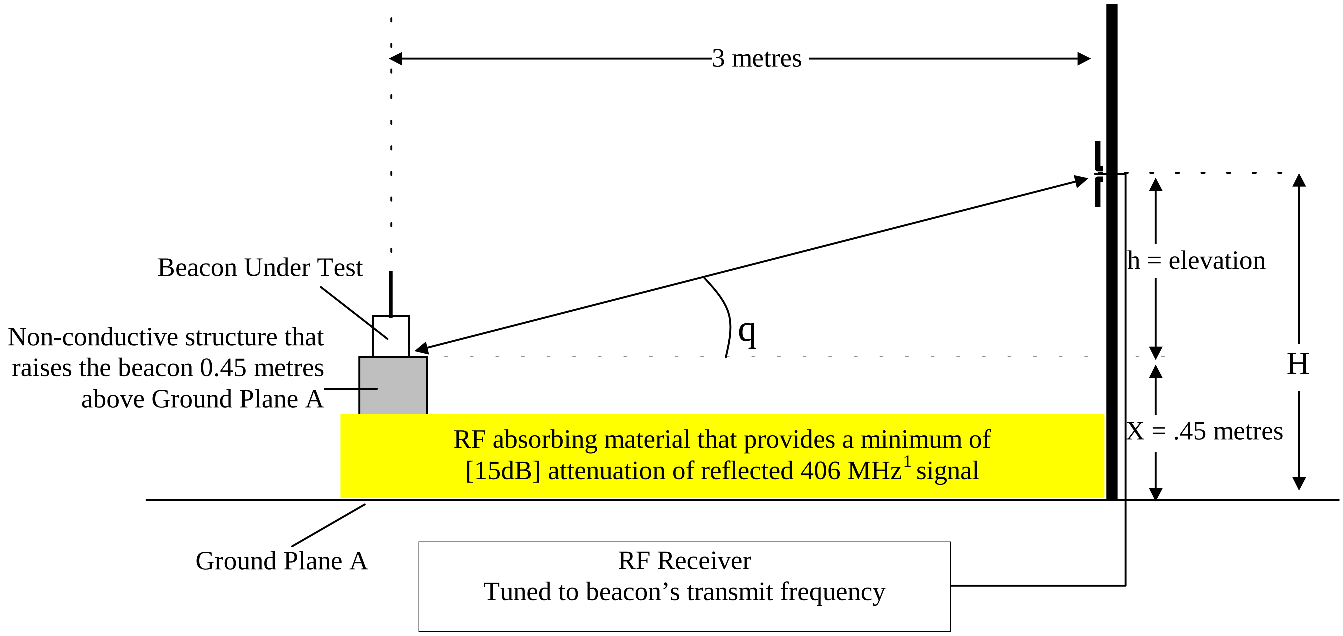
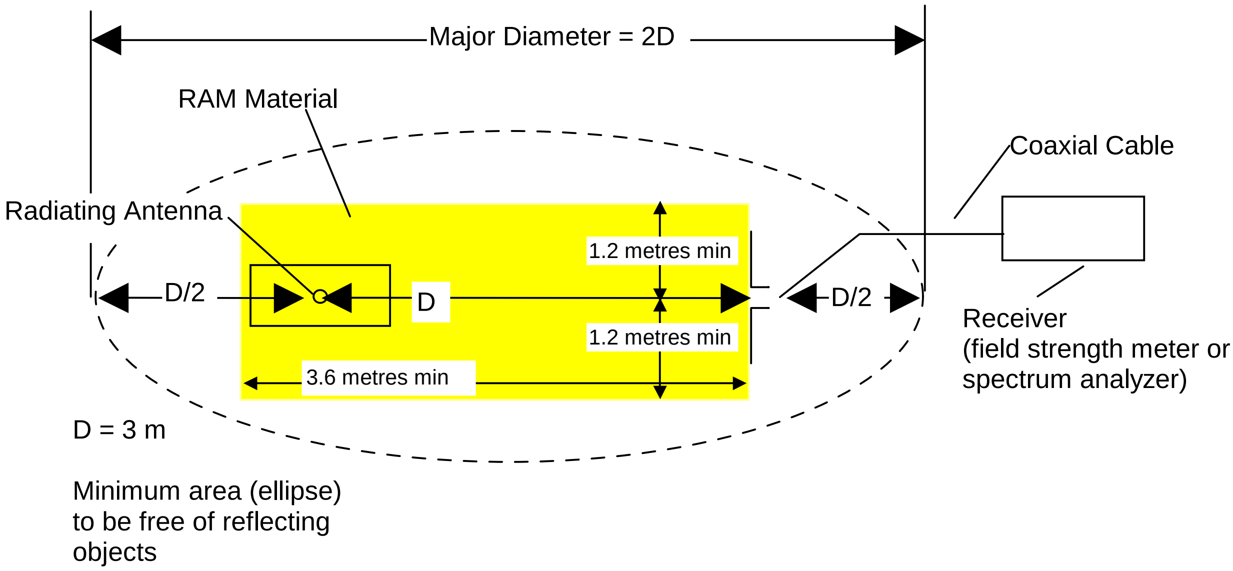


Figure B.5: Additional Test Configuration for all Devices that Might be Required to Operate Without a Ground Plane

[1] The dimensions of the RF absorbing material: minimum length of 3.6 metres, minimum width of 2.4 metres and equally spaced either side of the major axis "D" (see Figures B.1 and B.6), maximum height of 0.4 metres.

Figure B.6: Test Site Plan View with RAM Material



B.5 MEASURING ANTENNA

B.5.1 The radiated field of the BUT antenna shall be detected and measured using a tuned dipole. This dipole antenna shall be positioned at a horizontal distance of 3 metres from the BUT antenna and mounted on a non-conducting vertical mast that permits the height of the measuring antenna to be varied sufficiently to measure the beacon EIRP at elevation angles ranging from 10 to 50 degrees.

Referring to Figures B.2 through B.5, the height at which the measuring antenna must be elevated on the supporting mast for a specific elevation angle θ is calculated as follows:

$$h = 3 (\tan \theta) \text{ metres}$$

and

$$H = h + X$$

where,

X is the reference height (0.45 metres or 0.75 metres depending upon the test configuration)

h[1] is the height of the measuring antenna relative to the reference height X,

θ is the desired angle of elevation as indicated on Figures B.2 through B.5 (at reference height X),

H is the height of the measuring antenna above the ground plane A.

[1] The centre of the measuring dipole antenna is used as the reference to determine its height.

B.5.2 As the measuring antenna is vertically elevated, the distance (R) between the BUT antenna and the measuring antenna increases. The distance (R) is a function of the elevation angle (θ) and it is calculated as follows:

$$R = \frac{3}{\cos\theta} \text{ metres}$$

B.5.3 The antenna factor (AF) of the measuring antenna at 406 MHz must be known. This factor is normally provided by the manufacturer of the dipole antenna or from the latest antenna calibration data. It is used to convert the induced voltage measurement into electric field strength.

B.5.4 Since the value of AF depends on the direction of propagation of the received wave relative to the orientation of the receiving antenna, the measuring dipole should be maintained perpendicular to the direction of propagation. In order to minimize errors during measurement, it is recommended to adopt this practice (Figure B.7). If the measuring antenna cannot be maintained perpendicular to the direction of propagation (Figure B.8), a correction factor must be considered due to the gain variation pattern of the measuring antenna. For a dipole, the corrected antenna factor (AF_c) is calculated as follows:

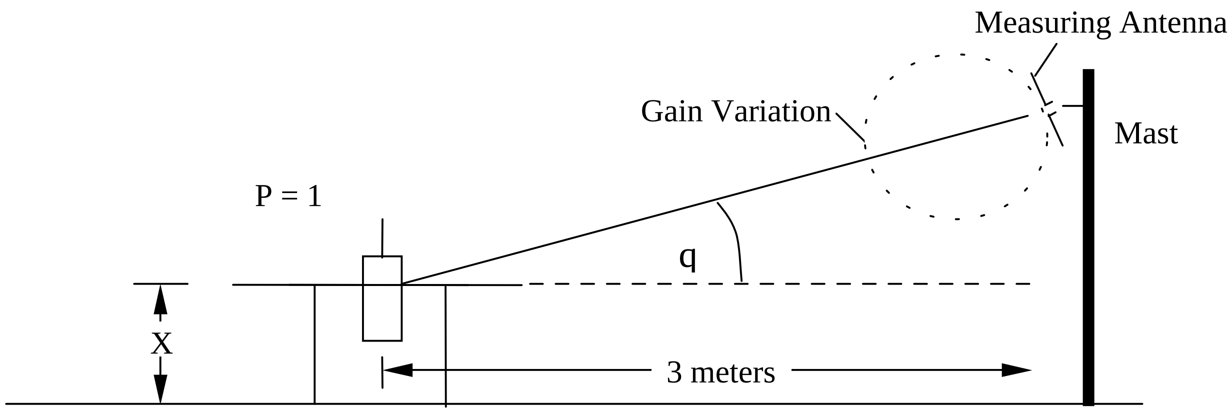
$$AF_c = \frac{AF}{P}$$

and

$$P = \frac{\cos\left(90 \text{ x } \sin\theta\right)}{\cos\theta}$$

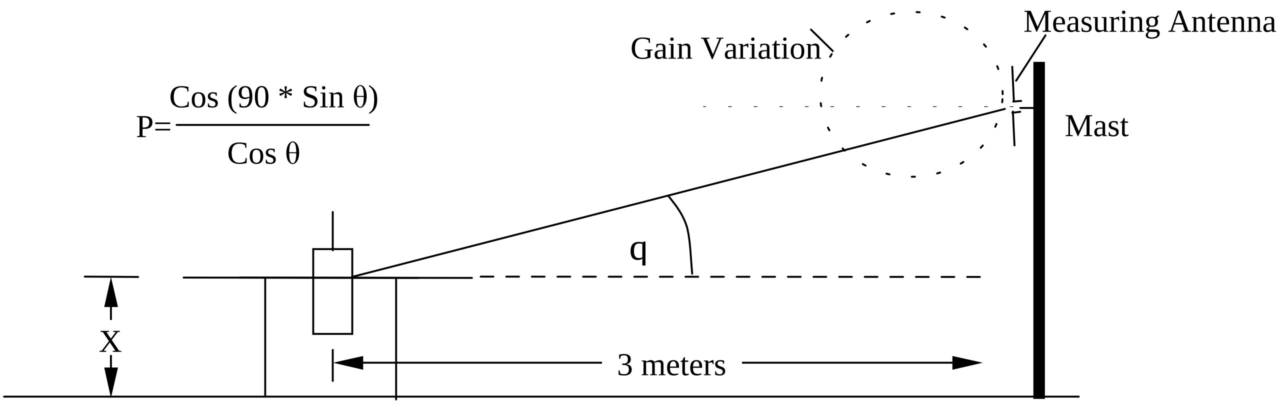
where: AF is the antenna factor from paragraph B.5.3,
θ is the elevation angle,
P[1] is the correction factor for the dipole antenna pattern.

Figure B.7: Measuring Antenna Perpendicular to the Direction of Propagation



[1] The correction factor (P) is equal to 1 when the measuring antenna elements are maintained perpendicular to the direction of propagation. P is therefore equal to 1 when the measuring antenna is horizontally polarized at any elevation angle. The correction factor applies only to vertically polarized measurements.

Figure B.8: Measuring Antenna NOT Perpendicular to the Direction of Propagation



B.6 BEACON TRANSMITTING ANTENNA

The BUT antenna may have been designed to transmit signals in the 406.0 – 406.1 MHz frequency band, and also at 243 MHz and 121.5 MHz, and also to conduct power to a strobe light mounted above the antenna. It is possible that the radiated signal will be composed of an unknown ratio of vertically and horizontally polarized waves. For this reason, consideration shall be given to the type of antenna and its radiated field. The results shall encompass all wave polarizations. The antenna pattern and field strength measurements should provide sufficient data to evaluate the antenna characteristics.

B.7 RADIATED POWER MEASUREMENTS

B.7.1 Prior to each open field test site transmission, the appropriate national authorities responsible for Cospas-Sarsat and radio emissions shall be notified.

B.7.2 The test provides data which characterises the antenna by measuring the vertically and horizontally polarised waves.

B.7.2.1 Measurement Requirements

The BUT shall be transmitting normally with a fresh battery. The signal received by the measuring antenna shall be coupled to a spectrum analyzer or a field strength meter and the radiated power output shall be measured during the beacon transmission. An example of a power measurement made with a spectrum analyzer during the unmodulated portion of a beacon transmission is illustrated in Figure B.9. The receiver shall be calibrated according to the range of levels expected, as described in Section B.8.

Measurements[1] shall be made at the azimuth and elevation angles indicated in the table below.

Test Configurations	Azimuth Angle in Degrees Rotated about the Antenna Axis (± 3°)	Elevation Angle in Degrees (± 3°)
Figures B.2, B.3 and B.4	0, 30, 60, 90, 120, 150, 180, 210, 240, 270, 300 and 330	10, 20, 30, 40, 50
Figure B.5	0, 90, 180, 270	10, 20, 30, 40, 50

B.7.2.2 EIRP and Antenna Gain Calculations

The following steps shall be performed for each set of measured voltages and the results recorded:

Step 1: Calculate the total induced voltage V_{rec} in dBV using

$$V_{rec}(dBV) = 20 \log \sqrt{V_h^2 + V_v^2}$$

where:

V_v and V_h are the induced voltage measurements (in volts) when the measuring antenna is oriented in the vertical and the horizontal plane respectively.

Step 2: Calculate the field strength E in dBV/m at the measuring antenna using

$$E\ (dBV/m) = V_{rec} + 20 \log AF_c + Lc$$

where:

V_{rec} is the calculated signal level from Step 1 (dBV)

AF_c is the corrected antenna factor as defined in paragraph B.5.4

Lc is the receiver system[2] attenuation and cable loss (dB)

Step 3: Calculate the EIRP and the G_i

Using the standard radio wave propagation equation:

$$E(volts/metre) = \frac{\sqrt{(30 \text{ x } Pt(Watts) \text{ x } Gi)}}{R\ (metres)}$$

[1] The measuring antenna should be linearly polarized and positioned twice to align with both the vertical and horizontal components of the radiated signal in order to measure the total EIRP as described in section B.7.2.2.

[2] The receiver system attenuation is compensated for when performing the calibration procedure (section B.8). Otherwise, it shall be calculated separately.

and

$$Pt(Watts) \times Gi = EIRP$$

the EIRP for each set of angular coordinates is obtained from

$$EIRP\ (Watts) = \frac{E^2 x\ R^2}{30}$$

and the antenna gain from

$$Gi = \frac{E^2\ x\ R^2}{30\ x\ Pt}$$

where:

R is the distance between the BUT and the measuring dipole antenna calculated in section B.5.2

Pt is the power transmitted into the BUT antenna

Gi is the BUT antenna numerical gain relative to an isotropic antenna

E is the field strength converted from Step 2 into volts/metre

B.8 TEST RECEIVER CALIBRATION

In order to minimize measurement errors due to frequency response, receiver linearity and cable loss, the test receiver (which may be a field strength meter or a spectrum analyzer) shall be calibrated as follows:

a. Connect the equipment as shown in Figures B.2 through B.5, as appropriate. Install the BUT as described in Section B.4.

b. Turn on the BUT for normal transmission. Set the receiver bandwidth to measure the power of the transmission. An example using a spectrum analyzer to measure the unmodulated portion of the transmission is illustrated in Figure B.9. The same receiver bandwidth shall be used during the antenna measurement process. Tune the receiver for maximum received signal. Position the measuring antenna in the plane (horizontal or vertical) that gives the greatest received signal. Rotate the BUT antenna and determine an orientation which is representative of the average radiation field strength (not a peak or a null). Record the receiver level.

c. Disconnect the measuring antenna and feed the calibrated RF source to the receiver through the measuring antenna cable. Adjust the signal source to give the same receiver level recorded in (b) above.

d. Disconnect the calibrated RF source from the measuring antenna cable and measure its RF output with a power meter.

e. Reconnect the calibrated RF source to the measuring antenna cable and adjust the gain calibration of the receiver for a reading which is equal to the power.

B.9 ANTENNA POLARIZATION MEASUREMENT

B.9.1 An analysis of the raw data (V_v, V_h) obtained during the antenna test conducted with the beacon in configurations B.2 through B.4 should be sufficient to determine if the polarization of the BUT antenna is linear or circular. There is no requirement to evaluate the sense of polarization for Figure B.5.

B.9.2 If the induced voltage measurements V_v and V_h for at least 80% of all angular coordinates (azimuth, elevation) differ by at least 10 dB, the polarization is deemed to be linear. The polarization shall be declared as vertical or horizontal depending upon whether Vv or V_h is greater.

B.9.3 If more than 20% of the induced voltage measurements (V_v, V_h) are within 10 dB of each other, the BUT antenna is considered to be circularly polarized. Since the sense of the polarization must be right hand circular polarized (RHCP), determine the polarization using the following method and report the results.

Compare the signals received at an elevation angle of 40° for each specified azimuth angle using known right-hand circularly-polarized (RHCP) and left-hand circularly-polarized (LHCP) antennas. The circularly polarized antenna that receives the maximum signal obtained from measurements at the required azimuth angles determines the sense of polarization.

The amount of gain variation, see item B.10.5, is determined by the results obtained with circularly-polarized antennas.

B.9.4 In the case of inclined linear beacon antennas, EIRP measurements may be performed directly using a RHCP measuring antenna with known antenna factor at 406 MHz. In this case the requirements of section B.10 shall be directly applied to the EIRP results. If the results are in accordance with C/S T.007 requirements, then the antenna should be accepted regardless of any circularly polarized component of the signal.

B.9.5 Report the measurement results in Table F-B.2.

B.10 ANALYSIS OF RESULTS

B.10.1 Enter the sense of the antenna polarization, determined per Section B.9, into Table F.1.

B.10.2 Provide the measured EIRP levels in Table F-B.1 (for configurations described in Figures B.2 through B.4) and Table F-B.3 (for Figure B.5). Verify that the BUT produces a field equivalent to an EIRP in the ranges indicated in the table below.

Test Configurations	EIRP Required
Figures B.2, B.3, and B.4	32 dBm to 43 dBm[1] for at least 90% of the measurement points
Figure B.5	[30] dBm to 43 dBm for at least 80% of the measurement points

Specifically annotate Table F-B.1 and F-B.3:

a. with highlighted text, to indicate all the EIRP values that are not within the ranges indicated above; and

b. with stricken-out text, to indicate any EIRP levels that were removed from consideration for calculating the EIRP maximum and minimum values at the end of life.

B.10.3 For the set of measurements identified in Section B.10.2, the overall maximum ($EIRP_{max}$) and minimum ($EIRP_{min}$) EIRP values shall be determined.

B.10.4 A power loss factor ($EIRP_{Loss}$) shall be determined[2] to correct for what the power output would be after the beacon had operated at minimum temperature for its operating lifetime. The value of $EIRP_{LOSS}$ shall be entered in Table F.1 and also at Appendix B to Annex F. This value shall be subtracted from the results in Section B.10.3 and entered in Appendix B to Annex F and item 15 of Table F.1 as $EIRP_{max\ EOL}$ and $EIRP_{min\ EOL}$.

