

United Nations - India Workshop
on
Satellite - Aided Search and Rescue
(SASAR)

Hosted by Indian Space Research Organisation (ISRO)
in association with
United Nations Office for Outer Space Affairs (UNOOSA)

18-22 March 2002
Bangalore, India

WORKSHOP REPORT



UN



ISTRAC

ISRO Telemetry Tracking And Command Network (ISTRAC)
Indian Space Research Organisation (ISRO)
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**United Nations-India Workshop on
Satellite-Aided Search and Rescue (SASAR)**

WORKSHOP REPORT

Table of Contents

Topic	Page No.
1. Background	3
2. Objective	4
3. Participation	4
4. Financial Support	4
5. Conduct of the Workshop	4
6. Observations and Results	6
7. Recommendations	7
8. Annexure-1: Summary of Participants' Feedback (Consolidated)	9
9. Annexure-2: Workshop Schedule	13
10. Annexure-3A: SAR point of Contacts of Participating Countries	18
11. Annexure-3B: Estimates of Radio beacons in Participants' Countries	25
12. Annexure-3C: Status of SAR Facilities available in Participants' Countries	26
13. Annexure-4: Format of Feedback Form	27
14. Annexure-5: National Report Format	28
15. Annexure-6: List of Participants	31



1. Background

With the use of state of art space technology services, Search and Rescue (SAR) is receiving worldwide attention. Most of the space faring nations, including India, have included this as one of their important programme elements. The Cospas-Sarsat international satellite system for search and rescue provides distress alert and location information for maritime, aviation and land users, and supports the search and rescue objectives of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). The system is available to any country on a non-discriminatory basis and free of charge for the end-user in distress.

The system comprises:

- i. a space segment operating in low-Earth orbit (LEO) and geostationary orbit (GEO);
- ii. a ground segment consisting of satellite receiving stations, known as local user terminals (LUT), and data distribution centres, known as mission control centres (MCC); and
- iii. emergency radio beacons operating at 121.5 MHz, 243 MHz and/or 406 MHz, the characteristics of which comply with provisions of the International Telecommunication Union (ITU) and Cospas-Sarsat specifications.

Approximately 660,000 121.5 MHz emergency beacons and 285,000 406 MHz emergency beacons are currently in use worldwide.

As a humanitarian search and rescue programme, the Cospas-Sarsat system has been in place for 20 years. It has been providing critical assistance in terms of real/near real time information support that helped in rescuing 12,747 persons in 3,747 SAR events from September 1982 to December 2000.

Countries or organizations may participate in the management and the operation of the system through their association with the Cospas-Sarsat programme. There are now 36 countries and organizations formally associated with Cospas-Sarsat programme, including the 4 parties to the international Cospas-Sarsat programme agreement (Canada, France, Russia and the USA), which provide and operate the space segment of the system.

For the last 12 years, the Indian Space Research Organization (ISRO) has been providing operational SAR alerting services to national and international users under the umbrella of the Cospas-Sarsat programme. With the implementation of mandatory international regulations for marine vessels and aircraft, the users of the system are growing rapidly. Apart from the ground system support, ISRO also provides a geostationary space segment (INSAT-2B), which is one of the important components of the Cospas-Sarsat system.



In addition to India's national users, the Indian service area has a large base that includes 7 neighbouring countries (**Nepal, Bhutan, Bangladesh, Srilanka, Maldives, Seychelles, and Tanzania**). These countries use ISRO's system for Search and Rescue (SAR) alerting services with no financial commitment towards the operations and maintenance of the system. To enable them to appropriately benefit from these services, there was an urgent need for capacity building in terms of education, training and policymaking.

As part of this effort, the United Nations Office of Outer Space Affairs (UNOOSA) and ISRO jointly organised a 5-day workshop on "**Satellite Aided Search and Rescue**" for the countries that are within the Indian Mission Control Centre (INMCC) service area, and countries in the Asia-Pacific region sharing common SAR boundaries with India.

2. Objectives

The prime objective of the workshop was to promote awareness of the international Cospas-Sarsat Search and Rescue system, and to establish a formal interface with user countries in the Indian Mission Control Centre (INMCC) Service area, for better understanding and coordination of the programme activities and operations.