B.10.5 The amount of gain variation in azimuth for the 40° measurements shall be extracted from Table F-B.1 and entered in Table F.1.

B.11 ANTENNA VSWR MEASUREMENT

This section is not applicable to beacons with integral antennas, nor for tests conducted in the configuration described at Figure B.5.

B.11.1 The antenna VSWR of the BUT shall be measured at the input of the antenna (or the matching network if applicable) using an acceptable VSWR measurement technique, to be described in the test report.

B.11.2 Numerous precautions are necessary in VSWR measurement to avoid errors due to the effect of nearby conducting objects on the antenna current distribution.

B.11.3 The VSWR measurement shall be performed with the BUT mounted in the configurations that were used for the previously described antenna test (i.e. configurations B.2 through B.4 as appropriate).

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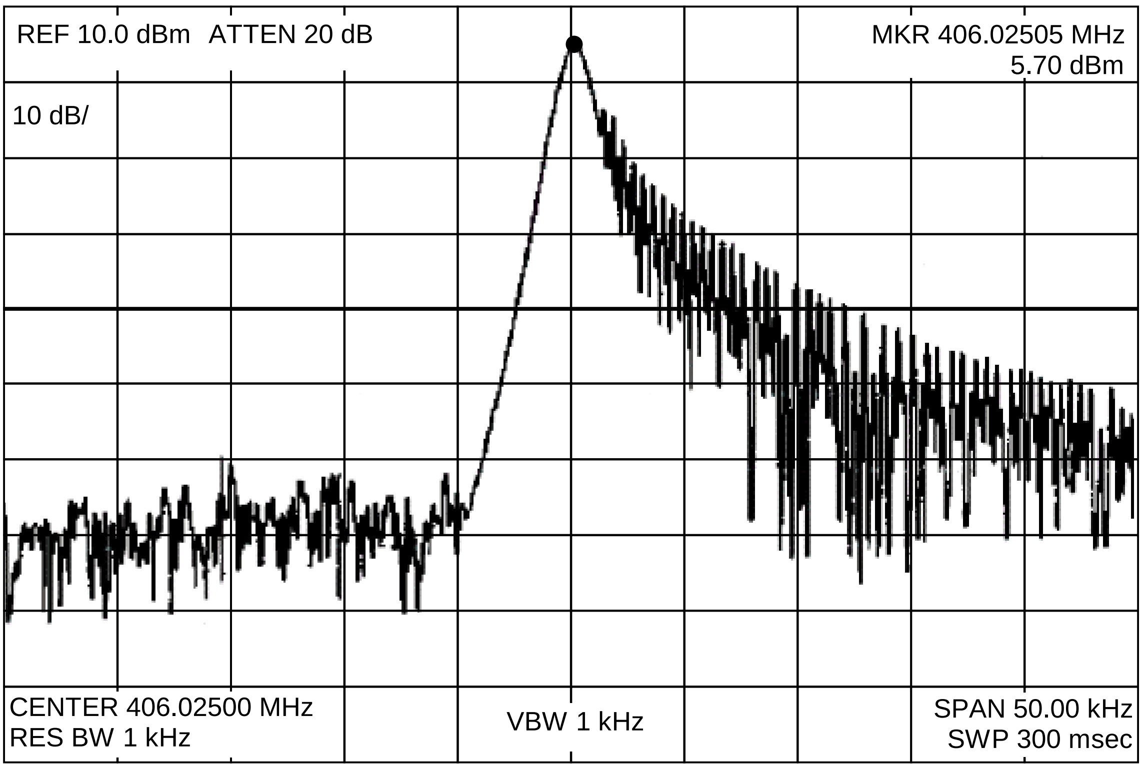
[1] The 32 dBm to 43 dBm limit is calculated from the specifications of Transmitter Power Output (37 dBm ± 2 dB) and Antenna Characteristics (+4 dBi and -3 dBi).

[2] The loss factor ($EIRP_{Loss}$) is defined as the minimum transmitter power measured during the operating lifetime test (at minimum temperature) subtracted from the transmitter power measured at ambient temperature during the transmitted power output test (i.e. $EIRP_{Loss} = Pt_{ambient} - Pt_{EOL}$).

B.11.4 Report the measured results in Table F.1. The antenna VSWR at the nominal value of the transmitted frequency in the 406.0 – 406.1 MHz frequency band shall not exceed a 1.5:1 ratio.

B.11.5 If the antenna VSWR exceeds the 1.5:1 ratio but remains less than 1.8:1[1] at the nominal operational frequency, and if the antenna EIRP is evaluated by direct measurements[2] and is within the limits specified in section B.10, the beacon can still be considered as meeting the Cospas-Sarsat requirements. However, in this case, Cospas-Sarsat type approval will be deemed as valid only for the beacon-cable-antenna configuration tested (with specific cable type and length) and the antenna should not be used with any other beacon/cable[3] without further type approval testing.

Figure B.9: RF Measurement During Preamble



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1 Provisions of section A.1 in respect of impedance matching network apply.

2 In the case when the separated antenna was previously tested for type approval with an ELT, the direct EIRP measurement may be replaced with an analysis showing that the EIRP of the beacon-antenna combination would be within the limits specified in Section B.10.2 of Annex B. The analysis must address the actual measured beacon output power and the impedance mismatch between the beacon and the cable loaded with the ELT antenna.

3 A special tag should be provided on the antenna cable with a warning that the length of the cable should not be changed.

- END OF ANNEX B -

ANNEX C

BEACON CODING TO BE USED FOR EVALUATING BEACON MESSAGE CODING

If the beacon is designed to operate with a protocol that requires any of the following data elements, the values programmed into the beacon for evaluating beacon message coding (Table F.1 item 16) shall be in accordance with Table C.1. Examples of each requested beacon message protocol shall be included in the test report as per Tables F-D.1 and F-D.2.

Table C.1: CODING VALUES FOR BEACON MESSAGE CODING TESTING

Data Element	Value
Format Flag	As required by the specific protocol
Protocol Flag	As required by the specific protocol
Country Code	201
Protocol Code	As required by the specific protocol
MMSI	999999
Radio Call Sign	XPA02
Cospas-Sarsat Type Approval Certificate Number	999
Beacon Serialised Number	99
Any National Use Data Elements	Default values as specified in C/S T.001
Aircraft Registration Marking	C7518
Aircraft Operator Designator and a serial number	AAA1000
Aircraft 24-bit Address	11472655 (Base 10 representation)
Specific Beacon	Assume only 1 beacon on vessel or aircraft
Non-Protected Data Field	Default values specified in C/S T.001
Auxiliary Radio Locating Device	As appropriate for the beacon design[1]
Manual / Automatic Activation	As appropriate for the beacon design[1]

[1] In cases where the beacon has several variants (i.e. with and without an automatic activation capability, with and without a 121.5 MHz homer), the report shall provide examples of the coding assuming automatic activation and the 121.5 MHz homer.

-END OF ANNEX C-

ANNEX D

NAVIGATION SYSTEM TEST SCRIPTS

This test shall be conducted by inputting the test scripts provided below into the beacon. The test scenario shall be implemented in the order indicated, and the beacon shall not be turned-off until after all the scenarios have been completed. The procedure shall be completed for each location protocol type (i.e. Standard, National or User) for which type approval is being requested.

The test results shall be reported in the format provided at Tables F-C.1, F-C.2 and F-C.3.

Table D.1: User-Location Protocol Procedure

Script	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	BCH Correct (√)	Required Value of Encoded Location Bits (Hexadecimal)[1]
1. Turn on beacon ensuring that navigation is not provided to the beacon. Record the value of encoded location bits.	Bits 108-132=		Bits 108-132= FE0FF0
2. Keeping the beacon active, apply the following navigation data to the beacon: 1° 3min 30 sec North, 1° 2min 30 Sec West. When the beacon transmitted message changes, record the new encoded location bits and the duration of time the beacon took to update.	Bits 108 – 132= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: _______		Bits 108-132= 23011 Response time for beacon to transmit correct encoded location must be less than 52.5 Sec.
3. Keeping the beacon active, change the navigation input to the beacon to: 3° 23min 30 sec North, 5° 6min 15 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 108-132=		Bits 108-132= 6D052

[1] The hexadecimal values reported in this column are calculated by converting the binary value of the data required by column two into a base 16 value. For example the following bits 0000 0011 would be expressed as “3”, not “03”.

Table D.2: Standard Location Protocol Procedure

Script	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	BCH Correct (√)	Required Value of Encoded Location Bits (Hexadecimal)
1. Turn on beacon ensuring that navigation is not provided to the beacon. Record the value of encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= FFBFF Bits 113-132= 83E0F
2. Keeping the beacon active, apply the following navigation data to the beacon: 1° 3 min 31 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits and the duration of time the beacon took to update.	Bits 65-85= Bits 113-132= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: _______		Bits 65-85= 2404 Bits 113-132= 8E227 Response time for beacon to transmit correct encoded location must be less than 52.5 Sec.
3. Keeping the beacon active, change the navigation input to the beacon to: 1° 30 min 0 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2404 Bits 113-132= F8227
4. Keeping the beacon active, change the navigation input to the beacon to: 1° 32 min 0 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 3404 Bits 113-132= 88227
5. Keeping the beacon active, change the navigation input to the beacon to: 1° 0 min 56 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 3404 Bits 113-132= 74627

Script	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	BCH Correct (√)	Required Value of Encoded Location Bits (Hexadecimal)
6. Keeping the beacon active, change the navigation input to the beacon to: 0° 58 min 0 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2404 Bits 113-132= 8227
7. Keeping the beacon active, change the navigation input to the beacon to: 0° 58 min 0 sec North, 1° 29 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2404 Bits 113-132= 83D7
8. Keeping the beacon active, change the navigation input to the beacon to: 0° 58 min 0 sec North, 1° 32 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2406 Bits 113-132= 8227
9. Keeping the beacon active, change the navigation input to the beacon to: 0° 58 min 0 sec North, 1° 2 min 29 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2406 Bits 113-132= 81B8
10. Keeping the beacon active, change the navigation input to the beacon to: 0° 58 min 0 sec North, 0° 30 min 24 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 65-85= Bits 113-132=		Bits 65-85= 2402 Bits 113-132= 8206

Table D.3: National Location Protocol Procedure

Script	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	BCH Correct (√)	Required Value of Encoded Location Bits (Hexadecimal)
1. Turn on beacon ensuring that navigation is not provided to the beacon. Record the value of encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= 3F81FE0 Bits 113-126= 27CF
2. Keeping the beacon active, apply the following navigation data to the beacon: 21° 4 min 36 sec North, 6° 3 min 24 Sec West. When the beacon transmitted message changes, record the new encoded location bits and the duration of time the beacon took to update.	Bits 59-85= Bits 113-126= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: _______		Bits 59-85= A8A0C2 Bits 113-126= 2489 Response time for beacon to transmit correct encoded location must be less than 52.5 Sec.
3. Keeping the beacon active, change the navigation input to the beacon to: 21° 7 min 56 sec North, 6° 3 min 24 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= A8A0C2 Bits 113-126= 3F09
4. Keeping the beacon active, change the navigation input to the beacon to: 27° 4 min 12 sec North, 6° 3 min 24 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126= =		Bits 59-85= D8A0C2 Bits 113-126= 2189
5. Keeping the beacon active, change the navigation input to the beacon to: 27° 2 min 36 sec North, 6° 3 min 24 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= D8A0C2 Bits 113-126= B09

Script	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	BCH Correct (√)	Required Value of Encoded Location Bits (Hexadecimal)
6. Keeping the beacon active, change the navigation input to the beacon to: 25° 3 min 4 sec North, 179° 58 min 36 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= C8B67D Bits 113-126= 749
7. Keeping the beacon active, change the navigation input to the beacon to: 25° 3 min 4 sec North, 179° 58 min 4 Sec East. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= C8B67D Bits 113-126= 77E
8. Keeping the beacon active, change the navigation input to the beacon to: 25° 3 min 4 sec North, 179° 55 min 52 Sec East. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= C8967C Bits 113-126= 702
9. Keeping the beacon active, change the navigation input to the beacon to: 25° 3 min 4 sec North, 179° 59 min 56 Sec East. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= C8967C Bits 113-126= 77E
10. Keeping the beacon active, change the navigation input to the beacon to: 25° 3 min 4 sec North, 179° 58 min 36 Sec West. When the beacon transmitted message changes, record the new encoded location bits.	Bits 59-85= Bits 113-126=		Bits 59-85= C8B67D Bits 113-126= 749

- END OF ANNEX D –

ANNEX E

SAMPLE PROCEDURE FOR TYPE APPROVAL TESTING OF 406 MHz BEACONS WITH VOICE TRANSCEIVER

The following sample procedure illustrates the guidelines provided in section C/S T.007, section A.3.7.2, concerning the testing of beacons with operator controlled ancillary devices. It is applicable to beacons with operator controlled voice transceivers but may need to be adapted for specific beacon designs. All other aspects of the testing, as documented in C/S T.007 are unchanged.

E.1 Beacon Voice Transceiver Configuration

The following requirements pertain to the configuration of the beacon voice transceiver for the duration of all testing:

a. if the beacon has a volume control setting, the beacon loudspeaker shall be set to maximum volume;

b. if the beacon includes a manual squelch mode, this shall be selected, and it shall be set to its most sensitive level;

c. if the beacon includes different transmitter power levels, the highest level shall be selected; and

d. any other manual settings shall be set to the mode which creates the highest load on the beacon battery.

E.2 Thermal Shock Test (C/S T.007, section A.2.2)

The beacon transceiver shall be operated as described below for the duration of the thermal shock test:

a. 5 Seconds (+/- 2.5 Seconds) before the first beacon burst to be measured, the voice transmitter shall transmit for 30 seconds, followed immediately by 30 seconds during which the beacon voice transmitter is not active. The receive mode shall be activated during the 30 seconds following the transmission cycle. This process shall be repeated for 15 minutes; and

b. thereafter, the transceiver shall be configured to repeat the following cycle, 3 times in succession, once each hour;

   i. transmit for 30 seconds,

   ii. followed by 30 seconds receiving.

E.3 Operating Lifetime at Minimum Temperature (C/S T.007, section A.2.3)

The beacon transceiver shall be operated as described below, for the duration of this test:

a. for the first 15 minutes of this test, the transceiver shall be operated as described at paragraph 2.a above;

b. 4 hours before the end of the test period the procedure described at paragraph 2.a above shall be repeated for 15 minutes; and

c. for the full duration of the test except the periods specified in paragraphs (a) and (b) above, the transceiver shall be operated to drain maximum energy from the battery.

E.4 Frequency Stability Test with Temperature Gradient (C/S T.007, section A.2.4)

The beacon transceiver shall be operated as described below, for the duration of this test:

a. the transceiver shall be operated as described at paragraph 2.b above for the duration of the test period; and

b. in addition, the transceiver shall be operated as described at paragraph 2.a above for one 15 minute period during which the temperature is rising, and for one 15 minute period during which the temperature is falling.

E.5 Satellite Qualitative Tests (C/S T.007, section A.2.5)

The beacon transceiver shall be operated as described at paragraph 2.a above for the entire duration that the beacon is in view of the satellite.

E.6 All Other Tests

For all other tests, the beacon transceiver shall be operated as described at paragraph 2.b above.

- END OF ANNEX E -

ANNEX F

BEACON TYPE APPROVAL TEST RESULTS

Table F.1: Overall Summary of 406 MHz Beacon Test Results

Parameters to be Measured	Bits number	Range of Specification	Units	Test Results T_{min} (_____C)	Test Results T_{amb} (_____C)	Test Results T_{max} (_____C)	Comments
1. Power Output							
-transmitter power output		35-39	dBm				
-power output rise time		<5	ms				
-power output 1 ms before burst		<-10 dBm	√[1]				
2. Digital Message							
-bit sync	1-15	15 bits "1"	√				
-frame sync	16-24	"000101111"	√				
-format flag	25	1 bit	bit value				
-protocol flag	26	1 bit	bit value				
-identification / position data	27-85	59 bit	√				
-BCH code	86-106	21 bits	√				
-emerg. code / nat. use / supplem. data	107-112	6 bits	bit value				
-additional data / BCH (if applicable)	113-144	32 bits	√				
-position error (if applicable)		<5	km				
3. Digital Message Generator							
-repetition rate T_R:							
• average T_R		48.5-51.5	sec				
• min T_R		$47.5 \le T_R \le 48.0$	sec				
• max T_R		$52.0 \le T_R \le 52.5$	sec				
• standard deviation		0.5-2.0	sec				
-bit rate:							
• min f_b		≥396	bit/sec				
• max f_b		≤404	bit/sec				
-total transmission time:							
• short message		435.6-444.4	ms				
• long message		514.8-525.2	ms				
-unmodulated carrier:							
• min T_1		≥158.4	ms				
• max T_1		≤161.6	ms				
-first burst delay		≥47.5	sec				

[1] Indicate that testing demonstrated conformance to requirements by placing the √ symbol in Table F.1.

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			T_{min} (____C)	T_{amb} (____C)	T_{max} (____C)	
4. Modulation -biphase-L -rise time -fall time -phase deviation: positive -phase deviation: negative -symmetry measurement	 50-250 50-250 +(1.0 to 1.2) -(1.0 to 1.2) ≤0.05	 √ µsec µsec radians radians √				
5. 406 MHz Transmitted Frequency -nominal value -short-term stability -medium-term stability slope -medium-term stability residual frequency variation	 C/S T.001 $\leq 2x10^{-9}$ $(-1 \text{ to } +1)x10^{-9}$ $\leq 3x10^{-9}$	 MHz /100 ms /min				
6. Spurious Emissions into 50 Ohms (406.0 – 406.1 MHz)[1]	C/S T.001 mask	√				
7. 406 MHz VSWR Check -nominal transmitted frequency -modulation rise time -modulation fall time -modulation phase deviation +ve -modulation phase deviation -ve -modulation symmetry measurement -digital message	 C/S T.001 50-250 50-250 +(1.0 to 1.2) -(1.0 to 1.2) ≤0.05 correct	 MHz µsec µsec radians radians √ √				

[1] Include spectral plots of the 406.0-406.1 MHz band, showing the transmit signal and the emission mask as defined in document C/S T.001.

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
8. Self-test Mode				
-frame sync	“011010000”	√		
-format flag	1/0	bit value		
-single radiated burst	≤440/520 (+1%)	ms		
-default position data (if applicable)	must be correct	√		
-description provided		√		
-design data provided on protection against repetitive self-test mode transmissions		√		
-single burst verification	one burst	√		
-provides for 15 Hex ID	correct	√		
-121.5 MHz RF power (if applicable)	self-test checks that RF power emitted	√		
-406 MHz RF power	self-test checks that RF power emitted	√		
9. Thermal Shock[1]				
-soak temperature			T_{soak}=________°C	
-measurement temperature			T_{meas}=________°C	
the following parameters are to be met within 15 minutes of beacon turn on and maintained for 2 hours:				
-transmit frequency nominal value	C/S T.001	MHz		
-transmit frequency short-term stability	$\leq 2x10^{-9}$	/100 ms		
-transmit frequency medium-term stability slope	$(-2 \text{ to } +2)x10^{-9}$	/min		
-transmit frequency medium-term stability residual frequency variation	$\leq 3x10^{-9}$			
-transmitter power output	35-39	dBm		
-digital message	correct	√		

[1] Attach graphs depicting the test results.

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
10. Operating Lifetime at Minimum Temperature[1]				
-duration	>24		_____hours at T_{min}=_____	
-transmit frequency nominal value	C/S T.001	MHz		
-transmit frequency short-term stability	$\leq 2x10^{-9}$	/100ms		
-transmit frequency medium-term stability slope	$(-1 \text{ to } +1)x10^{-9}$	/min		
-transmit frequency medium-term stability residual frequency variation	$\leq 3x10^{-9}$			
-Pt_{EOL}=minimum transmitter power output observed during lifetime at minimum temperature	35-39	dBm		
-Digital message	correct	√		
11. Temperature Gradient (5 C/hr)[23]				
-transmit frequency nominal value	C/S T.001	MHz		
-transmit frequency short-term stability	$\leq 2x10^{-9}$	/100ms		
-transmit frequency medium-term stability				
• slope (A to B, C+15 to D and E+15 to F)	$(-1 \text{ to } +1)x10^{-9}$	/min		
• slope (B to C+15 and D to E+15)	$(-2 \text{ to } +2)x10^{-9}$	/min		
• residual frequency variation	$\leq 3x10^{-9}$			
-transmitter power output	35-39	dBm		
-digital message	correct	√		
12. Oscillator Aging (data provided)	C/S T.001	MHz		
13. Protection Against Continuous Transmission description provided	<45	sec		Provide description.
14. Satellite Qualitative Test (results provided)[2]	15 Hex ID provided by LUT and position within 5 km 80% of time	√		

[1] Attach graphs depicting test results.

[2] Attach a satellite qualitative test summary report (Appendix A to Annex F) for each test configuration.

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
15. Antenna Characteristics				
-polarization	linear or RHCP			
-VSWR	≤1.5			Report each
-$EIRP_{LOSS}$		dB		Antenna
-$EIRP_{maxEOL}$	≤43	dBm		Configuration
-$EIRP_{minEOL}$	≤32	dBm		Tested
-azimuth gain variation at 40° elevation angle	≤3	dB		
16. Beacon Coding Software[1]				
-sample message provided for each coding option of the applicable coding types	correct	√		Per Table F-D.1
-sample self-test message provided for each coding option of the applicable coding types	correct	√		Per Table F-D.1
17. Navigation System[2]				
-position data default values	correct	√		
-position acquisition time	<10/1	min		Per Table F-C.4 or Table F-C.5
-encoded position data update interval	>20	min		
-position clearance after deactivation	cleared	√		Test per A.3.8.4
-position data input update interval (as applicable)	20/1	min		
-position data encoding	correct	√		Results per tables F-C.1, F-C.2 and F-C.3 as appropriate
-retained last valid position after navigation input lost	240(±5)	min		
-default position data transmitted after 240(±5) minutes without valid position data	cleared	√		Test per A.3.8.6
-information provided on protection against beacon degradation due to navigation device, interface or signal failure or malfunction		√		

[1] Attach examples of each requested coding option as per Appendix D to Annex F.

[2] Attach navigation system test results as per Appendix C to Annex F.

APPENDIX A TO ANNEX F

SATELLITE QUALITATIVE TEST SUMMARY REPORT

Date of the Test:____

Time of the Test:____

Beacon Model:____

Beacon 15 Hex ID:____

Actual location of the test beacon: Latitude:____ ___ ___; Longitude:_____________

Beacon test configuration (e.g. on dry ground, floating in water, etc):______________

Satellite ID	Satellite Pass Number	Time of Closest Approach (TCA)	Cross Track Angle	15 Hex ID Provided by LUT	Doppler Location	Location Error (km)

$$\text{Ratio of successful solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1^\circ < \text{CTA} < 21^\circ}{\text{number of satellite passes over test duration with } 1^\circ < \text{CTA} < 21^\circ} \times 100 = \_\_\_\_\%$$

Note: A separate table shall be provided for each beacon configuration tested.

APPENDIX B TO ANNEX F

406 MHz BEACON ANTENNA TEST RESULTS

Table F-B.1: Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)
(To be used for reporting the results of antenna testing in configurations B.2, B.3 and B.4)

Azimuth Angle (degrees)	Elevation Angle (degrees)				
	10	20	30	40	50
0	/	/	/	/	/
30	/	/	/	/	/
60	/	/	/	/	/
90	/	/	/	/	/
120	/	/	/	/	/
150	/	/	/	/	/
180	/	/	/	/	/
210	/	/	/	/	/
240	/	/	/	/	/
270	/	/	/	/	/
300	/	/	/	/	/
330	/	/	/	/	/
Overall Gain Variation					

$EIRP_{LOSS} = Pt_{AMB} - Pt_{EOL}$ =__________dB

$EIRP_{max\ EOL}$ = **MAX [** $EIRP_{max}$ **,** $(EIRP_{max} - EIRP_{LOSS})$ **] = MAX (** _____ **,** _____ **)** = __________dBm

$EIRP_{min\ EOL}$ = **MIN [** $EIRP_{min}$ **,** $(EIRP_{min} - EIRP_{LOSS})$ **] = MIN (** _____ **,** _____ **)** = __________dBm

Table F-B.2: Induced Voltage Measurements V_v / V_h (dBuV)
(To be used for reporting the results of antenna testing in configurations B.2, B.3 and B.4)

Azimuth Angle (degrees)	Elevation Angle (degrees)				
	10	20	30	40	50
0	/	/	/	/	/
30	/	/	/	/	/
60	/	/	/	/	/
90	/	/	/	/	/
120	/	/	/	/	/
150	/	/	/	/	/
180	/	/	/	/	/
210	/	/	/	/	/
240	/	/	/	/	/
270	/	/	/	/	/
300	/	/	/	/	/
330	/	/	/	/	/
Min(V_v-V_h)					

Table F-B.3: Equivalent Isotropically Radiated Power (dBm) / Antenna Gain (dBi)
(To be used for reporting the results of antenna testing in configuration B.5)

Azimuth Angle (degrees)	Elevation Angle (degrees)				
	10	20	30	40	50
0	/	/	/	/	/
90	/	/	/	/	/
180	/	/	/	/	/
270	/	/	/	/	/

$EIRP_{LOSS}$ = Pt_{AMB} – Pt_{EOL} =__________dB

$EIRP_{max\ EOL}$ = **MAX [** $EIRP_{max}$ **,** ($EIRP_{max}$ – $EIRP_{LOSS}$) **]** = **MAX (** _____ **,** _____ **)** = __________dBm

$EIRP_{min\ EOL}$ = **MIN [** $EIRP_{min}$ **,** ($EIRP_{min}$ – $EIRP_{LOSS}$) **]** = **MIN (** _____ **,** _____ **)** = __________dBm

APPENDIX C TO ANNEX F

NAVIGATION SYSTEM TEST RESULTS

Table F-C.1: Position Data Encoding Results User-Location Protocol

Script Reference (See Table D.1)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (√)
1	Bits 108-132=	
2	Bits 108 – 132= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: ______	
3	Bits 108-132=	

Table F-C.2: Position Data Encoding Results Standard Location Protocol

Script Reference (See Table D.2)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (√)
1	Bits 65-85= Bits 113-132=	
2	Bits 65-85= Bits 113-132= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: ______	
3	Bits 65-85= Bits 113-132=	
4	Bits 65-85= Bits 113-132=	
5	Bits 65-85= Bits 113-132=	
6	Bits 65-85= Bits 113-132=	
7	Bits 65-85= Bits 113-132=	
8	Bits 65-85= Bits 113-132=	

Script Reference (See Table D.2)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (√)
9	Bits 65-85= Bits 113-132=	
10	Bits 65-85= Bits 113-132=	

Table F-C.3: Position Data Encoding Results National Location Protocol

Script Reference (See Table D.3)	Value of Encoded Location Bits Transmitted by Beacon (Hexadecimal)	Confirmation that BCH Correct (√)
1	Bits 59-85= Bits 113-126=	
2	Bits 59-85= Bits 113-126= Number of seconds after providing navigation data that beacon transmitted the above encoded location information: ______	
3	Bits 59-85= Bits 113-126=	
4	Bits 59-85= Bits 113-126= =	
5	Bits 59-85= Bits 113-126=	
6	Bits 59-85= Bits 113-126=	
7	Bits 59-85= Bits 113-126=	
8	Bits 59-85= Bits 113-126=	
9	Bits 59-85= Bits 113-126=	
10	Bits 59-85= Bits 113-126=	

Table F-C.4: Position Acquisition Time and Position Accuracy (Internal Navigation Devices)

Operational Configuration	C/S T.007 Section A3.8.2.1		C/S T.007 Section A3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Floating in Water				
Resting on Dry Ground				
Other (specify)				

Table F-C.5: Position Acquisition Time and Position Accuracy (External Navigation Devices)

C/S T.007 Section A3.8.2.1		C/S T.007 Section A3.8.2.2	
Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres

APPENDIX D TO ANNEX F

BEACON CODING SOFTWARE RESULTS

Table F-D.1: Examples of User Protocol Beacon Messages
(Examples required for each protocol requested for inclusion on the type approval certificate)

Protocol	Operational Message (in hexadecimal including bit and frame synchronisation bits)	Self-Test Message (in hexadecimal including bit and frame synchronisation bits)
Maritime User Protocol with MMSI		
Maritime User Protocol with Radio Call Sign		
Radio Call Sign User Protocol		
Serial User: Float-Free EPIRB with Serial Number		
Serial User: Non Float-Free EPIRB with Serial Number		
Aviation User Protocol		
Serial User: ELT with Serial Number		
Serial User: ELT with Aircraft Operator Designator & Serial Number		
Serial User: ELT with Aircraft 24-bit address		
Serial User: PLB with Serial Number		
National User (Short)		
National User (Long)		

Table F-D.2: Examples of Location Protocol Beacon Messages
(Examples required for each protocol requested for inclusion on the type approval certificate)

Protocol	Operational Message (in hexadecimal including bit and frame synchronisation bits)		Self-Test Message (in hexadecimal including bit and frame synchronisation bits)
	Location “A”[1]	Location “B”[1]	
Standard Location: EPIRB with MMSI			
Standard Location: EPIRB with Serial Number			
Standard Location: ELT with 24-bit Address			
Standard Location: ELT with Serial Number			
Standard Location: ELT with Aircraft Operator Designator			
Standard Location: PLB with Serial Number			
National Location: EPIRB			
National Location: ELT			
National Location: PLB			
User-Location[2]			

- END OF ANNEX F -

[1] Location “A” and location “B” must be separated by at least 500 metres for the Standard and National location protocols, and by at least 10 km for the User-Location protocol.

[2] Conformance of User-Location protocol demonstrated by a single example of “A”, “B”, and self-test messages provided in Table F-D.2 supplemented by Table F-D.1 completed with the specific User protocol variations requested.

ANNEX G

APPLICATION FOR A COSPAS-SARSAT 406 MHz BEACON TYPE APPROVAL CERTIFICATE

G.1 INFORMATION PROVIDED BY THE BEACON MANUFACTURER

Beacon Manufacturer and Beacon Model

Beacon Manufacturer	
Beacon Model	

Beacon Type and Operational Configurations

Beacon Type	Beacon used while:	Tick where appropriate
EPIRB	Floating in water or on deck or in a safety raft	
PLB	On ground and above ground	
	On ground and above ground and floating in water	
ELT Survival	On ground and above ground	
	On ground and above ground and floating in water	
ELT Auto Fixed	Fixed ELT with aircraft external antenna	
ELT Auto Portable	In aircraft with an external antenna	
	On ground, above ground, or in a safety raft with an integrated antenna	
ELT Auto Deployable	Deployable ELT with attached antenna	
Other (specify)		

Beacon Characteristics

Characteristic	**Specification**
Operating temperature range	Tmin =______ Tmax=______
Operating lifetime	_______hours
Battery chemistry	
Battery cell size and number of cells	
Battery manufacturer	
Battery pack manufacturer and part number	
Oscillator type (e.g. OCXO, MCXO, TCXO)	
Oscillator manufacturer	
Oscillator part name and number	
Oscillator satisfies long-term frequency stability requirements (Yes or No)	
Antenna type (Integrated or External)	
Antenna manufacturer	
Antenna part name and number	
Navigation device type (Internal, External or None)	
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	
Navigation device capable of supporting global coverage (Yes, No or N/A)	

Characteristic	**Specification**
For Internal Navigation Devices	
- Geodetic reference system (WGS 84 or GTRF)	
- GNSS receiver cold start forced at every beacon activation (Yes or No)	
- Navigation device manufacturer	
- Navigation device model name and part Number	
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	
For External Navigation Devices	
- Data protocol for GNSS receiver to beacon interface	
- Physical interface for beacon to navigation device	
- Electrical interface for beacon to navigation device	
- Navigation device model and manufacturer (if beacon designed to use specific devices)	
Self-Test Mode Characteristics	
- Self-test has separate switch position (Yes or No)	
- Self-test switch automatically returns to normal position when released (Yes or No)	
- Self-test activation can cause an operational mode transmission (Yes or No)	
- Self-test causes a single beacon self-test message burst only regardless of how long the self-test activation mechanism applied (Yes or No)	
- Results of self-test indicated by (e.g. Pass / Fail Indicator Light, Strobe Light, etc.)	
- Self-test can be activated from beacon remote activation points (Yes or No)	

Characteristic	**Specification**
- Self-test performs an internal check and indicates that RF power emitted at 406 MHz and 121.5 MHz if beacon includes a 121.5 MHz homer (Yes or No)	
- Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No)	
- Self-test can be activated directly at beacon (Yes or No)	
- List of Items checked by self-test	
- Self-test transmission burst duration (440 or 520 ms)	
- Self-test format bit ("0" or "1")	
Beacon includes a homer transmitter (if yes identify frequency of transmission)	_______MHz
-Homer Transmit Power	_______dBm
-Homer Duty Cycle	_______%
-Duty Cycle of Homer Swept Tone	_______%
Beacon includes a strobe light (Yes or No)	
- Strobe light intensity	
- Strobe light flash rate	
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	
Other ancillary devices (e.g. voice transceiver). List details on a separate sheet if insufficient space to describe.	
Beacon includes automatic activation mechanism (Yes or No)	

Dated:...................... Signed:..

(Name, Position and Signature of Beacon Manufacturer Representative)

(Continued on Next Page)

G.2 INFORMATION PROVIDED BY THE COSPAS-SARSAT ACCEPTED TEST FACILITY

Name and Location of Beacon Test Facility: ________________________________

Date of Submission for Testing: ________________________________

Applicable C/S Standards:

Document	**Issue**	**Revision**
C/S T.001		
C/S T.007		

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the Cospas-Sarsat 406 MHz Beacon Type Approval Standard (C/S T.007) and complies with the Specification for Cospas-Sarsat 406 MHz Distress Beacons (C/S T.001) as demonstrated in the attached report.[1]

Dated:........................ Signed:..
(Name, Position and Signature of Cospas-Sarsat Accepted Test Facility Representative)

- END OF ANNEX G –

[1] If the test results do not support full compliance to the above standards, the test laboratory shall modify this statement to identify discrepancies. A complete explanation of such discrepancies should be provided in the test report and the report references identified in this statement.

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ANNEX H

CHANGE NOTICE FORM

The Manufacturer of the Cospas-Sarsat Type Approved 406 MHz Distress Beacons:

Manufacturer: ____

(name and address) ____

____

406 MHz Beacon Model numbers: ____

Cospas-Sarsat Type Approval Certificate Numbers:______________________________________

Proposed New Model Numbers Beacon:____

hereby informs Cospas-Sarsat of the following changes to production beacons

planned date of change _______________

Oscillator type: _____

Battery: _____ (specify): ________

Antenna type: _____

Homing transmitter: _____

Strobe light: _____

Size or shape of beacon package: _____

Other physical characteristics: _____(specify): ______________________________

Significant change to circuit design: _____

Internal navigation device: _____(specify): ______________________________

Other _____(specify): ______________________________

and substantiates these changes with the attached technical documentation and beacon test results (if applicable).

I hereby confirm that with these changes the above 406 MHz beacon models are technically equivalent to the type approved beacon and continue to meet the Cospas-Sarsat requirements.

Dated:...................... Signed:...

(Name, Position and Signature of Beacon Manufacturer Representative)

-END OF ANNEX H-

ANNEX I

DESIGNATION OF ADDITIONAL NAMES OF A COSPAS-SARSAT TYPE APPROVED 406 MHz BEACON MODEL

The Manufacturer of the following Cospas-Sarsat Type Approved 406 MHz Distress Beacon:

Beacon Manufacturer: ______________________________
(name and address)

____

____

406 MHz Beacon model: ______________________________

having Cospas-Sarsat Type Approval Certificate Number: ____________________

hereby informs Cospas-Sarsat that the above beacon will also be sold as:

Additional name and model number of beacon: ____________________

by Agent/Distributor:
(name and address) ______________________________

telephone: ______________________________

fax: ______________________________

contact person/title: ______________________________

I certify that we have an agreement with this agent/distributor to market the above-referenced 406 MHz beacon, which we will manufacture and which will be identical to the Cospas-Sarsat type approved beacon, except for labelling.

Dated:...................... Signed:..

(Name, Position and Signature of Beacon Manufacturer Representative)

- END OF ANNEX I -

ANNEX J

APPLICATION FOR TESTING SEPARATED ELT ANTENNA(S) AT AN INDEPENDENT ANTENNA TEST FACILITY

The Manufacturer of the Cospas-Sarsat Type Approved 406 MHz Distress Beacons:

Manufacturer: ____

(name and address) ____

____

applies to test ELT antennas: ____

____

at antenna test facility: ____

located at: ____

Dated:...................... Signed:..
(Name, Position and Signature of ELT Manufacturer Representative)

DECLARATION OF COSPAS-SARSAT REPRESENTATIVE FOR THE COUNTRY WHERE THE ANTENNA TEST FACILTY IS LOCATED:

I hereby confirm that the operation of the antenna test facility mentioned above is independent from the 406 MHz beacon manufacturer who is submitting this application.

Dated:...................... Signed:..
(Name and Signature of Cospas-Sarsat Representative)

- END OF ANNEX J -

ANNEX K

REQUEST TO EXCLUDE ELT ANTENNA(S) FROM THE COSPAS-SARSAT SECRETARIAT LIST OF ELT ACCEPTED ANTENNAS

The Manufacturer of the Cospas-Sarsat 406 MHz ELT:

Manufacturer: ____

(name and address) ____

____

requests that the following ELT antenna(s), designed by us:

____

____

(model, part number)

used with the 406 MHz ELT: ____

not be included in the Cospas-Sarsat Secretariat list of accepted ELT antennas

Dated:...................... Signed:...