3. Participation

The workshop was attended by 12 participants from 9 countries: Nepal, Bangladesh, Srilanka, Maldives, Seychelles, Tanzania, Mauritius, Madagascar and Saudi Arabia, and about 25 participants from Indian user agencies (Airports Authority of India, Coastguard, Shipping, Defence), ISRO and other related organisations. About 125 delegates attended the inaugural session from different R&D and Indian agencies related to this activity.

The participants were from senior managerial positions with decision making-authority at national institutions, related to navigational security and Search and Rescue operations. There were total 18 speakers who addressed the workshop on different topics (6 experts from COSPAS-SARSAT Secretariat UK, NOAA USA, CNES France and Spain, 7 from ISRO associated with SASAR operations, and 3 from Indian user agencies) The list of Participants, speakers and organising committee members is enclosed in [Annexure-6](#).

4. Financial Support

Within the limited financial resources available to the co-sponsors (UN-OOSA and ISRO), a number of selected participants from developing countries were offered financial support to attend the Workshop. Funded participants were provided with a round trip air ticket, room and board expenses for the duration of the Workshop by the UN-OOSA. The ISRO provided organising and technical support, local hospitality and logistic arrangements.

5. Conduct of the Workshop

A consolidated summary of the feedback provided by the participants at the end of the workshop is enclosed in the [Annexure-1](#). The workshop was divided into **13 sessions**, spread over 5 days, and was supported by 18 speakers both from India and abroad. The details of each session of the workshop are given in [Annexure-2](#).



The workshop was inaugurated by Dr. V.K. Aatre, Scientific Adviser to Defence Minister, Government of India. Dr. K.N. Shankara, Director, Satellite Communication Programme Office, ISRO Headquarters, welcomed the dignitaries and the participants, on behalf of ISRO and Government of India and briefed about the Satellite Aided Search and Rescue (SASAR) activities in India.

Mr. Viktor Kotelnikov, Political Affairs Officer, Space Applications Programme, representing the programme on Space Applications from UN-OOSA, welcomed all the participants on behalf of the United Nations. In his inaugural speech, he highlighted various activities supported and under taken by the United Nations, particularly in respect of the use of space technology for humanitarian services.

Dr. P.S. Goel, Director ISRO Satellite Centre, in his presidential address focussed on the affordability of the technology (radio beacons) to the common man and asked the media to create awareness of this humanitarian programme among the user community. He also expressed satisfaction over the kind of services SASAR system is providing to the global community in terms of saving precious human lives.

A message from the Chairman ISRO, Dr. K. Kasturirangan, highlighting the importance of SASAR services and ISRO's commitment towards this, and focus of Indian space programme on humanitarian services, was read by Mr. S.K. Shivakumar, Director, ISTRAC.

Mr. Daniel Levesque, Head of the Cospas-Sarsat Secretariat, presented the contribution made by the Cospas-Sarsat in general, and India in particular, towards the development of the programme. He underlined the importance of such workshops for imparting the knowledge of the system to the user community, and complemented United Nations and ISRO for taking this initiative.

Vice Admiral O.P. Bansal, Director General, Indian Coast Guard, in his keynote address, emphasised the importance of Search and Rescue services, and the role and responsibility of the Indian Coast Guard towards maritime Search and Rescue. He recognised the contribution made by the COSPAS-SARSAT and its global reach to the people in distress, but cautioned users to eliminate false alarms in order to provide best possible services through the system.

Mr. N.K. Shrivastava, Operations Coordinator INMCC, ISTRAC, and organising Secretary proposed the vote of thanks.

The workshop was well covered by the media persons, and the coverage of the inaugural function appeared in leading news papers and TV channels.