(Name, Position and Signature of ELT Manufacturer Representative)

- END OF ANNEX K –

ANNEX L

BEACON QUALITY ASSURANCE PLAN

We, manufacturer of Cospas-Sarsat 406 MHz beacons (Manufacturer name and address)

____

____

confirm that ALL PRODUCTION UNITS of the following beacon model(s),

____
(model, part number)

will meet the Cospas-Sarsat specification and technical requirements in a similar manner to the units subjected for type approval testing. To this effect all production units will be subjected to following tests at ambient temperature:

- Digital message
- Bit rate
- Rise and fall times of the modulation waveform
- Modulation Index (positive/negative)
- Output power
- Frequency stability (short, medium)*

Note*: Beacon manufacturer shall provide technical data on the beacon frequency generation to demonstrate that the frequency stability tests at ambient temperature are sufficient for ensuring that each production beacon will exhibit frequency stability performance similar to the beacon submitted for type approval over the complete operating temperature range. If such assurance of adequate performance over the complete operating temperature range cannot be deduced from the technical data provided and the frequency stability test results at ambient temperature, a thermal gradient test shall be performed on all production units.

- Other tests:

____
____
____
____
____

We confirm that the above tests will be performed as appropriate to ensure that the complete beacon satisfies Cospas-Sarsat requirements, as demonstrated by the test unit submitted for type approval.

We agree to keep the test result sheet of every production beacon for inspection by Cospas-Sarsat, if required, for a minimum of 10 years.

We confirm that Cospas-Sarsat representative(s) have the right to visit our premises to witness the production and testing process of the above-mentioned beacons. We understand that the cost related to the visit is to be borne by Cospas-Sarsat.

We also accept that, upon official notification of Cospas-Sarsat, we may be required to re-submit a unit of the above beacon model selected by Cospas-Sarsat for the testing of parameters chosen at Cospas-Sarsat discretion at a Cospas-Sarsat accepted test facility selected by the Cospas-Sarsat. We understand that the cost of the testing shall be borne by Cospas-Sarsat.

We understand that the Cospas-Sarsat Type Approval Certificate is subject to revocation should the beacon type for which it was issued, or its modifications, cease to meet the Cospas-Sarsat specifications, or Cospas-Sarsat has determined that this quality assurance plan is not implemented in a satisfactory manner.

Dated:....................... Signed:...
(Name, Position and Signature of Beacon Manufacturer Representative)

- END OF ANNEX L –

ANNEX M

COSPAS SARSAT

TYPE APPROVAL CERTIFICATE

For a 406 Megahertz Distress Beacon for use with the Cospas-Sarsat Satellite System

Certificate Number: …xxx

Manufacturer:	The ABC Beacon Company, London, UK
Beacon Type(s):	EPIRB
Beacon Model(s):	ABC-406
Test Laboratory:	Intespace, Toulouse, France
Date of Test:	January 2005

Details of the beacon features and battery type are provided overleaf.

The Cospas-Sarsat Council hereby certifies that the 406 MHz Distress Beacon Model identified above is compatible with the Cospas-Sarsat System as defined in documents:

C/S T.001 Specification for Cospas-Sarsat 406 MHz Distress Beacon
Issue 3 – Rev. 6, October 2004

C/S T.007 Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
Issue 4 , November 2005

Date Originally Issued: 10 March 2005

Date(s) Amended:

D. Levesque
Head of Cospas-Sarsat Secretariat

NOTE, HOWEVER:
1. This certificate does not authorize the operation or sale of any 406 MHz distress beacon. Such authorization may require type acceptance by national administrations in countries where the beacon will be distributed, and may also be subject to national licensing requirements.
2. This certificate is intended only as a formal notification to the above identified manufacturer that the Cospas-Sarsat Council has determined, on the basis of test data of a beacon submitted by the manufacturer, that 406 MHz distress beacons of the type identified herein meet the standards for use with the Cospas-Sarsat System.
3. Although the manufacturer has formally stated that all beacons identified with the above model name(s) will meet the Cospas-Sarsat specification referenced above, this certificate is not a warranty and Cospas-Sarsat hereby expressly disclaims any and all liability arising out of or in connection with the issuance, use or misuse of the certificate.
4. This certificate is subject to revocation by the Cospas-Sarsat Council should the beacon type for which it is issued cease to meet the Cospas-Sarsat specification. A new certificate may be issued after satisfactory corrective action has been taken and correct performance demonstrated in accordance with the Cospas-Sarsat Type Approval Standard.
5. Cospas-Sarsat type approval testing requirements only address the electrical performance of the beacon at 406 MHz. Conformance of the beacon to operational and environmental requirements is the responsibility of national administrations.

Certificate Number: …xxx **Dated: …xxx**

Operating temperature range: -20°C to +55°C

Battery Details: xxx Battery Company, type 123 (4 D-cells)
Battery chemistry

Operating Lifetime: 48 hours

Transmit Frequency: 406.028 MHz

Beacon Model Features:

- 121.5 MHz auxiliary radio locating device (50 mW, continuous)
- Automatic activation mechanism
- Strobe light (0.75 cd, 20 flashes/min)
- Internal navigation device (GPS): manufacturer: YY, model ZZZ
- Self-test mode: one burst of 520 ms

Approved Beacon Message Protocols: ....Beacon is approved for use with the beacon message protocols blackened below:

USER PROTOCOLS	USER-LOCATION PROTOCOLS	LOCATION PROTOCOLS
■ Maritime with MMSI	■ Maritime with MMSI	■ Standard Location: EPIRB with MMSI
■ Maritime with Radio Call Sign	■ Maritime with Radio Call Sign	■ Standard Location: EPIRB with Serial Number
■ EPIRB Float Free with Serial Number	■ EPIRB Float Free with Serial Number	☐ Standard Location: ELT with 24-bit Address
■ EPIRB Non Float Free with Serial Number	■ EPIRB Non Float Free with Serial Number	☐ Standard Location: ELT with Aircraft Operator Designator
■ Radio Call Sign	■ Radio Call Sign	☐ Standard Location: ELT with Serial Number
☐ Aviation	☐ Aviation	☐ Standard Location: PLB with Serial Number
☐ ELT with Serial Number	☐ ELT with Serial Number	■ National Location: EPIRB
☐ ELT with Aircraft Operator and Serial Number	☐ ELT with Aircraft Operator and Serial Number	☐ National Location: ELT
☐ ELT with Aircraft 24-bit Address	☐ ELT with Aircraft 24-bit Address	☐ National Location: PLB
☐ PLB with Serial Number	☐ PLB with Serial Number	
☐ National (Short Format Message)		
☐ National (Long Format Message)		

-END OF ANNEX M

-END OF DOCUMENT-

ANNEX 12

DRAFT NEW ISSUE OF DOCUMENT

**"COSPAS-SARSAT
ACCEPTANCE OF 406 MHz BEACON
TYPE APPROVAL TEST FACILITIES"**

**C/S T.008
Draft Issue 2**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft new issue of System document C/S T.008 for submission to Council for approval.

1 - INTRODUCTION

1.1 Purpose

The purpose of this document is to set the technical criteria and state the procedures a test facility must follow when applying to become a Cospas-Sarsat accepted 406 MHz beacon type approval test facility.

1.2 Scope

Section 1 states the contents of this document and references; section 2 states the Cospas-Sarsat policy and outlines the acceptance process. Section 3 describes the acceptance process in detail.

Annex A lists the required measurement accuracies of the parameters measured at a Cospas-Sarsat accepted test facility~~, and the additional capabilities needed to test beacons which transmit position data~~.

~~Annex B lists the International Organization for Standardization (ISO) documentation that the applicant's facility must meet. The assessment is to be performed by a national accreditation organization.~~

Annex *B* ~~C~~ is an application form which is to be completed and submitted to start the acceptance process by Cospas-Sarsat.

1.3 Reference Documents

a) C/S T.001 Specification for Cospas-Sarsat 406 MHz Distress Beacons

b) C/S T.007 Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard

c) ISO-17025 General requirements for the competence of calibration and testing laboratories

~~c) ISO 9002 Quality systems - Model for quality assurance in production, installation and servicing.~~

~~d) ISO/IEC Guide 25-1990 General requirements for the competence of calibration and testing laboratories.~~

~~e) ISO 10012-1 Quality assurance requirements for measuring equipment.~~

~~f) ISO 9004-2 Quality management and quality system elements - guidelines for services.~~

- END OF SECTION 1 -

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2 - COSPAS-SARSAT ACCEPTANCE OF 406 MHz BEACON TEST FACILITIES

2.1 Policy

Test facilities ~~in any country formally associated with the Cospas-Sarsat Programme~~ may apply to become a Cospas-Sarsat accepted type approval facility by following the procedures described in this document. *The test facility must be independent of any beacon manufacturer.*

~~The Cospas-Sarsat Parties (i.e. Canada, France, Russia and the USA) can designate their own national test facility as a Cospas-Sarsat accepted type approval test facility, without having to go through the application and review process described in this document.~~

Test facilities that are accepted by the Cospas-Sarsat Council are entitled to perform tests on 406 MHz distress beacons for the purpose of having a Cospas-Sarsat Type Approval Certificate issued by the Cospas-Sarsat Secretariat. A list of Cospas-Sarsat accepted type approval test facilities is maintained by the Secretariat.

2.2 Costs

The direct costs (i.e. travel, accommodation, laboratory testing, etc.) associated with carrying out this Cospas-Sarsat acceptance procedure will be borne by the applicant facility.

~~2.3 Application~~

~~The applicant's country must be formally associated with the Cospas-Sarsat Programme. The application for acceptance of the test facility is to be made through the country's Representative in Cospas-Sarsat.~~

~~2.4 Responsibility of the Country~~

~~The country's Representative takes the responsibility for ensuring that the process stated in this document is being followed and also verifies the independence of the applicant test facility from any beacon manufacturer.~~

2.~~5~~*3* Required Capabilities of Test Facility

The test facility must be capable of performing all tests on a 406 MHz beacon in accordance with *the applicable issue of* C/S T.007~~, with the exception of those specific tests required for beacons with navigation data input. Testing such beacons is an optional additional capability described in section 3.9~~. The antenna tests may be performed at a different location, but the responsibility of meeting the requirements still lies with the test facility. The measurement accuracy requirements of the test facility are listed in Table A1 in Annex A of this document.

The Quality Assurance Programme prepared and used by the test facility must meet the requirements of ~~the four~~ ISO-*17025* ~~documents stated in Annex B, section B.1~~.

~~A "Table of Worldwide Equivalence of ISO 9000 Quality Assurance Standards" is also given in Annex B, providing a cross reference to various national documentation numbers.~~

2.~~6~~*4* Summary of Beacon Test Facility Acceptance Process

The acceptance process, illustrated in Figure 2.1 and described in detail in section 3, evaluates the applicant's test facility technical capabilities and Quality Assurance Programme.

a) The applicant's test facility would have its Quality Assurance Programme assessed by a national accreditation organization. The test facility must meet the Cospas-Sarsat requirements which are given in Table A1 of Annex A and *the requirements of ISO-17025*~~in Annex B~~.

b) The test facility would submit its application form (see Annex *B* ~~C~~) plus the required technical data (see section 3.2) to the Secretariat~~, through its country's Cospas-Sarsat Representative~~.

c) The submission would then be reviewed by an ad-hoc technical team consisting of the Secretariat and technical experts designated by the Cospas-Sarsat Council.

d) An on-site technical visit would then be conducted by one of the team members to observe tests being performed, including antenna tests. ~~(The direct costs associated with this visit are to be paid by the applicant).~~

e) A complete set of type approval tests are then performed according to C/S T.007 and to the requirements of C/S T.001 on a test beacon provided by the applicant or borrowed from Cospas-Sarsat.

f) If the test beacon had not been previously tested by an accepted test facility, it would subsequently be tested at one of the accepted facilities, with the costs borne by the applicant.

g) Upon completion of the tests, a test report will be written and sent to the Secretariat by the applicant, and by the reference test facility, as applicable. The reports will be reviewed by the technical team and their findings will be provided to the applicant, to the Cospas-Sarsat Parties and to the Joint Committee for review and recommendations to the Council.

h) If the documentation demonstrates that the test facility meets the Cospas-Sarsat requirements, the Cospas-Sarsat Parties may grant interim acceptance of the facility until the formal review by the Joint Committee and Council has been completed.

i) Following acceptance by the Council, the facility will need to provide on an annual basis, a letter confirming that their Quality Assurance technical status is still maintained.

2.~~7~~*5* Cospas-Sarsat Acceptance

When the procedure has been successfully completed and the test facility has been accepted by the Cospas-Sarsat Council, the name of the facility will be included in the list of accepted test facilities which is maintained by the Cospas-Sarsat Secretariat.

2.~~8~~*6* Other Capabilities

The applicant test facility may also wish to provide Cospas-Sarsat with a description of its capabilities for testing 406 MHz beacons to national or other international standards.

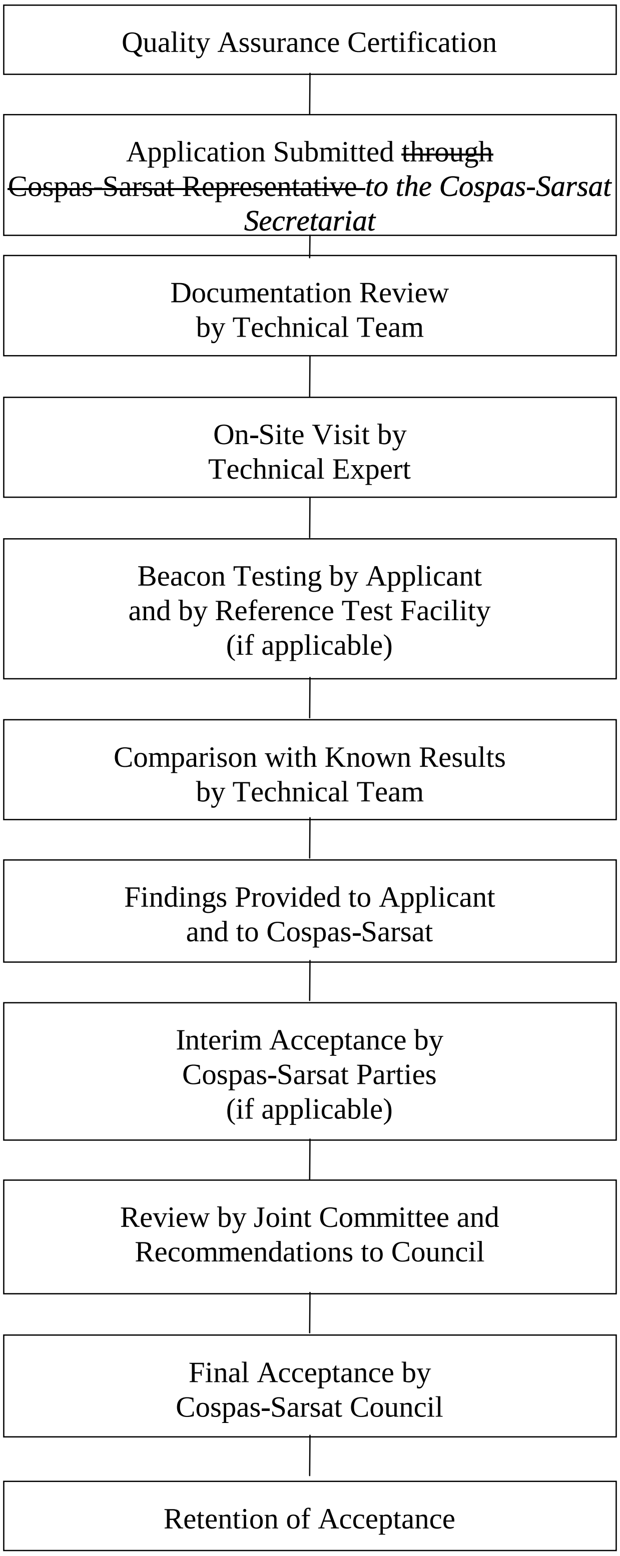

Figure 2.1: Process to Become a Cospas-Sarsat Accepted 406 MHz Beacon Type Approval Test Facility

- END OF SECTION 2 -

3 - 406 MHz BEACON TEST FACILITY ACCEPTANCE PROCESS

3.1 Quality Assurance

The applicant must obtain certification from a national accreditation organization that its test facility meets the quality assurance requirements defined in ~~Annex B~~ ~~of this document~~ *ISO-17025*.

3.2 Application Package

The application form provided in Annex *B* ~~C~~ of this document is to be completed and submitted *to the Cospas-Sarsat Secretariat* ~~through the Cospas-Sarsat Representative of that country together with supporting quality assurance and technical documentation. The country, having become formally associated with the Cospas-Sarsat Programme, accepts responsibility for the test facility to perform Cospas-Sarsat type approval testing. The Representative should guide the applicant through this acceptance process, and correspondence to and from the Cospas-Sarsat Secretariat shall be through the country Representative. By signing the application form, the Representative is also confirming that the operation of the applicant test facility is independent of any beacon manufacturer.~~

The application package must include a letter or certificate from a national accreditation organization in the applicant's country confirming that the applicant's Quality Assurance Programme meets the requirements defined in ~~Annex B of this document~~ *ISO-17025*. The name and address of this accreditation organization must also be given.

Further, the application package must also include the following technical data:

a) a list of test equipment required to perform Cospas-Sarsat testing, serial number and model number;

b) test equipment calibration reports;

c) test equipment traceability to National Standards;

d) a description of software to be used (if applicable);

e) calibration reports and traceability of environmental chambers (if applicable); and

f) a copy of technical procedures they intend to use during approval testing.

The completed application package is to be submitted ~~by the Representative~~ to the Cospas-Sarsat Secretariat who will verify that the necessary information is included in the package.

3.3 Technical Review

Upon submission of the completed application package, the Cospas-Sarsat Secretariat will send a copy to the technical experts appointed by the Cospas-Sarsat Council to work with the Secretariat. These experts will review the technical material and provide recommendations on whether or not to proceed to the next step.

Once the recommendations indicate that the applicant test facility meets the basic requirements, an on-site technical visit is arranged.

3.4 On-Site Technical Visit

A technical expert on beacon testing then visits the applicant test facility. Some tests, including antenna tests, are to be performed on a beacon to demonstrate to the technical expert the capabilities of the test facility. The technical expert will verify the following:

a) the availability of the required test equipment;

b) witness the operation of the test equipment and antenna test range;

c) the test equipment and environmental chambers are calibrated and traceable to national standards;

d) assess the use of applicable procedures; and

e) evaluate the procedures, data sheets and results for completeness and accuracy.

A report will be made by the technical experts to Cospas-Sarsat confirming that the test facility is now ready to proceed to the next step.

3.5 Beacon Test

The test facility will perform a full set of Cospas-Sarsat tests that include antenna tests on a 406 MHz beacon, which may be operated from an external power supply, and subsequently provides the test report to Cospas-Sarsat for review and analysis. The test report is to be written in the format described in C/S T.007.

The beacon testing can be performed in either of two ways:

a) the test facility can acquire its own beacon, on which it conducts the tests and then provides the beacon to one of the designated Cospas-Sarsat test facilities for a subsequent verification test, which the applicant would pay for; or

b) alternatively, the applicant could arrange, on a bilateral basis, to borrow from one of the other accepted test facilities a test beacon having known, previously-measured, characteristics. The applicant would then perform the full set of tests on this beacon and prepare a test report.

3.6 Review of Beacon Test Report

The test report, duly signed by the test facility's authorized official should then be submitted to the Cospas-Sarsat Secretariat.

The Cospas-Sarsat Secretariat and the technical experts will review the test report and compare the results generated by the applicant's test facility with those of the verification test facility, taking into account the measurement accuracies of the two test facilities.

If there is a significant difference between the two sets of test results, some additional tests may be requested.

3.7 Report and Recommendations to Cospas-Sarsat

A report is prepared jointly by the Secretariat and the technical experts. Their findings will be provided to the Applicant, to the Cospas-Sarsat Parties and to the Joint Committee for its review and recommendation as appropriate to the Cospas-Sarsat Council.

If the documentation demonstrates that the test facility meets the Cospas-Sarsat requirements, the Cospas-Sarsat Parties may grant interim acceptance of the facility until the formal review by the Joint Committee and Council has been completed.

Following acceptance of the test facility by the Cospas-Sarsat Council, the Secretariat will notify the applicant ~~and the country Representative~~ of the Council decision. If the process is successful, the applicant's name will then be included in the list of Cospas-Sarsat accepted type approval test facilities maintained by the Secretariat.

3.8 Retention of Test Facility Acceptance

The retention of test facility acceptance is the responsibility of the test facility. This will be accomplished by supplying to the Cospas-Sarsat Secretariat ~~through the country's Representative~~:

- a letter submitted annually by May stating their intention to retain Cospas-Sarsat acceptance and confirming that their test facility continues to meet Cospas-Sarsat requirements; *and*

- a reassessment of the facility's Quality Assurance Programme by a national accreditation organization every five years.

In addition, the Cospas-Sarsat Council reserves the right to request:

- that a technical expert (designated by the Council) be entitled to visit the test facility periodically;

- that a test be conducted every two years (at no cost to Cospas-Sarsat) on a beacon provided by Cospas-Sarsat; and
- a technical audit by Cospas-Sarsat every five years.

~~3.9 Additional Special Testing Capabilities~~

~~Test facilities wishing to perform type approval testing of 406 MHz beacons which transmit encoded position data need to have additional capabilities, listed in Table A2 of Annex A, to perform the tests defined in C/S T.007 for such beacons.~~

~~In order to obtain Cospas-Sarsat acceptance of this optional testing capability, the test facility must provide the following data, for review and approval by the Council, to demonstrate its capability to perform the additional tests in accordance with C/S T.007:~~

~~a) a technical description of the test methods used;~~

~~b) a list of the test equipment used; and~~

~~c) a sample test report.~~

- END OF SECTION 3 -

ANNEXES TO

COSPAS-SARSAT ACCEPTANCE

OF 406 MHz BEACONS

TYPE APPROVAL TEST FACILITIES

ANNEX A

Table A1. Measurement Accuracy Requirements for Cospas-Sarsat 406 MHz Beacon Type Approval Test Facilities

Parameter	**Beacon Requirement**	**Test Facility Accuracy**
Repetition Time	50 sec ± 2.5 sec	± 0.01 sec
Total Transmission Time	440 ms ± 4.4 ms or 520 ms ± 5.2 ms	± 1.0 ms ± 1.0 ms
CW Preamble	160 ms ± 1.6 ms	± 1.0 ms
Bit Rate	400 bps ± 4 bps	± 0.6 bps
Nominal Frequency	~~406.025 MHz ± 2 kHz~~ *see C/S T.001 Section 2.3.1*	± 100 Hz
Frequency Stability	~~< 1 x 10 $^{-9}$~~ *see C/S T.001 Section 2.3.1*	< 1 x 10 $^{-10}$
Transmitted Power	5 W ± 2 dB	± 0.5 dB
Spurious Power Level	see mask in C/S T.001	± 2 dB
Carrier Rise Time	< 5 ms	± 0.5 ms
Modulation Rise	150 µs ± 100 µ~~u~~s	± 25 µs
Modulation Symmetry	≤ 0.05	< 0.01
Phase Modulation	1.1 rad ± 0.1 rad	± 0.04 rad
Temperature (near beacon)	various	± 2°C
Antenna Measurement	see C/S T.007 Annex B	± 3 dB

Table A2. Optional Additional Capabilities Needed to Test 406 MHz Beacons Which Transmit Encoded Position Data

Capability	C/S T.007 Reference	Comments
a) - to provide input signals to the navigation receiver during the tests - to provide simulated/real data in the interface	section A2.7	either by receiving real signals via a remote exterior antenna or by means of a signal simulator
b) to transport the beacon the requisite distance within a required time period	section A2.5	a beacon with an internal navigation device needs to be moved a distance, (possibly a number of kilometres) to exercise the position update feature, if applicable
c) to monitor and decode the content of the message while the beacon is stationery or being transported	section A2.5	the update rate and the new position data transmitted need to be verified
d) to determine the true latitude and longitude of the beacon at each test location	section A2.5	the validity of the position data transmitted needs to be verified

- END OF ANNEX A -

ANNEX B

ISO ACCREDITATION REQUIRED

B.1 The following International Organization for Standardization (ISO) documentation is required to be met by the Applicant's Test Facility:

a)	ISO 9002	Quality systems - Model for quality assurance in production, installation and servicing.
b)	ISO/IEC Guide 25-1990	General requirements for the competence of calibration and testing laboratories.
c)	ISO 10012-1	Quality assurance requirements for measuring equipment.
d)	ISO 9004-2	Quality management and quality system elements - Guidelines for services.

B.2 The following "Table of Worldwide Equivalence of ISO 9000 Quality Assurance Standards", published by ISO, provides a cross-reference to various national document numbers which are identical or equivalent to corresponding ISO documents.

Table of worldwide equivalence of ISO 9000 quality assurance standards

Standards body (country)	*Quality management and quality assurance standards- Guidelines for selection and use*	*Quality systems - Model for quality assurance in design/development, production, installation and servicing*	*Quality systems - Model for quality assurance in production and installation*	*Quality systems - Model for quality assurance in final inspection and test*	*Quality management and quality system elements - Guidelines*
ISO	ISO 9000: 1987	ISO 9001: 1987	ISO 9002:1987	ISO 9003:1987	ISO 9004:1987
CEN*/CENELEC**	EN 29000	EN 29001	EN 29002	EN 29003	EN 29004
COPANT***	COPANT-ISO 9000	COPANT-ISO 9001	COPANT-ISO 9002	COPANT-ISO 9003	COPANT-ISO 9004
Australia	AS 3900	AS 3901	AS 3902	AS 3903	AS 3904
Austria	Ö Norm EN 29000	Ö Norm EN 29001	Ö Norm EN 29002	Ö Norm EN 29003	Ö Norm EN 29004
Barbados	BNS 180:1992	BNS 181:1992	BNS 182:1992	BNS 183:1992	BNS 184:1992
Belgium	NBN-EN 29000	NBN-EN 29001	NBN-EN 29002	NBN-EN 29003	NBN-EN 29004
Brazil	NB 9000:1990	NB 9000:1990	NB 9000:1990	NB 9000:1990	NB 9000:1990
Canada	Q9000	Q9001-91	Q9002-91	Q9003-91	Q9004
Chile	NCH-ISO 9000	NCH-ISO 9001	NCH-ISO 9002	NCH-ISO 9003	NCH-ISO 9004
China	GB/T 10300.1-88	GB/T 10300.2-88	GB/T 10300.3-88	GB/T 10300.4-88	GB/T 10300.5-88
Colombia	ICONTEC-ISO 9000	ICONTEC-ISO 9001	ICONTEC-ISO 9002	ICONTEC-ISO 9003	ICONTEC-ISO 9004
Cuba	NC-ISO 9000	NC-ISO 9001	NC-ISO 9002	NC-ISO 9003	NC-ISO 9004
Cyprus	CYS ISO 9000	CYS ISO 9001	CYS ISO 9002	CYS ISO 9003	CYS ISO 9004
Czech Republic	CSN ISO 9000	CSN ISO 9001	CSN ISO 9002	CSN ISO 9003	CSN ISO 9004
Denmark	DS/ISO 9000	DS/ISO 9001	DS/ISO 9002	DS/ISO 9003	DS/ISO 9004
Egypt	ES/ISO 9000	ES/ISO 9001 - 1987	ES/ISO 9002 - 1987	ES/ISO 9003 - 1987	ES/ISO 9004 - 1987
Finland	SFS-ISO 9000	SFS-ISO 9001	SFS-ISO 9002	SFS-ISO 9003	SFS-ISO 9004
France	NF-EN 29000	NF-EN 29001	NF-EN 29002	NF-EN 29003	NF-EN 29004
Germany	DIN ISO 9000	DIN ISO 9001	DIN ISO 9002	DIN ISO 9003	DIN ISO 9004
Greece	ELOT EN 29000	ELOT EN 29001			
Hungary	MI 18990 - 1988	MI 18991 - 1988	MI 18992 - 1988	MI 18993 - 1988	MI 18994 - 1988
Iceland	IST ISO 9000: 1987	IST ISO 9001: 1987	IST ISO 9002: 1987	IST ISO 9003: 1987	IST ISO 9004: 1987
India	IS 14000: 1988	IS 14001: 1988	IS 14002: 1988	IS 14003: 1988	
Indonesia	SNI 19-9000-1991	SNI 19-9001-1991	SNI 19-9002-1991	SNI 19-9003-1991	SNI 19-9004-1991
Ireland	IS/ISO 9000	IS/ISO 9001	IS/ISO 9002	IS/ISO 9003	IS/ISO 9004
Israel	SI 2000: 1990	SI 2001:1990	SI 2002:1990	SI 2003:1990	SI 2004:1990
Italy	UNI/EN 29000-1987	UNI/EN 29001-1987	UNI/EN 29002-1987	UNI/EN 29003-1987	UNI/EN 29004-1988
Jamaica		JS 167: Part 1: 1990	JS 167: Part 2: 1990	JS 167: Part 3: 1990	
Japan	JIS Z 9900-1991	JIS Z 9901-1991	JIS Z 9902-1991	JIS Z 9903-1991	JIS Z 9904-1991
Korea, Rep. of	KS A 9000-1992	KS A 9001-1992	KS A 9002-1992	KS A 9003-1992	KS A 9004-1992
Malaysia	MS-ISO 9000-1991	MS-ISO 9001-1991	MS-ISO 9002-1991	MS-ISO 9003-1991	MS-ISO 9004-1991
Mexico	NOM-CC-2	NOM-CC-3	NOM-CC-4	NOM-CC-5	NOM-CC-6
Netherlands	NEN-ISO 9000	NEN-ISO 9001	NEN-ISO 9002	NEN-ISO 9003	NEN-ISO 9004
New Zealand	NZS 9000:1990	NZS 9001: 1990	NZS 9002: 1990	NZS 9003:1990	NZS 9004:1990
Norway	NS-ISO 9000: 1988	NS-ISO 9001: 1988	NS-ISO 9002: 1988	NS-ISO 9003: 1988	NS-ISO 9004: 1988
Pakistan	PS: 3000: 90	PS: 3001: 90	PS: 3002: 90	PS: 3003: 90	PS: 3004: 90
Philippines	PNS ISO 9000:1989	PNS ISO 9001: 1989	PNS ISO 9002:1909	PNS ISO 9003:1989	PNS ISO 9004:1989
Poland	ISO 9000	ISO 9001	ISO 9002	ISO 9003	ISO 9004
Portugal	NP EN 29000	NP EN 29001	NP EN 29002	NP EN 29003	NP EN 29004
Romania	RS ISO 9000	RS ISO 9001	RS ISO 9002	RS ISO 9003	RS ISO 9004
Russian Federation		GOST 40.9001-88	GOST 40.9002-88	GOST 40.9003-88	
Singapore	SS/ISO 9000: 1988	SS/ISO 9001: 1988	SS/ISO 9002: 1988	SS/ISO 9003: 1988	SS/ISO 9004: 1988
Slovakia	CSN ISO 9000	CSN ISO 9001	CSN ISO 9002	CSN ISO 9003	CSN ISO 9004
South Africa	SABS/ISO 9000	SABS/ISO 9001	SABS/ISO 9002	SABS/ISO 9003	SABS/ISO 9004
Spain	UNE 66 900	UNE 66 901	UNE 66 902	UNE 66 903	UNE 66 904
Sri Lanka	SLS 825:Part 2:1988	SLS 825:Part 3:1988	SLS 825:Part 4:1988	SLS 825:Part 5:1988	SLS 825:Part 6:1988
Sweden	SS-ISO 9000:1989	SS-ISO 9001:1989	SS-ISO 9002:1989	SS-ISO 9003:1989	SS-ISO 9004:1989
Switzerland	SN EN 29000: 1990	SN EN 29001: 1990	SN EN 29002: 1990	SN EN 29003: 1990	SN EN 29004: 1990
Tanzania	TZS 500: 1990	TZS 501: 1990	TZS 502: 1990	TZS 503: 1990	TZS 504: 1990
Thailand	TISI ISO 9000	TISI ISO 9001	TISI ISO 9002	TISI ISO 9003	TISI ISO 9004
Trinidad and Tobago	TTS 1 65 400: 1988	TTS 1 65 401: 1988	TTS 1 65 402: 1988	TTS 1 65 403: 1988	TTS 1 65 404: 1988
Tunisia	NT 110.18-1987	NT 110.19-1987	NT 110.20-1987	NT 110.21-1987	NT 110.22-1987
Turkey	TS-ISO 9000	TS-ISO 9001	TS-ISO 9002	TS-ISO 9003	TS-ISO 9004
United Kingdom	BS 5750:1987: Pt 0	BS 5750:1987: Pt I	BS 5750:1987: Pt 2	BS 5750:1987: Pt 3	BS 5750:1987: Pt 0
Uruguay	UNIT-ISO 9000-91	UNIT-ISO 9001-91	UNIT-ISO 9002-91	UNIT-ISO 9003-91	UNIT-ISO 9004-91
USA	ANSI/ASQC Q90	ANSI/ASQC Q91	ANSI/ASQC Q92	ANSI/ASQC Q93	ANSI/ASQC Q94
Venezuela	COVENIN - ISO 9000:1990	COVENIN - ISO 9001:1990	COVENIN - ISO 9002:1990	COVENIN - ISO 9003:1990	COVENIN - ISO 9004:1990
Yugoslavia	JUS-ISO 9000	JUS-ISO 9001	JUS-ISO 9002	JUS-ISO 9003	JUS-ISO 9004
Zimbabwe	SAZS 300:1990:Part 5	SAZS 301:1990:Part I	SAZS 302:1990:Part 2	SAZS 303:1990:Part 3	SAZS 304:1990:Part 4

* CEN = European Committee for Standardization
** CENELEC = European Committee for Electrotechnical Standardization
*** COPANT = Pan American Standards Commission

ANNEX ~~C~~*B*

APPLICATION TO BECOME A COSPAS-SARSAT ACCEPTED 406 MHz BEACON TYPE APPROVAL TEST FACILITY

Applicant Test Facility: ______________________________
(name, address, etc.) ______________________________
____
____

National Accreditation Organization: ______________________________
(name, address, etc.) ______________________________
____
____

DECLARATION OF APPLICANT:

The ____ test facility located at ____ applies to become a Cospas-Sarsat accepted test facility and provides the enclosed documentation and quality assurance certification. I hereby agree to provide the technical information required by Cospas-Sarsat, as defined in documents C/S T.007 and C/S T.008.

_______________________ _______________________
Date Signature of Test Facility Representative

~~DECLARATION OF COUNTRY REPRESENTATIVE:~~

~~I support the applicant in this application to become a Cospas-Sarsat accepted test facility and I agree to liaise between the applicant and Cospas-Sarsat, for this application. I hereby confirm that the operation of the applicant test facility is independent of any 406 MHz beacon manufacturer.~~

_______________________ _______________________
~~Date Signature of Country Representative~~

~~*Complete and send to:*~~
~~*Cospas-Sarsat Secretariat, c/o Inmarsat, 99 City Road, London EC1Y 1AX, United Kingdom*~~

- *END OF ANNEX B* –

- END OF DOCUMENT -

ANNEX 13

DRAFT AMENDMENTS TO DOCUMENT

**"COSPAS-SARSAT GEOLUT
PERFORMANCE SPECIFICATION AND DESIGN GUIDELINES"**

**C/S T.009
Issue 1 – Draft Revision 4**

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S T.009 for submission to Council for approval.

5. PERFORMANCE REQUIREMENTS

The performance requirements defined in the following paragraphs establish measurable quantities that a GEOLUT must meet before it can be integrated into the Cospas-Sarsat System and commissioned by the Cospas-Sarsat Council.

5.1 Processing Performance

The GEOLUT shall be able to receive, detect, recover and provide to the associated MCC, valid messages within 5 minutes of beacon activation with a probability of 0.95, provided that:

a. the beacon conforms to the coding and burst repetition specifications detailed in document C/S T.001;

b. the beacon signal was not interfered with by another emitter in the GEOSAR satellite uplink field of view. For this particular requirement, interference is defined as any emitter whose radiated energy occupies both the same time and frequency as the individual bursts from the 406 MHz beacon; and

c. the beacon uplink signal is linearly polarised and has a transmit EIRP of:

- 32 dBm for GEOLUTs that operate with the MSG satellite,
- ~~[TBD]~~ *29 dBm* for GEOLUTs that operate with the GOES satellites, and
- [TBD] for GEOLUTs that operate with the INSAT satellite.

5.2 Frequency Measurement

Subject to the conditions described at section 5.1, and a beacon signal that completely conforms to the specifications of document C/S T.001, the GEOLUT shall measure frequency of beacon signals to an accuracy of 2 Hz.

Due to the potential instability of the beacon frequency at the time of beacon activation, the frequency measurement shall be based upon the most recent frequency data measured by the GEOLUT.

5.3 Capacity

The definition of capacity is provided in Cospas-Sarsat document C/S T.012 (406 MHz frequency management plan). The GEOLUT shall support a capacity of 20 active beacons in each 406 MHz channel.

ANNEX 14

DRAFT AMENDMENTS TO DOCUMENT

"COSPAS-SARSAT 406 MHz FREQUENCY MANAGEMENT PLAN"

C/S T.012
Issue 1 – Draft Revision 3

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S T.012 for submission to Council for approval.