The speakers of the workshop, who are experts in their fields, aided the participants to acquire rich knowledge of the Cospas-Sarsat system, its operations and interfaces. As per



the reports received from the session's chairmen, every session was interactive with rich technical contents. The various sessions of the workshop covered the following topics:

- System Concept
- IMO and ICAO Regulations
- Ground system operations
- Beacon Specifications
- Beacon coding and registration policies and procedures
- Data Distribution procedures
- Understanding of the Cospas-Sarsat distress alert formats
- Guidelines for developing national regulatory policies
- System testing and exercising
- False alarms and necessary preventive measures
- Phase out plan for 121.5/243 MHz beacons
- Future system developments

On the 4th day of the workshop, all the participants visited the ISRO facilities at Bangalore and received actual feel of the space systems, technology and operations. The participants were given elaborate explanation of the COSPAS-SARSAT systems and operations in real operational environment. During the visit, a demonstration was conducted by activating a 406 MHz beacon to simulate an end-to-end process of system operations, and presented to the visitors. This gave an opportunity to the participants to understand and get the feel of the actual operations involved.

The technical material as received from the speakers was compiled in a hardbound file as well as on a CD, and distributed to individual participants, in addition to the promotional material provided by ISRO and the Cospas-Sarsat Secretariat.

A summary of the reports, as provided by the participants in their national report, is enclosed in [Annexure-3 \(A, B and C\)](#).

To assess the overall outcome of the workshop, a feedback form, as given in [Annexure-4](#), was designed for submission by the individual participant. Each country submitted its national report in a given format as enclosed in the [Annexure-5](#), providing highlights of SAR operations and activities in their country.

6. Observations and Results

The experts and participants made the following observations during the workshop:

- The user countries understood the Cospas-Sarsat system well, with its interfaces, requirements and protocols to use the SAR alerting information efficiently.
- Appropriate contacts were established for information distribution and follow-up coordination.
- Every participating country presented a national report. This gave an opportunity to know how SAR operations were organised in their country and what needed to be done further to strengthen this activity.



- The workshop provided an opportunity to develop a stronger regional cooperation, without which activity like SAR is not possible.
- Direct exchange of information amongst user countries helped each other to organise and restructure their operations and activities.
- The three tiers structure of the workshop in terms of technical presentations as adopted in the Bangalore workshop was adequate and should be maintained in future events to include:
 - i. General presentations on the Cospas-Sarsat system and program, including basics on satellites.
 - ii. Presentations on the practical aspects of using the system (Alert messages, beacon registration, etc.).
 - iii. Presentation by participants on their own SAR Organisation and preparedness to accept Cospas-Sarsat alert data.
- The workshop provided an opportunity to develop a closer interaction among representatives of ISRO and Cospas-Sarsat, which will assist in planning future developments of the space system and will enhance the cooperation through greater participation in the programme activities.
- The interaction between UN-OOSA and Cospas-Sarsat representatives benefited both in terms of understanding priorities and planning future course of action to promote the programme activities in other parts of the world.
- UN-OOSA, Cospas-Sarsat and participating countries complimented ISRO for the excellent organisation of the workshop and the hospitality.

7. Recommendations

1. The participants shall prepare a report on the outcome of the workshop incorporating their viewpoints, and submit to their respective Governmental organisations responsible for SAR, in order to make them aware of the COSPAS-SARSAT programme, its services offered by Indian MCC and minimum operational requirements to be implemented, to get best possible services of the system.
2. Participants shall endeavour to advise their respective Governments to officially designate a well defined SAR point of contact at national level to coordinate with Indian MCC to implement necessary policies, procedure and operational requirements at national level, as per the provisions of International regulations mandated by COSPAS-SARSAT, ICAO and IMO.
3. The follow-up of this activity should continue in the region to assess and further improve upon the Cospas-Sarsat operations. The participants may consider hosting such follow-up meetings in their countries.

Some of the participants requested UN-OOSA to organise national level awareness programmes by coordinating with the local authorities. The UN-OOSA may consider providing experts for such awareness programmes at national level as a part of the follow-up activity.