Table H.2: Cospas-Sarsat 406 MHz Channel Assignment Table

Chan. #	Centre Freq. (MHz)	Status for Type Approval of New Beacon Models		Comments Table approved by the Cospas-Sarsat Council at the CSC-31 Session – Oct. 2003 (see note 1)
		Date open	Date closed	
	406.007	Not available		SARP-2 limitation
	406.010	Not available		Doppler shift limitation
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	406.019	Not available		Doppler shift limitation
A	406.022	C/S orbitography / reference		Reserved for System beacons
B	406.025	1982	1 Jan 2002	Open for beacon models submitted for TA before 01/01/02
C	406.028	1 Jan 2000	1 Jan 200~~6~~ *7*	Open for beacon models submitted for TA before 01/01/0~~6~~ *7*
D	406.031			Reserved, not to be assigned
E	406.034			Reserved, not to be assigned
F	406.037	1 Jan 2004	TBD	Planned assignment (see note 1)
G	406.040	1 Jan 2008	TBD	Planned assignment (see note 1)
H	406.043			Reserved, not to be assigned
I	406.046			Reserved, not to be assigned
J	406.049	TBD	TBD	Available for future assignments / New developments
K	406.052	TBD	TBD	Available for future assignments / New developments
L	406.055			Reserved, not to be assigned
M	406.058			Reserved, not to be assigned
N	406.061	TBD	TBD	Available for future assignments / New developments
O	406.064	TBD	TBD	Available for future assignments / New developments
P	406.067			Reserved, not to be assigned
Q	406.070			Reserved, not to be assigned
R	406.073	TBD	TBD	Available for future assignments / New developments
S	406.076	TBD	TBD	Available for future assignments / New developments
	406.079	Not available		Doppler shift limitation
	-------	----------------		---
	406.088	Not available		Doppler shift limitation
	406.091	Not available		SARP-2 limitation

Notes:

(1) Planned assignments may change if the Cospas-Sarsat Council determines that the beacon population in an active channel differs from the projected population.

TA Type approval

TBD To be determined

- END OF ANNEX H –

- END OF DOCUMENT –

ANNEX 15

DRAFT AMENDMENTS TO DOCUMENT

"COSPAS-SARSAT 406 MHz MEOSAR IMPLEMENTATION PLAN"

C/S R.012
Issue 1 – Draft Revision 1

June 2005

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached draft amendments to System document C/S R.012 for submission to Council for approval.

Note that the enclosed amendments include new annexes and will require a renumbering of the existing annexes. The update pages that will be submitted to Council for approval will include additional changes required to keep references to the Annexes consistent.

a. identifies the organisations responsible for the development, testing and operation of SAR/Galileo;

b. delineates the authorities and scope of responsibilities of these organisations in respect of the coordination of SAR/Galileo integration into the Cospas-Sarsat system;

c. defines the role, responsibilities, and authority of the Cospas-Sarsat Council and its subsidiary organs (i.e. Joint Committee, Experts Working Groups, etc.) in respect of the development and integration of SAR/Galileo into Cospas-Sarsat; and

d. defines the procedures for progressing operational, technical and management issues that impact upon MEOSAR development and integration into the Cospas-Sarsat System, including the documentation of decisions, recommendations and actions agreed between Cospas-Sarsat and SAR/Galileo.

In addition, the MEOSAR Providers have stated that they do not intend to fund, procure and operate the complete ground segment required to provide global coverage. Such a complete ground segment providing global coverage will encompass a number of ground receiving/processing stations (MEOLUTs) established world-wide.

Furthermore, as described in section 3 of this document, there are significant advantages to establishing MEOLUTs that operate simultaneously with several MEOSAR satellite systems. Since the development of such ground processing capabilities for MEOSAR distress alerting will also have to be coordinated with Cospas-Sarsat, it would be advantageous to envisage that:

- the development, testing and operation of MEOLUTs should be coordinated by Cospas-Sarsat in the framework of the existing ICSPA;

- a common set of performance requirements should be agreed by Cospas-Sarsat, taking into account the design and capabilities of each MEOSAR constellation; and

- all MEOLUTs would be required to undergo commissioning testing before being authorised to input distress alert information into the Cospas-Sarsat System.

As is the case with the Cospas-Sarsat LEOSAR and GEOSAR systems, the formal process of MEOLUT commissioning testing and reporting would be the responsibility of the respective MEOLUT provider, and the Cospas-Sarsat Council would have final authority to approve the commissioning of a MEOLUT into the Cospas-Sarsat System.

Annex H summarises the guidance provided above, and further details the work plan to be undertaken during the development and integration of the MEOSAR system.

ANNEX G

PRELIMINARY MEOLUT INTEROPERABILITY PARAMETERS

Parameter	*Requirement*	*Definition*	*Comments*	*Reference*
MEOLUT BER Performance	*Suitable to provide BER of 5E-5*		*Achievable with a G/T of 4 dB/K* *Update MIP to correct BER discrepancy at Annex E.*	
Antenna Polarisation	*RHCP and LHCP*		*DASS will operate with RHCP downlinks, SAR/Galileo with LHCP downlinks and a decision for SAR/Glonass has not yet been finalised.*	
MEOLUT System Clock Accuracy	*UTC +/- 50 ns*			
Time Tagging Accuracy	*Standard Deviation within 7 µs*	*Time tagging accuracy measured at MEOLUT processing threshold using a calibrated input signal fed directly into the MEOLUT.*	*When processing C/S T.001 signals.* *Theoretical limit at threshold is 3 µs.*	
Frequency Measurement Accuracy	*Standard Deviation within 0.1 Hz*	*Frequency measurement accuracy at MEOLUT processing threshold using a calibrated input signal fed directly into the MEOLUT.*	*To facilitate the exchange of frequency measurements between MEOLUTs.* *Theoretical limit at threshold is 0.025 Hz.*	
Processing Threshold	*34.8 dB - Hz*	*C/No measured at the demodulator.*	*C/No that supports a BER of 5E-5.*	

Parameter	***Requirement***	***Definition***	***Comments***	***Reference***
Beacon Modulations Supported	*As per C/S T.001*		*New modulations are being considered to enhance MEOSAR system performance. When and if accepted these will be included in C/S T.001.*	

Note: The above MEOLUT interoperability parameters have not been finalised and may be amended as MEOLUT development proceeds.

- END OF ANNEX G -

ANNEX H

WORK PLAN FOR MEOSAR SYSTEM DEVELOPMENT AND INTEGRATION IN RESPECT OF TECHNICAL AND OPERATIONAL MATTERS

This annex presents a work plan overview for the development and integration of the MEOSAR system. The work plan is organized by system data flow; it presents the work required for each process or interface and the Cospas-Sarsat body which should undertake the work effort. The work effort in some cases can be accomplished during a single implementation phase, but in others it can span several phases. The work plan must retain some measure of flexibility to account for the different implementation schedules of the MEOSAR component providers. The work plan overview is graphically depicted at Figure H.1.

H.1 Beacon to Satellite Interface

Because of the use of transparent repeaters planned for the MEOSAR satellite payloads, there are no modifications required to the 406 MHz beacon for its compatibility with the proposed MEOSAR system. However, the possible implementation of advanced capabilities of a return link or enhanced beacon transmissions would require consideration by the Joint Committee and Task Groups as required to study specific needs. Consideration of a return link service should be accomplished as early as possible in the development and proof-of-concept/in-orbit validation phases. Because of the use of spacecraft repeater instruments, enhanced beacon characteristics can be considered at any time.

H.2 Satellite to MEOLUT Interface

The satellite to MEOLUT interface, or the satellite downlink parameters, must be completed in the development phase. To this end, the major parameters for downlink compatibility and interoperability have been agreed among the MEOSAR system providers and are documented in section 6 and Annex F of this document. Issues remaining to be completed should be addressed in specific Experts' Working Groups established by the Council, with the results recorded in this document according to procedures given in section 1.3.

H.3 MEOLUT Processing

The development of MEOLUT processing will initially be accomplished by the respective MEOSAR component providers. The performance of the prototype MEOLUTs will be evaluated during the proof-of-concept/in-orbit validation phase. Further evaluation of the MEOLUTs will be accomplished during the demonstration and evaluation phase, and the MEOSAR D&E Plan should include the necessary test objectives to be measured. These evaluations will contribute to the effort within Cospas-Sarsat to develop new System *documents for MEOLUT performance, design guidelines, and commissioning. The development of these documents should be accomplished by the Joint Committee, with Task Groups as necessary, and should be completed and approved by the end of the demonstration and evaluation phase.*

H.4 MEOLUT to MCC Interface

There are no explicit actions to be taken in respect of the MEOLUT to MCC interface as Cospas-Sarsat does not create specifications dealing with this nominally technical matter of ground segment provider concern. However, the appropriate body of the Joint Committee should ensure that the necessary data fields to be provided by the MEOLUTs are specified in the operational documents. The Joint Committee should continue to look at changes that need to be made to existing System documents and ensure that the MEOSAR D&E Plan includes the appropriate references to MEOLUT / MCC interface, as necessary.

H.5 MCC Processing

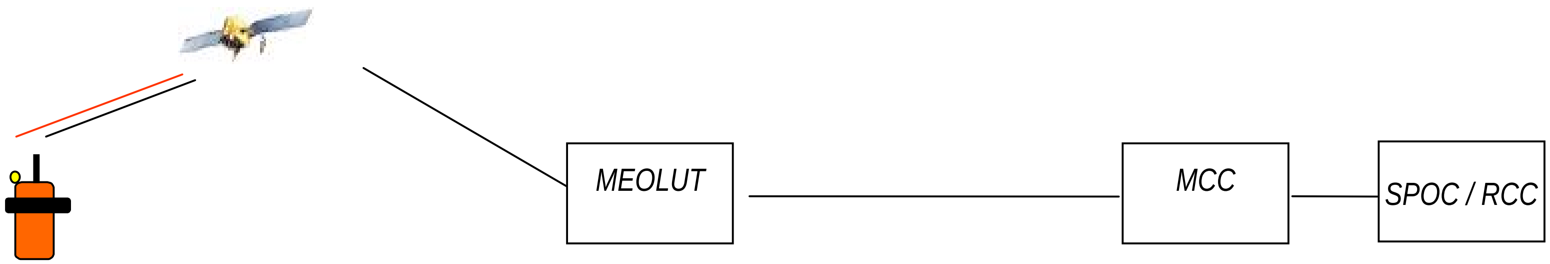
A significant effort is required to determine how MEOSAR alert data will be incorporated into the distress alert information distributed to the SAR services. The amount of modifications necessary in the Cospas-Sarsat MCCs will depend on the operational scenario concept developed for the use of MEOSAR data, and the additional information provided by the MEOSAR system. Extensive modifications will require the convening of a dedicated task group to review the impact on the documents C/S A.001 (DDP) and C/S A.002 (SID), and to recommend the necessary updates. Modification will also be required to ancillary documents such as C/S A.003 (monitoring and reporting), but these may be accomplished within the context of the Joint Committee. The Joint Committee should ensure that the MEOSAR D&E Plan accommodates the necessary objectives to evaluate the MCC performance.

H.6 MCC to RCC/SPOC MEOSAR Alert Data Distribution

The MEOSAR D&E implementation phase offers the opportunity to evaluate the planned data distribution procedures for MEOSAR distress alert data, and the anticipated response procedures for the use of the data by SAR services. The Joint Committee, and possibly a dedicated task group, will need to ensure that the operational procedures and message formats are modified as necessary to optimise the availability of MEOSAR data. This will particularly impact the document C/S A.002 (SID) and other ancillary documents provided for RCC/SPOC edification on the use of Cospas-Sarsat alert data. Cospas-Sarsat will need to coordinate with the appropriate international organizations to ensure that their publications are updated to include the most current description of the System.

H.7 Return Link Service

If a return link service is implemented by any MEOSAR component provider, it will represent a new function that will, in all probability, impact on several, or all, interfaces and processes within the Cospas-Sarsat System, depending on its operational implementation. The return link function may be implemented by entities outside the Cospas-Sarsat System, or may be part of Cospas-Sarsat, but in either case its implementation must be recognised and accommodated by the System. Because it represents an entirely new operational concept, the introduction of a return link process should first be studied in dedicated operational / technical task groups, given adequate guidance by the Council on the scope of their efforts. The impact of a return link service on the processes and interfaces covered in the preceding sections will not be known until an operational scenario is developed by Cospas-Sarsat task groups, in coordination with the MEOSAR component providers and, possibly, national Administrations. Any impact on the Cospas-Sarsat System must be documented in the appropriate System documents. The development of a return link service could impact all phases of MEOSAR system implementation.



Technical / Operational Matter	*Beacon to Satellite Interface*	*Satellite to MEOLUT Interface*	*MEOLUT Processing*	*MEOLUT to MCC Interface*	*MCC Processing*	*MCC to SPOC/RCC Alert Distribution*
Description	*No change to current beacon specifications; review return link service*	*Development of downlink parameters and issues regarding interoperability*	*Development of design and performance specifications*	*Development of specifications*	*Change to specifications and data distribution*	*Changes to alert message format and content*
Venue	*N/A*	*EWG*	*JC / TG*	*JC / TG*	*JC / TG*	*JC / TG*
System Documentation Affected	*N/A*	*C/S R.012 (MIP)*	*D&E Plan; New documents; affected System documents*	*D&E Plan; affected System documents*	*D&E Plan; C/S A.001; C/S A.002; affected System documents*	*Affected System documents; documents of international bodies*
Return Link	*Discussed in JC / TG and may affect several System documents*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*

Figure H.1: Summary of Work Plan for Technical and Operational Matters

- END OF ANNEX H –

ANNEX 16

PROPOSED TERMINATION DATE FOR X.25 AT EACH MCC

MCC Name / Location	Data Distribution Region	X.25 Termination Date	Comments
ALMCC (Algiers, Algeria)	South Central DDR		No planned termination
ARMCC (Ezeiza, Argentina)	Western DDR	June 2005	
ASMCC (Cape Town, South Africa)	Southwest Pacific DDR		No planned termination
AUMCC (Canberra, Australia)	Southwest Pacific DDR		No planned termination
BRMCC (Brasilia, Brazil)	Western DDR		No planned termination
CHMCC (Santiago, Chile)	Western DDR		USA dependent
CMC (Moscow, Russia)	Eastern DDR	July 2006	
CMCC (Trenton, Canada)	Western DDR	Complete	
CNMCC (Beijing, P. R. of China)	Northwest Pacific DDR	July 2006	
FMCC (Toulouse, France)	Central DDR	December 2005	
HKMCC (Hong Kong, China)	Northwest Pacific DDR	March 2006	
IDMCC (Jakarta, Indonesia)	Southwest Pacific DDR	TBD	
INMCC (Bangalore, India)	Eastern DDR	TBD	
ITMCC (Bari, Italy)	Central DDR	December 2005	Not finalised
JAMCC (Tokyo, Japan)	Northwest Pacific DDR	March 2006	
KOMCC (Daejeon, R. of Korea)	Northwest Pacific DDR	TBD	
NIMCC (Abuja, Nigeria)	South Central DDR		Not available
NMCC (Bodoe, Norway)	Central DDR	2008	
PAMCC (Lahore, Pakistan)	Eastern DDR	Complete	
PEMCC (Callao, Peru)	Western DDR	TBD	
SAMCC (Jeddah, Saudi Arabia)	Southwest Pacific DDR	December 2005	Not finalised
SIMCC (Singapore, Singapore)	Southwest Pacific DDR	September 2005	
SPMCC (Maspalomas, Spain)	South Central DDR		No planned termination
TAMCC (ITDC/Taipei MCC)	Northwest Pacific DDR	Complete	
THMCC (Bangkok, Thailand)	Southwest Pacific DDR		No planned termination
TRMCC (Turkey)	Central DDR		No planned termination
UKMCC (Kinloss, UK)	Central DDR	December 2005	
USMCC (Suitland, USA)	Western DDR	September 2005	
VNMCC (Haiphong, Vietnam)	Northwest Pacific DDR	TBD	

ANNEX 17

TEST PROCEDURES FOR HANDLING PLANNED METOP SATELLITE MANOEUVRES

Responsible MCC (R-MCC): USMCC
Simulated Satellite: Metop-1
Time period of test: December 5 – 6, 2005

The detailed test plan is provided in Table 1.

Test results shall be reported in accordance with Table 2 for MCCs and with Table 3 for LEOLUTs. Test results shall be reported by each MCC (for its MCC and associated LEOLUTs) to its associated nodal MCC within 7 days of the end of the test period. Test results shall be reported by each nodal MCC to the responsible MCC within 14 days of the end of the test period. Test results shall be reported by the responsible MCC to the Secretariat within 21 days of the end of the test period.

Table 1: Detailed Test Plan

Ref	Test Item	R-Mcc Send Time	Mcc/Lut Record Time	C/S Document Ref.
1	Send initial orbital data in a SIT 216 message	5 Dec 1400z	5 Dec 1410z	A.001: 3.7.5 A.002: Table C.2 T.002: 4.1.3
2	Notification of planned satellite manoeuvre scheduled for 6 Dec 1600z	6 Dec 1400z	6 Dec 1410z	A.001: 3.7.5, Annex II / F.2
3	Record orbit vectors in effect 10 minutes prior to time of planned satellite manoeuvre	**n/a**	6 Dec 1550z	**n/a**
4	Notification of executed satellite manoeuvre	6 Dec 1630z	6 Dec 1640z	A.001: 3.7.5, Annex II / F.2
5	Send revised orbital data in a SIT 216 message	6 Dec 1700z	6 Dec 1710z	A.001: 3.7.5 A.002: Table C.2 T.002: 4.1.3
6	Record orbit vectors in effect 10 minutes after SIT 216 message sent	**n/a**	6 Dec 1710z	**n/a**

Table 2: MCC Test Results

Reporting MCC: xxMCC

Ref	**Mcc Rcv Time**	**Mcc Send Time**	**Pass/ Fail**	**Actions Taken at the MCC. Explanation of failures (if any). Other Remarks**
1	dd mon hhmm	dd mon hhmm		Time orbit vectors updated at MCC: dd mon hhmmz Time orbit vectors sent to MCCx: dd mon hhmmz (specify per MCC if not equal to "MCC Send Time") Time orbit vectors sent to LUTx: dd mon hhmmz (specify per LUT if not equal to "MCC Send Time")
2	dd mon hhmm	dd mon hhmm		For example, MCC special orbit vector tolerance updated to x Km, effective from dd mon hhmmz to dd mon hhmmz.
3	**n/a**	**n/a**		MCC orbit vectors in effect at dd mon hhmmz: x,y,z position, x,y,z velocity
4	dd mon hhmm	dd mon hhmm		
5	dd mon hhmm	dd mon hhmm		Time orbit vectors updated at MCC: dd mon hhmmz Time orbit vectors sent to MCCx: dd mon hhmmz (specify per MCC if not equal to "MCC Send Time") Time orbit vectors sent to LUTx: dd mon hhmmz (specify per LUT if not equal to "MCC Send Time")
6	**n/a**	**n/a**		MCC orbit vectors in effect at dd mon hhmmz: x,y,z position, x,y,z velocity

Table 3: LUT Test Results

Reporting LUT: LUTxx

Ref	**LUT Rcv Time**	**Pass/ Fail**	**Actions Taken at the LUT.** **Explanation of failures (if any). Other Remarks**
1	dd mon hhmm		Orbit vectors updated at LUT: Yes/No
2		N/A	No action expected at LUT.
3	**n/a**		LUT orbit vectors in effect at dd mon hhmmz: x,y,z position, x,y,z velocity
4		N/A	No action expected at LUT.
5	dd mon hhmm		Orbit vectors updated at LUT: Yes/No
6	**n/a**		LUT orbit vectors in effect at dd mon hhmmz: x,y,z position, x,y,z velocity

ANNEX 18

2005 COSPAS-SARSAT SYSTEM TEST RESULTS

This annex includes the summary of the System test results as compiled in each data distribution region (DDR).

The System test was conducted on 11 - 12 January 2005 according to the test script provided in document C/S A.003, Annex J.