4. Beacon registration is a very important aspect of the system, as USA pointed out, 70% of false alarms are resolved with the help of registration database information. Hence it is necessary to implement registration of 406 MHz beacons at national level, and this information should be made available to INMCC and SAR agencies when needed. In addition, beacon carriage requirements should be developed nationally, and periodic monitoring and testing of the ELTs/EPIRBs for nominal performance should be implemented in each country.
5. One of the major outcomes of the workshop was the recognition of an urgent need for low cost beacons for users such as fishermen, who cannot afford 406 MHz beacons at their current retail costs. It is recommended that Cospas-Sarsat should continue their efforts towards lower cost 406 MHz beacons.
6. It appeared from the deliberations that awareness of the Cospas-Sarsat programme is generally insufficient. Therefore, an awareness and promotional programme should be continued to allow more users worldwide to benefit from the Cospas-Sarsat system, and to encourage countries to participate in this humanitarian programme.
7. National authorities should include COSPAS-SARSAT as one of the topics in local training and exercise programmes on Search and Rescue for building awareness in the user community.
8. The Cospas-Sarsat representatives identified the following regions for possible future workshops on satellite aided search and rescue, and requested that the UN consider supporting these workshops:
 - i. Central America and Caribbean
 - ii. Middle East
 - iii. South East Asia
 - iv. Southern Africa
9. The UN-OOSA invited ISRO's cooperation and support for organising such workshops in future.





ANNEXURE-1

SUMMARY OF FEEDBACK (CONSOLIDATED)

Compiled from participants' feedback

1. General Remarks on Technical and Operational Issues of SAR and Cospas-Sarsat System:

1.1 Education /Awareness / Training

- Institutional training program on SAR & SASAR would help to improve the knowledge of persons working for SAR.
- Awareness programs on safe operation of ELTs and EPIRBs should be arranged to minimize false alarms.
- Constant update and exchange of information on ongoing events and new developments should be maintained.
- More workshops should be conducted in future for full utilization of space technology for search and rescue.
- Workshops of this type should be held periodically for keeping all interested users informed of latest activities and developments.

1.2 Technology

- SASAR is a new technology in some of the African countries, so, the proper use of beacons requires training.
- Satellite technology should be more widely used, as it can greatly assist in solving SAR problems.
- The system needs improvement in terms of cost effectiveness, interference and jamming robustness, which should be considered in future technical implementations.
- Incorporating re-generative transponders on the spacecraft could reduce RF Link budget requirements.
- Ways to isolate false alarms should be investigated.

1.3 Policy and regulations

- All vessels and crafts should be made to carry beacons.
- Appropriate regulations should be developed and applied to beacon users with a view to minimizing false alerts.
- A system should be developed for monitoring and licensing beacons.
- Efforts should be made to convince people of the need to purchase 406MHz EPIRBs/ELTs instead of 121.5 MHz beacons.





1.4 Registration Database

- Beacon registration databanks are required to provide SAR services with easy access to beacon details.
- Beacon database registration information should be made available to SAR services on 24 hr basis.
- A data bank of EPIRBs could be made available on COSPAS-SARSAT website
- Online availability of database information for all registered beacons would be helpful to SAR services and administrations.

1.5 Beacon Cost

- The cost of EPIRBs/ELTs should be reduced without affecting the System performance.
- Administrations should consider the feasibility/advantages of subsidizing Cospas-Sarsat beacons for needy fishermen in sub-continental coastal states.
- Since the system is mainly intended for people in distress, the cost of the beacon should be reduced by an order of 10.
- The retail price of Cospas-Sarsat beacons vary widely between countries and this matter should be addressed in parallel with the reduction of manufacturing costs, to ensure an even access to the technology.

1.6 Communication/Coordination

- Improved coordination between INMCC & SPOCs, will help the system immensely.
- Good communication medium between MCC & RCCs are required for timely and efficient alert data distribution.
- Connectivity of MCC with MRCC is important to ensure quick reaction to a SAR situation.
- There should be interactions between MRCCs from time to time to discuss SAR cases.
- Establishment of VSAT terminals at Coast Guard MRCCs/MRSCs for SAR information exchange should be investigated.

1.7 Operational Issues

- The number of lives saved is highly dependent upon quick reaction times.
- Although 406 MHz beacons are more reliable than 121.5 MHz beacons, they should be periodically tested/controlled to ensure reliability.
- The processing of Cospas-Sarsat distress alert messages should be included in the GMDSS course for General Operator Certificate
- AMVER and other reporting systems could be made available to MRCC on Internet by giving passwords.
- The system is well maintained and all the agencies involved are committed.





2. General Remarks about the Workshop

2.1 Assessment of the Workshop

- The Cospas-Sarsat system is a “UNIQUE” system using technology that is adequate for the new century. It is the best distress alerting and life saving system.
- Information on number of lives saved indicates the benefits of SAR services to humanity.
- The workshop underlined the importance of the SAR mission and INSAT satellites among SAARC (South Asian Association for Regional Cooperation) countries in achieving successful SAR operations.
- The workshop brought out the operation and function of COSPAS-SARSAT system.
- The objective of the workshop was met, and it successfully created basic awareness about SASAR.
- It was informative and thought provoking.
- Excellent informative and interactive workshop highlighted the importance of SASAR.
- Good Workshop for expansion of SAR activities.

2.2 Speakers/Presentations/Technical Contents/Documentation

- Presentations of COSPAS-SARSAT system were exhaustive and gave very good insight of working of the system.
- The documents provided were a useful support.
- Selection of topics and sequence of presentation logic was excellent.
- Information on how beacons should be used was very well explained.
- Speakers were good with their presentation.
- It was very informative and well explained by speakers.
- Sessions gave good exposure to the technical aspects of COSPAS-SARSAT system.
- Awareness of ground and space segment, working knowledge of Beacons was imparted to all participants.
- Information on beacons, ground & space segments of satellite aided SAR was good.
- Understanding of SAR and its utilization was good.
- The three tier structure was adequate and should be maintained to include:
 - i. presentations on the C-S system and program, including basics on satellites;
 - ii. presentations on the practical aspects of using the system (alert messages, beacon registration, etc.);
 - iii. presentations by participants on their own SAR organization and preparedness to accept C-S alert data.

2.3 Logistics

- Logistics and facilities were well planned.



- Good logistics arrangements.
- Visits to ISAC and INMCC were very exciting.

2.4 Interactivity

- Interaction with foreign delegates gave fair idea of their SAR organization.
- Interactive sessions demonstrated the interest and enthusiasm of the participants.
- Active involvement of participants in the discussion of issues was noted. (e.g: false alarms, phase-out of 121.5 MHz beacon, lowering the cost of 406 MHz beacons).
- Participation of associated agencies provided useful interaction & information exchange.

3. Suggestions for Future Workshops

- Include audio-visual aids to improve knowledge of SAR.
- Explanation of abbreviations/acronyms should have been given for better understanding.
- Decoding of SAR alert message to make sure it is fully understood.
- Interactive sessions between INMCC Bangalore, LUT&SPOCs/RCCs should have been included.
- Availability of E-mail & Fax facilities at the venue to keep track of our office would be an added advantage.
- Handouts should be more descriptive.
- Include live simulation of SAR incidents.
- Include a practical item by establishing small work group in future workshop.
- More than one representative from each country should be included to represent both Maritime & Aeronautical SAR components.
- National reports of participants should be distributed prior to their presentation.
- Workshop should be conducted once in a year at different MCCs.
- Conducting SAR operations at field level would give more exposure.
- “Certificate of Participation” would be in order.
- For future workshop the topics to be addressed should include:
 - i. The termination of 121.5 MHz satellite processing with an emphasis on preparing for the transition to 406 MHz beacons, i.e. regulatory issues, low cost beacons, registration & type approval, and prevention & processing of false alerts.
 - ii. Practical use of C-S alert data by RCCs/SPOCs with live demonstration and real incident analysis in interactive sessions.
- Regions to be covered for future workshop:
 - a) Central America and Caribbean
 - b) Middle East
 - c) South-East Asia
 - d) Southern Africa



ANNEXURE-2

Workshop Schedule

Session - I: Inauguration

Date & Time: - 18th March 2002, 09:00 – 10:45 hrs.