Each Ground Segment Provider was asked to provide the results of their equipment in a standard format as part of their annual report on System status and operations. The standard reporting format was not used in the presentation of the results in this annex.

DATA DISTRIBUTION REGIONAL REPORT ANALYSIS

1. CENTRAL DDR

1.1 Problems and Measures Taken by the Central DDR MCCs

ALMCC

The ALMCC reported that nine test sequences were not detected by the LEOLUT during the annual System test of January 2005. The ALMCC indicated that the system appeared to be working properly during normal operations.

ITMCC

The ITMCC reported that six test sequences did not generate the expected results. Five cases were due to wrong System parameters, which were corrected after the System test, and Ref. No.22 (multiple invalid alert) was incorrectly suppressed.

NMCC

The NMCC reported that five test sequences did not generate the expected results. LUTs did not generate the expected data from Ref. Nos.11 and 13. MCC had problems with Ref. Nos.14, 15 and 22. All anomalies were reported to the manufacturer for corrective action.

SPMCC

The SPMCC reported that nine test sequences did not generate the expected results.

GEOLUT-MSG had problems with Ref. Nos.1, 2, 3 and 20. GEOLUT-GOES had problems with Ref. Nos.1, 2, 15 and 16. MCC had problems with Ref. Nos.3, 13, 14 and 22. All these problems were resolved except the hardware problem at the GEOLUT-GOES which prevented the reception of the complete test sequence Ref. Nos.15 and 16. The solution to this problem were in progress.

UKMCC

The UKMCC reported that seven test sequences did not generate the expected results. GEOLUT had problems with Ref. No.1. MCC had problems with Ref. Nos.3, 7, 8, 10, 15 and 22. MCC configuration error was identified and corrected.

FMCC

The FMCC observed unexpected results for eight test sequences. Seven anomalies were detected on the LUTs. The most important one was the wrong satellite ID, in the alert data transmitted to the MCC, which caused the Doppler positions to be suppressed by the MCC at footprint check. The other ones were mainly related to the beacon message validation. Two anomalies were detected in the MCC software. One was corrected (Ref. No.7, wrong parameter in the MCC caused useless SIT message to be sent back to the USMCC), and one was under investigation (Ref. No.3, MCC did not suppress invalid data from GEOLUT). Both MCC and LUT manufacturers were requested to correct the anomalies.

1.2 The Central DDR Nodal MCC

At the nodal MCC level, 18 test sequences had correct results, or an explanation was given:

Ref. Nos.1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 22.

Four test sequences that had incorrect results were Ref. Nos.3, 7, 20 and 21:

- Ref. No.3, the FMCC did not suppress GEOLUT data (invalid protocol and encoded position) but sent a SIT 122 to the USMCC.
- Ref. No.7, the FMCC sent a SIT 124 back to the USMCC. A wrong parameter in the FMCC was then identified and corrected.
- Ref. No.20, an unexpected (inverted frame sync.) SIT 122 received from the SPMCC was forwarded to the USMCC.
- Ref. No.21, an unexpected (bad frequencies) SIT 125 received from the ITMCC generated a SIT 126 to the USMCC. Then, an unexpected old SIT 126 generated a new case, and a SIT 133 was sent to the USMCC 17 hours after the TCA.

1.3 Comments on the System Test and Other Opinions

Ref. No.1: a typographic error was noted in the script (Table J.2 of document C/S A.003, Annex J.). The beacon message to be transmitted by LUT
CC7469A69A69A68C0D49**B**FFFFFFFFF
should read: CC7469A69A69A68C0D49**8**FFFFFFFFF

Ref. No.11: this reference showed an incoherence between the beacon message transmitted and the expected result. The beacon message presented a protocol error in fixed bits that should prevent the transmission of the SIT 122 message.

It was suggested that, either the beacon message be modified to have correct fixed bits.

In that case the current message 8E361100007FDFFDD859**C**600000C75
should read: 8E361100007FDFFDD859**F**600000C75

or the expected result for the LEOLUT / GEOLUT be modified as follows:

> "MCC Action code: Sw0 + Invalid Data -> AW0. MCC suppress SIT 122 alert due to the standard location protocol beacon message does not conform to fixed bit requirements (bits 107 - 110). (DDP, Table III/B.4 and Table III/B.5)."

in order to replace the current wording:

> "MCC Action code: Sw0 + I1 -> AW1. MCC sends SIT 122 alert based on the country code of the beacon (DDP, Figure III/B.2 and Figure III/B.3)."

Ref. No.21: several LEOLUTs could derive a Doppler location, despite the bad frequencies. When eliminating one of the 4 points, the LUT probably found a possible Doppler curve. It was suggested to modify the script in order to transmit a sequence of ascending frequencies, such as 406.017, 406.022, 406.027, 406.032 MHz.

Ref. No.22: three MCCs in the Central DDR had problems with this test. They suppressed the miscoded alert based on invalid beacon message, instead of processing based on Doppler positions.

1.4 Conclusion

The test was useful for identifying problems with Ground Segment software and configuration parameters, as well as some possible updates to the test script.

2. EASTERN DDR

2.1 Problems Encountered and Measures to be Undertaken

2.1.1 **INMCC**

LUT in Bangalore: no problem.

LUT in Luchnow:

Ref. No.21: SIT 125 was sent instead of 122.
Ref. No.22: no SIT message was sent.
Ref. Nos.4, 7, 8, 9, 10, 13, 15, 16,17,21, 22: data was lost due to prediction offset.

2.1.2 **CMC**

Russian LEOLUTs did not participate in the System test due to their on-going modernization efforts.

3. NORTHWEST PACIFIC DDR

3.1 **JAMCC**

There were no particular problems in the JAMCC with respect to all test items. The JAMCC did not receive any data from JALUT1 and two Ref. Nos.7, 8, 11, 12, 17 and 21, but there was no effect on data distribution. The JAMCC was under investigation why these LUTs did not send any data.

The JAMCC sent SIT 126 instead of SIT 125 for Ref. No.22. This problem will be resolved when the JAMCC system is replaced by new equipment in 2006.

3.2 **KOMCC**

The KOMCC was working normally at the time of the annual System level test. But there was data which was not processed properly at the Daejeon LEOLUT. This case was under investigation by the manufacturer. The Daejeon LEOLUT was working without problems.

3.3 **TAMCC**

Most of data were received at the TAMCC as expected but data on Ref. Nos.12, 13, 14 and 21 did not match with the number indicated in Table J.4 of document C/S A.003, Annex J.

3.4 **HKMCC**

The HKLUTs and the HKMCC were working normally at the time of the annual System level test. Some unexpected results such as different SIT Message formats sent or suppressed alert messages were due to the change of the test sequence and the visibility of satellites. The unmatched situations happened at Ref. Nos.5, 6, 12, 13,14 and 21 of the document C/S A.003, Annex J.

3.5 **CNMCC**

Beijing LUT-1 and LUT-2 were not operational at the time of the annual System level test due to UPS power equipment failure and suspensions. As the Beijing LUTs did not receive the relevant test data from the satellite to derive expected solutions for the CNMCC, the JAMCC did not receive test messages from the CNMCC.

4. SOUTHWEST PACIFIC DDR

4.1 AUMCC

Ref. No.8: The beacon was aged out at 2203 UTC, 12 January 2005 based on time. When the alert was received from the THMCC the AUMCC processed it as a new alert.

Ref. No.21: The LUTs provided Doppler locations that were not expected and the AUMCC processed them as conflict alerts as the encoded and Doppler locations conflicted. An additional SIT 126 alert was transmitted to FMCC because of the receipt of this alert from THMCC and Thailand LUT (5671).

4.2 ASMCC

Ref. Nos.11, 12 and 13: The ASMCC reported that Ref. Nos.11, 12 and 13 were received on the same tracked pass. MCC processed alerts sequentially as per the solution file received from the LUT, i.e. order of processing was Ref. Nos.13, 11 and 12. Ref. No.13 resulted in a SIT 125 transmission, Ref. No.11, an unlocated alert, did not raise an alert and Ref. No.12, with an encoded position resulted in the transmission of a conflict SIT 123 alert.

Ref. No.21: The ASMCC reported that Cape Town LUT eliminated one of the detected four bursts and provided a Doppler location with three points to the MCC, which then conflicted with the encoded position and resulted in a SIT 126 being transmitted.

Ref. Nos.2 and 17: The ASMCC reported that Ref. Nos.2 and 17 were not processed by the MCC as they had not been received.

4.3 IDMCC

Ref. Nos.13 and 22: The IDMCC reported not detecting Ref. Nos.13 and 22.

Ref. No.15: The IDMCC agreed that Ref. No.15 should be transmitted as a SIT 126 not as a SIT 125.

4.4 SAMCC

Ref. Nos.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21 and 22: No feedback provided.

4.5 SIMCC

Ref. Nos.3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 21 and 22: The SIMCC reported that the beacons could not be located in the solution or logger files.

4.6 **THMCC**

Ref. No.8: The Thailand LUTs processed some dump data twice on sequential passes of the same satellite. This configuration allowed data not collected on a previous pass due to bad signal reception to be processed again. Ref. No.8 was initially received when Ref. No.7 was received. However, in this case the data was aged out and when processed again on 13 January and was transmitted to the AUMCC. This problem was resolved once a new version of software was installed in March 2005.

Ref. No.21: The Thailand LUTs 1 and 2 provided conflict alerts each in view of the Doppler locations for the two solutions being in conflict.

5. WESTERN DDR

5.1 Follow-up Analysis of Cospas-Sarsat System Test Results in the Western Data Distribution Region (WDDR)

Representatives from the Western DDR MCCs met during JC-19 to discuss the results of the Cospas-Sarsat System test in the WDDR.

5.2 Status of Test Issues

Ref. No.3: Canada was investigating the problem.

Ref. No.5: Brazil did not receive a response from its MCC vendor.

Ref. Nos.9 and 10: The problem resulted from the Canada and Brazil LUTs processing data out of sequence. The issue will be raised with their LUT vendors.

Ref. No.12: Chile was investigating the case.

Ref. No.13: Brazil did not received a response from its MCC vendor.

Ref. No.18: Canada was investigating the case.

Ref. No.22: Chile was investigating the case.

Argentina had no outstanding issues.

ANNEX 19

DRAFT PROCEDURE FOR THE MANAGEMENT OF CHANGE IN THE COSPAS-SARSAT SYSTEM

The Nineteenth Meeting of the Cospas-Sarsat Joint Committee agreed the attached addition to the draft document Cospas-Sarsat Programme Management Policy (C/S P.011, Issue 1 - Draft 1, March 2005) as part of the development of a comprehensive change management policy.

5.4.4 Changes to System Specifications, Ground Segment Requirements and Standards

As Cospas-Sarsat evolves into a mature system it is important to monitor and track the system's stability. A well defined process of change management ensures that only those changes which have a significant, cost effective impact on Cospas-Sarsat are approved for implementation. Attachment XX provides an overview to change management within the Cospas-Sarsat system. The change management process begins with proposals to change elements of the ground segment, space segment, beacon specifications or beacon type approvals by participants to the Cospas-Sarsat Joint Committee (JC) or specifically established Task Groups (TG).

Based on participants' proposals or TG reports, the JC debates the merits of the issue and, if approved by the participants, makes a recommendation to the Cospas-Sarsat Council (CSC) for approval. The recommendation includes a proposed implementation date and an indication of the criticality of the change. Between the JC meeting and the next Council meeting, the Participants confirm the possible implementation date and resources required with their equipment vendors/manufacturers. The CSC has the responsibility to approve the change and adopt the associated implementation schedule. The CSC also approves appropriate documentation changes/additions.

5.4.4.1 Evaluation Criteria

To properly evaluate proposed changes, the Joint Committee requires specific information (evaluation criteria) upon which it can make an objective decision. A reasonable set of evaluation criteria include the following:

- Detailed description of the Change
  - § Is the change description complete?
  - § Is the change consistent with previous Council policy?
- Requirement for Change
  - § Is there a new requirement? If so what is it and what is the source of the requirement.
  - § Is the change proposed because an existing requirement is not being met? If so, what is the deficiency?
- Performance Impact
  - § What performance specification is impacted by the change?
  - § What is the impact if the change is not implemented?
- Resources Required
  - § Resources may include manpower or equipment cost as well as an estimate of whether the amount of required resources is considered high, low or medium. Note: The information provided for this element will vary significantly depending on national administration and should be considered for information purposes.
- Implementation Schedule
- Who and or what does it affect?
  - § Are all members of Cospas-Sarsat affected by the change or a limited set? If a limited set, who are they?
  - § Are external entities (e.g., SPOCs, RCCs beacon manufacturers, etc.) affected, If so, who are they?
  - § What subsystem is impacted (MCCs, LUTs, Space Segment, etc.)

5.4.4.2 Process

When Participants introduce proposed changes they should, as a minimum, define the change and address each of the evaluation criteria listed above. These criteria will be included in the JC paper template provided prior to each meeting.

Consistent with the Rules of Procedure for the Joint Committee, the appropriate Working Group chairman will schedule the paper for discussion. The group chairman will ensure that the discussion focuses on the information provided by the Participants to the evaluation criteria. The result of the discussion may include modifications to how the evaluation criteria are addressed. The final result of the discussion in the Working Group is a decision whether or not to recommend that the Council approve the proposal. In addition, for each proposed system change to which the Joint Committee agrees, the Working Group will assign a change type (see Page 2 of Attachment XX) and determine whether the change needs to be tracked.

The Secretariat will prepare a list of changes for CSC consideration.

The CSC will review the proposed changes recommended to them by the JC. The Council will consider the information provided for the evaluation criteria in making their decision.

Based on this data and the guidance provided as part of Attachment XX the CSC will approve, disapprove or recommend to the JC for further study.

5.4.4.3 Tracking And Controlling Changes

The Cospas-Sarsat Change Management Process follows best practices and includes a provision for Tracking and Controlling Changes. This information is not only important to track the status of changes but to also accurately highlight the system status outside the program.

All changes that require coordination among Ground Segment Operators, Space Segment, or external entities (e.g., beacon manufacturers) will be tracked. Each participant will report on the status of tracked changes as part of the annual system status report. The report will be provided in the format listed in Attachment XX+1.

The Secretariat will the provide the CSC a list of changes agreed to by the JC for their review at each Open Council meeting. The Council will use this list and the summary of changes from System Status Reports to:

- Evaluate the status of changes within Cospas-Sarsat;
- Encourage participants to complete necessary changes, particularly critical changes, by the agreed to deadline;
- Evaluate the priority of new changes that are brought to the Council for approval; and
- Make adjustments to priorities and due dates, as appropriate.

5.4.4.4 Roles And Responsibilities

Within the Cospas-Sarsat Change Management System, the roles and responsibilities for Change Management are:

National Administrations

- Propose changes to the approved Configuration Items using the evaluation criteria listed in Section in 5.4.4.1.
- Coordinate with vendors/manufacturers on cost and implementation schedule for changes that receive provisional approval from the Joint Committee
- Implement changes approved by the Council and provide comments to the Council, as appropriate.
- Report on the status of approved changes as part of their annual System Status Report.

Joint Committee/Task Groups

- Review proposed changes
- Decide which changes should be forwarded to the Council for final disposition based on the appropriate evaluation criteria.
- Assign a change type (see Page 2 of Attachment XX) to each change
- Decide which changes shall be tracked.

Secretariat

- Provide a list of changes approved by the Joint Committee to the CSC for their consideration. This list will include information provided in response to the evaluation criteria.
- Summarize the status of changes as provided in the annual System Status Reports.
- Inform Participants and Manufacturers of the approved changes (possibly through the Cospas-Sarsat web site.

Council

- Establish and modify, as appropriate, Cospas-Sarsat policy on change management.
- Review the system changes agreed to by the Joint Committee along with the information provided in response to the evaluation criteria and decide on final disposition of each change. The Council can approve, disapprove or send back to National Administrations/Joint Committee for further study. If the Council decides to approve a proposed system change, the Council will also make a final decision on the change type and scheduled implementation date.
- Review information on the status of pending changes approved at previous Council Meetings and make adjustments as necessary.

Proposed Changes to Annex C – Part IV of
COSPAS-SARSAT PROGRAMME MANAGEMENT POLICY
C/S P.011
Issue 1 – Draft 2
March 2005 (2)

B. Documents for Meetings

B.1 Documents addressing items of the provisional agenda that recommend changes to System technology, current operations or policy shall be submitted the Secretariat four weeks prior to the opening date of the meeting. *Furthermore these documents should address the following criteria (described at section 5.4.4.1) in the body of the document:*

1. *A detailed description of the change proposed.*
2. *The reason for the change.*
3. *Performance impact of the change.*
4. *The estimated effort or resources required implementing the change.*
5. *A proposed implementation schedule for the change.*
6. *The affected entities.*

The Secretariat shall format these documents and place them on the Secretariat's website as soon as possible for downloading by Participants.

Proposed Changes to Annex D of
COSPAS-SARSAT PROGRAMME MANAGEMENT POLICY
C/S P.011
Issue 1 – Draft 2
March 2005 (2)

/…

1.5 The Chairperson is responsible for ensuring that contentious issues brought to the Joint Committee are discussed in a free-flowing, friendly manner and that discussion time is equitably shared. He/she is responsible for terminating discussion of a topic after the discussion has allowed for a fair exchange of opinions.

1.6 The Chairperson is responsible for ensuring that documents submitted with proposed changes to System technology, current operations or policy are properly reviewed with respect to the criteria contained at section 5.4.4.1.

1.~~6~~*7* The Chairperson is responsible for ensuring that the Report to Council prepared by the Secretariat reflects the pertinent conclusions of the Joint Committee, highlights national positions which Participants wish to bring to the Council's attention, and include a complete list of actions for Participants and / or the Secretariat, with completion deadlines agreed with all Participants.

…/…

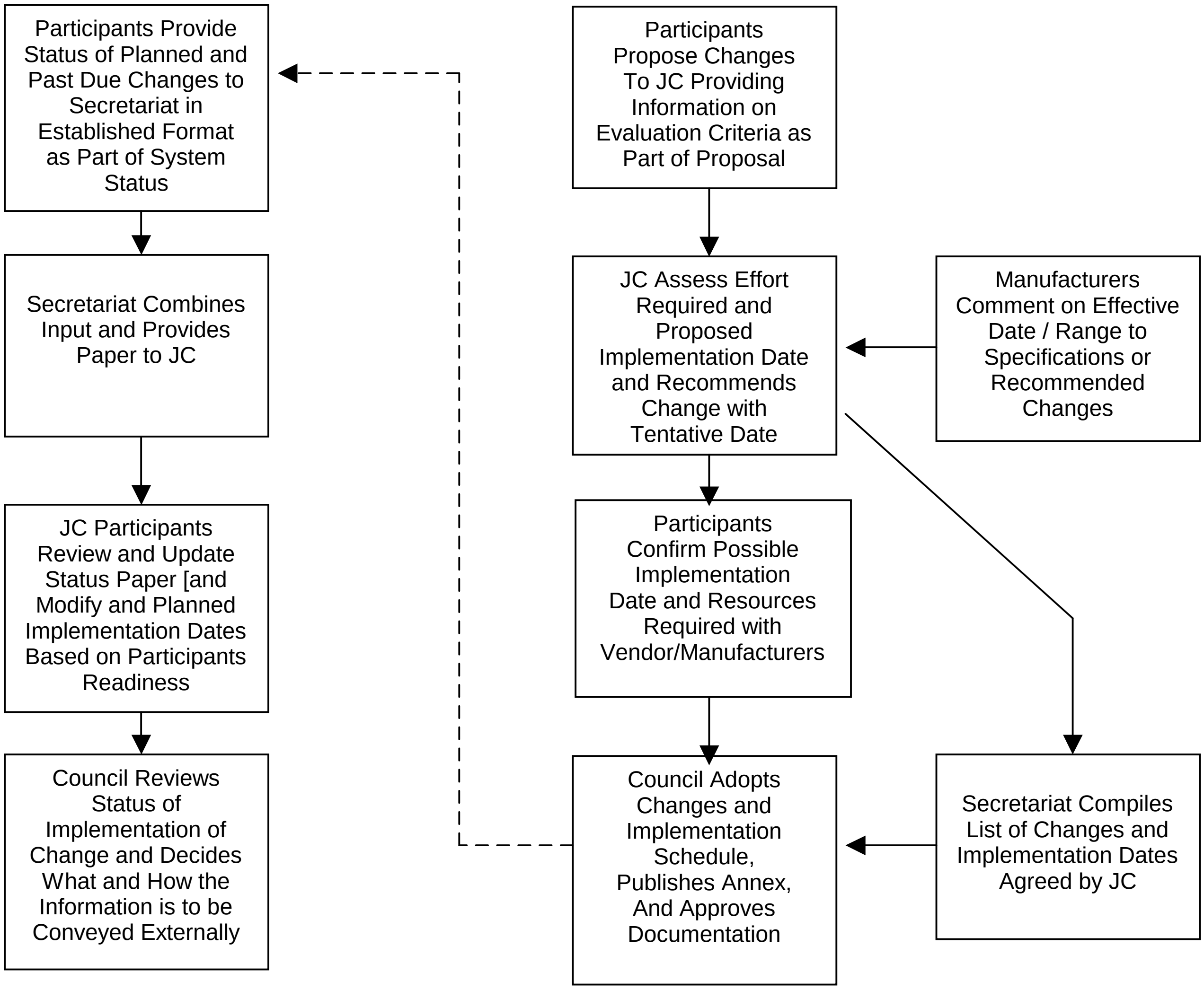
2.5 After all papers have been received, and prior to the beginning of the Joint Committee meeting, the Chairperson of a Working Group should confer with the Chairpersons of the Joint Committee and of the other Working Group and determine the venue (Plenary Session, TWG or OWG) for presentation and discussion of each paper. Papers requiring action by both Working Groups should be identified, and the handling of such papers should be coordinated with the Chairperson of the other group. All Chairpersons should agree on a detailed programme of work for the Joint Committee meeting.

2.6 *The Chairperson of a Working Group is responsible for ensuring that documents submitted with proposed changes to System technology, current operations or policy are properly reviewed with respect to the criteria contained at section 5.4.4.4.*

2.~~6~~*7* The Chairpersons of the Working Groups should attend the plenary meetings of the Joint Committee and conduct Working Group meetings on the basis of the work programme. As meetings progress, the Chairperson of a Working Group should confer periodically with the Chairpersons of the Joint Committee and of the other Working Group and adjust the work programme as necessary to reflect progress made.

…/

Change Tracking **Change Proposal**



ANNEX 20

DRAFT TERMS OF REFERENCE FOR THE 2006 EXPERTS' WORKING GROUP MEETING ON 406 MHz BEACON MESSAGE TRAFFIC MODEL PARAMETERS

An accurate forecast of the 406 MHz beacon message traffic load is critical in order to effectively manage Cospas-Sarsat's use of the 406.0 – 406.1 MHz band. The 406 MHz beacon message traffic model is the tool used by Cospas-Sarsat for making this forecast.

Prior to the EWG meeting, Participants should collect data and calculate the beacon message traffic model parameters using the procedures proposed at JC-19 (document JC-19/5/11).

The Experts' Working Group should:

1. Consider the results and experiences gained using these procedures and propose modifications or alternative procedures as appropriate.

2. Update the beacon message traffic forecast using agreed model parameters and the most up to date 406 MHz beacon population forecast.

3. Review and update the guidelines for opening and closing channels in the 406 MHz band.

4. Develop amendments to the Cospas-Sarsat 406 MHz Frequency Management Plan (C/S T.012), in particular:
   - the beacon message traffic model (Annex G); and
   - the Cospas-Sarsat 406 MHz Channel Assignment Plan (Annex H).

ANNEX 21

ACTION ITEMS FROM THE JC-19 MEETING

Action Item	*Topic and Action*
JC-19/AI.1	Commissioning LEO/GEO Processing (JC-19 Report Section 4.2.41) Secretariat to resubmit document JC-19/4/25 (Brazil) [commissioning report for LEO/GEO processing at Recife] to the JC-20 Meeting in 2006.
JC-19/AI.2	GNSS Self-test Mode (JC-19 Report Section 5.1.12) Participants to consider the implications of a GNSS self-test mode and to develop proposals to amend C/S T.001 and C/S T.007 as appropriate.
JC-19/AI.3	Ft. Huachuca Test Facility (JC-19 Report Section 5.2.35) The USA to confirm the status of the Ft. Huachuca facility and to make recommendations to CSC-35 as appropriate.
JC-19/AI.4	Beacon Replacement Cycle (JC-19 Report Section 5.6.5) Participants to develop methodologies for estimating the average beacon replacement cycle for consideration at JC-20.
JC-19/AI.5	Handbook of Beacon Regulations (JC-19 Report Section 5.7.5) a) Participants to review draft S.007 and provide additions or corrections to the Secretariat no later than 1 September 2005; b) Secretariat to prepare new issue of S.007 in the new structure and including input from Participants; and c) Secretariat to distribute the new document to all Document Holders and place it on website.
JC-19/AI.6	List of Accepted Aircraft Mounted ELT Antennas (JC-19 Report Section 5.7.7) Secretariat to remove all the antennas currently on the list of accepted aircraft mounted ELT antennas.
JC-19/AI.7	Live Beacon Testing (JC-19 Report Section 5.7.10) a) Secretariat to publish information on website concerning the impact of live testing; and b) Participants to submit proposals for a comprehensive Cospas-Sarsat policy on live beacon testing.
JC-19/AI.8	Use of Short Format Location Protocols (JC-19 Report Section 5.7.12) India to report on their current and planned use of short format location protocol beacons.
JC-19/AI.9	Alert Data Validation (JC-19 Report Section 6.1.22) a) Australia to lead a correspondence group for the development of illustrative examples of the DDP alert data validation procedure; and b) Ground Segment operators to review the System test script to ensure its alignment with the agreed changes to the DDP and SID.

Action Item	***Topic and Action***
JC-19/AI.10	AFTN SS Priority (JC-19 Report Section 6.4.20) a) Australia and USA to provide Secretariat their correspondence with ICAO concerning the problem experienced with the implementation of the "SS" priority in AFTN messages; b) Chile to prepare a detailed description of the issue with "SS" priority implementation and provide it to the Secretariat; and c) the Secretariat to approach ICAO experts to: - present the "SS" priority implementation problems, - request clarifications of the corresponding Annex 10 requirements, - explore the means of resolving this issue, and - report to the JC-20 meeting.
JC-19/AI.11	METOP Manoeuvres (JC-19 Report Section 6.5.4) a) Ground Segment providers to confirm at CSC-35 their readiness to test the planned procedures for METOP satellite manoeuvres; b) USA to lead the proposed test described at Annex 17 to the JC-19 report on 6 December 2005; and c) MCC operators to report test results in the format provided at Annex 17.
JC-19/AI.12	SSAS Beacons (JC-19 Report Section 7.4) Participants to consider the programmatic and technical issues associated with identifying SSAS beacon requirements in a dedicated new System document, and report their findings and recommendations to JC-20.
JC-19/AI.13	Change Management (JC-19 Report Section 9.4.3) Secretariat to include the draft policy on change management in the new document C/S P.011 for submission to Council for approval.
JC-19/AI.14	Return Link Service (JC-19 Report Section 10.2.13) Participants to review the RLS operation concept in document JC-19/Inf.10 and submit their views and comments to a future JC meeting.
JC-19/AI.15	Document P.011 (JC-19 Report Section 12.2.4) a) Secretariat to complete a new draft of document C/S P.011; b) Participants to provide comments to the Secretariat or submit additional text to the Council for approval at CSC-35.
JC-19/AI.16	Website Security (JC-19 Report Section 13.3) Canada to organise an informal meeting on website security and report at JC-20.
JC-19/AI.17	Ground Segment Status (JC-18 Report, section 4.1.3) Nigeria to propose a NIMCC service area definition for coordination with adjacent MCCs prior to NIMCC commissioning.
JC-19/AI.18	Metop Satellite Manoeuvres (JC-18, section 6.1.27) LEOLUT operators to explore the self-updating option after a METOP manoeuvre and report at a future Joint Committee meeting.

Action Item	***Topic and Action***
JC-19/AI.19	VNMCC Service Area (JC-18 Report, section 6.1.35) a) P.R. China, Hong Kong, China, Singapore and Vietnam to inform the Secretariat as soon as possible on whether the suggested HKMCC and VNMCC service areas developed at JC-18 would be acceptable, or propose amendments, so as to complete the definition of the new service areas and allow the VNMCC to declare IOC status. b) The Secretariat to complete and distribute to all MCC operators in due time the Geosort files reflecting the agreed VNMCC and HKMCC service areas.
JC-19/AI.20	Status of GOES and MSG Satellite Frequency Notifications to the ITU (JC-12 Report, section 10.3.6) (JC-17 Report, section 3.2.7) a) USA to provide the Secretariat with information regarding the advance notification of the GOES satellites for inclusion in document C/S T.010 (GEOLUT commissioning); and b) the Secretariat to produce and include as an annex to document C/S T.010 the ITU form ApS4-III, completed as appropriate.
JC-19/AI.21	Greece Change of Status (JC-17 Report, section 4.1.10) Greece to notify the change in their status of association from User State to Ground Segment Provider as soon as possible, preferably before undertaking the commissioning of their ground segment equipment.

OWG-19 ACTION ITEMS

Action Item	***Topic and Action***
OWG-19/AI.1	IBRD (JC-19 Report Section 5.5.11) a) USA to activate the S-VDR recording feature in IBRD as soon as possible; b) Secretariat to: - send a letter to Cospas-Sarsat Representatives on their need to declare intended use of the IBRD and request appropriate passwords, - distribute a circular letter to the ICAO and IMO representatives of countries not associated with the Cospas-Sarsat Programme, - place an announcement concerning the availability of the IBRD on the Cospas-Sarsat website; c) Participants to review and update as appropriate the information on national beacon registries in C/S A.001 and C/S S.007; d) Participants to provide the Secretariat with an appropriate National IBRD POC per C/S D.004 and assist other Administrations within their service areas to do the same; and e) National IBRD POCs to request passwords for access to the IBRD, per section 5 of document C/S D.004.
OWG-19/AI.2	NOCR and SSAS message routing (JC-19 Report Section 6.1.8) Ground Segment operators to propose changes to the System documents to support distributing NOCR and SSAS messages using the unlocated alert procedure.
OWG-19/AI.3	AMHS Standard (JC-19 Report Section 6.4.7) MCC operators to develop proposed AMHS standards for Ground Segment communications.
OWG-19/AI.4	Nodal Data Distribution (JC-19 Report Section 6.4.17) Ground Segment Operators to review documents and suggest changes necessary to distribute all traffic using the nodal distribution system.
OWG-19/AI.5	PDN (JC-19 Report Section 6.4.23) Canada and the UK to conduct PDN trials method as proposed in document JC-19/6/20 – Rev.1 and report to JC-20.
OWG-19/AI.6	METOP Satellite Manoeuvres (JC-19 Report Section 6.5.8) a) France to assess position errors induced by METOP satellite manoeuvres; b) Ground Segment Providers to insert a “technical warning” at paragraph 15 of SIT 185 messages notifying only affected RCCs and SPOCs of possible Doppler position degradation due to LEOSAR satellite manoeuvres; c) Ground Segment Providers to automate the satellite manoeuvre warning procedure at the MCC level by December 2005;
OWG-19/AI.7	Message Processing (JC-19 Report Section 6.5.14) a) Participants to submit proposals for harmonizing procedures at MCCs for merging encoded and Doppler positions in order to resolve ambiguity; and b) Participants to submit proposals for distributing multiple unlocated alerts from different GEO satellites in order to aid in the image determination process.

Action Item	***Topic and Action***
OWG-19/AI.8	Large Location Errors (JC-19 Report Section 9.3.3) Ground Segment Providers to: a) investigate problems that result in LLEs; and b) provide digital quarterly reports of LLEs to the Secretariat using the MS Access reporting format available from the Secretariat.
OWG-19/AI.9	Readiness for SSAS Alert Processing (JC-18 Report, section 7.14) MCCs that have not finalised plans to upgrade to process 406 MHz SSAS alerts to do so as soon as possible and all MCCs to inform their SPOCs and RCCs of their current status.
OWG-19/AI.10	Updates to C/S A.001 to Identify MCCs Not Manned on 24-Hour Basis (JC-17 Report, section 6.1.28) a) MCC operators that do not have personnel available on-site 24 hours per day, to provide the Secretariat with a statement of their capability to supply a real-time response or acknowledgement to a request for information or action; b) MCCs to provide the Secretariat with off-duty point of contact information, for reaching responsible staff in case of emergency; and c) the Secretariat to include the provided information in the “Comments” column of Table II/A.2 of the document C/S A.001 (DDP).

TWG-19 ACTION ITEMS

Action Item	*Topic and Action*
TWG-19/AI.1	SARP-3 (JC-19 Report Section 3.3.5) a) France to develop a test file of the SARP-3 downlink and provide to LEOLUT manufacturers on request; b) France and interested Participants to conduct analysis to define the optimum pulse repetition interval for the new time reference beacon and report at CSC-35; c) France to distribute System wide message announcing the date of introduction of new time reference beacon and its pulse repetition interval; d) Ground Segment operators to modify their LEOLUT software prior to the launch of the METOP-A satellite to process the SARP-3 downlink and accommodate new time reference beacon; and e) France to propose updates to C/S T.006 and C/S A.001 describing the characteristics of the new time reference beacon for consideration at JC-20.
TWG-19/AI.2	MSG-2 Commissioning (JC-19 Report Section 3.3.9) a) France to coordinate with EUMETSAT regarding commissioning of the MSG-2 GEOSAR payload and advise Ground Segment Operators of the details; b) MSG GEOLUT operators to conduct analysis to determine whether their GEOLUTs would experience interference if MSG-1 and MSG-2 were active simultaneously and provide the information to the Secretariat; and c) MSG GEOLUT operators to monitor the average C/No received for the Toulouse reference beacon, and advise EUMETSAT if there has been a noticeable change since MSG-1 GEOSAR payload commissioning.
TWG-19/AI.3	Error Ellipse: Commissioning (JC-19 Report Section 4.2.3) Participants to propose modifications to C/S T.002 and C/S T.005 for changing error ellipse performance from a “pass / fail” to a “reporting” requirement for LEOLUT commissioning.
TWG-19/AI.4	MSG GEOLUT frequency measurement (JC-19 Report Section 4.4.6) MSG GEOLUT operators to conduct tests to evaluate the accuracy of calibrated frequency measurements made by MSG GEOLUTs during eclipse periods and report at JC-20.
TWG-19/AI.5	Amendments to C/S T.010 (JC-19 Report Section 4.4.11) Participants to develop amendments to C/S T.010 for reporting identification of the beacon used for GEOLUT calibration and the identification of the beacon(s) used for evaluating the frequency measurement accuracy performance.
TWG-19/AI.6	LUT Frequency Calibration (JC-19 Report Section 4.6.4) a) USA to report the findings from their planned LUT frequency calibration exercise; and b) Participants propose modifications to C/S T.010 for the use of a calibration source for achieving the required frequency measurement accuracy for LEO/GEO processing.
TWG-19/AI.7	PLB Antenna Testing (JC-19 Report Section 5.2.7) CIRM and interested Participants to conduct tests to evaluate the proposed PLB antenna test configuration, and report the results to the Secretariat prior to 1 October 2005.
TWG-19/AI.8	Location Protocol Test Script (JC-19 Report Section 5.2.13) Beacon manufacturers to conduct trials of the proposed C/S T.007 test script for evaluating position data encoding in the navigation system test and report the findings to the Secretariat prior to 1 October 2005.

Action Item	***Topic and Action***
TWG-19/AI.9	Processing Anomalies (JC-18 Report, section 10.2.13) Ground Segment Operators to collect data on the processing anomaly rate from their LEOLUTs and GEOLUTs and report to JC-19.
TWG-19/AI.10	Protection Criteria for Search and Rescue Repeaters Against Interference in the 406.0 - 406.1 MHz Band (JC-16 Report, section 3.2.15) India to provide uplink protection requirements for INSAT GEOSAR payloads.

ANNEX 22

DRAFT AGENDA FOR THE TWENTIETH MEETING OF THE JOINT COMMITTEE (JC-20)

1. Approval of Agenda

2. System Status and Operations Reports

3. Space Segment Matters

3.1 Space Segment Status
3.2 Other Space Segment Matters

4. Ground Segment Matters

4.1 Ground Segment Status
4.2 Review of LUT Commissioning Reports
4.3 Review of MCC Commissioning Reports
4.4 LUT Specifications and Commissioning Standards
4.5 MCC Specification and Commissioning Standard
4.6 Other Ground Segment Matters

5. Beacons

5.1 Review of C/S T.001 and C/S G.005
5.2 Review of C/S T.007 and C/S T.008
5.3 406 MHz and 121.5 MHz Beacon Problems
5.4 Information for Beacon Users
5.5 International 406 MHz Beacon Registration Database
5.6 Review of C/S T.012 - 406 MHz Beacon Message Traffic Forecast
5.7 Other Beacon Matters

6. Operational Matters

6.1 Alert Data Distribution (C/S A.001)
6.2 SID Related Matters (C/S A.002)
6.3 406 MHz False Alerts
6.4 MCC Network Structure
6.5 Other Operational Matters

7. MCC Communication Issues

7.1 Status of FTP-VPN Implementation
7.2 Management of the MCC FTP-VPN Network
7.3 Security Issues in the MCC Communication Network
7.4 Other Communication Matters

8. Interference Monitoring

9. System Assessment

9.1 System Monitoring and Reporting (C/S A.003)
9.2 Results of Annual System Test
9.3 Analysis of 406 MHz Large Location Errors
9.4 Other System Assessment Matters

10. System Evolution

10.1 Phase-out of 121.5/243 MHz Satellite Processing
10.2 MEOSAR Systems
10.3 Other System Enhancements

11. Liaison with International Organisations

11.1 ICAO
11.2 IMO
11.3 ITU
11.4 Other International Organisations

12. Administrative Issues

12.1 Review of Action Items
12.2 Other Administrative Issues

13. Other Business

14. Future Meetings

15. Approval of Report to Council