Chief Guest: - Dr. V.K. Aatre, Scientific Advisor to Defence Minister
Presided over by: - Dr. P.S. Goel, Director, ISRO Satellite Center (ISAC)
Keynote address by: - Vice Admiral O.P. Bansal, AVSM, VSM
Director General Coast Guard and Chairman, National SAR Board.
Address by: - Dr. K.N. Shankara, Director SCP, ISRO HQ.
Mr. Viktor Kotelnikov, Political Affairs Officer, UN-OOSA
Mr. Daniel Levesque Head Cospas-Sarsat Secretariat
Message by: - From Chairman ISRO, Dr. K. Kasturirangan,
Read by Mr. S.K. Shivakumar, Director ISTRAC
Vote of thanks by: - Mr. N.K. Shrivastava, Ops. Coordinator, INMCC/ISTRAC

Session – II: Cospas-Sarsat System Overview

Date & Time: 18th March 2002, 11:15 – 13:15 hrs.

Chaired by: - Mr. S.K. Shivakumar, Director, ISTRAC
Supported by: - Mr. C. Venkataiah
Speakers: - Mr. Daniel Levesque, Head Cospas-Sarsat Secretariat, and
Mr. Bill Ruark , Dy. Head Cospas-Sarsat Secretariat

Subject material covered:

Background, Limitations of terrestrial system & need for satellite based system, System concept, International policies/ Regulations (ICAO/IMO), Evolution of Cospas-Sarsat system (history), International cooperation on SAR, Cospas-Sarsat Organization (including funding and participation in the programme), Current system status/statistics, Cospas-Sarsat Documentation, Cospas-Sarsat and other mobile communication/navigation systems, Future developments.

Session – III: Space Segment-I

Date & Time: - 18th March 2002, 14:15 – 15:15 hrs.

Chaired by: - Mr. Bill Ruark, Dy. Head Cospas-Sarsat Secretariat
Supported by: - Mr. K. Somasundaram, ISTRAC
Speaker: - Mr. P. Soma, INMCC/ISTRAC

Subject material covered: -

Brief introduction to space technology (different types of satellites and orbits, various applications), Concept of GPS system, Future trends.



Session – IV: Space Segment-II

Date & Time: - 18th March 2002, 15:45 – 17:15 hrs.

Chaired by: - Capt. L.K. Panda, DG Shipping
Supported by: - Mr. P. Soma, INMCC/ISTRAC
Speakers: - Mr. M. Hucteau, Cospas-Sarsat representative, France
Mr. Ajay Mehta, SARSAT Programme Manager, USA
Mr. D. John, ISRO HQ

Subject material covered: -

LEOSAR System, Comparison of Cospas and Sarsat satellites, GEOSAR System, Visibility coverage of LEO & GEO, Relative benefits of both the systems (complementarities), Onboard Processing of the signal, Future satellites planned, INSAT SAR System.

Chairman's Remarks: -

- The presentations of all the above speakers were excellent.
- Comparative analysis between two systems was very informative, which needs to be made available to all the users of SASAR System.

Session – V: Ground Segment-I

Date & Time: -19th March 2002, 09:00 – 10:30 hrs.

Chaired by: - Mr. Mario Hucteau, France
Supported by: - Mr. L. Srinivasan, ISTRAC
Speakers: - Prof. Julio Melian, Former Head of Spanish MCC, and
Mr. Bill Ruark, Dy. Head Cospas-Sarsat Secretariat

Subject material covered: -

Brief introduction of Cospas-Sarsat Ground System, LUT/MCC functions/operations/ commissioning standards, Working principle (Doppler principle, location estimation), Detection and ground processing of the distress signals, Ambiguity Resolution, Local and global coverage, System wait time , MCC Service Area (Geosort boundaries), Support MCCs and Nodal network, Data communication.

Session – VI: Ground Segment-II

Date & Time: - 19th March 2002, 11:00 – 13:00 hrs.

Chaired by: - Mr. V.K. Shroff, Airports Authority of India
Supported by: - Mr. D. John, ISRO HQ
Speakers: - Mr. NK Shrivastava, Mr.K. Somasundaram, Mr. P. Guna Sekhar ,
INMCC/ISTRAC.

Subject material covered: -

Indian LUTs and MCC description, INMCC System Organization and Operations, INMCC statistics, Data Distribution Principle, Geosorting, SRR boundaries, Beacon registration at INMCC, Distress alert formats (MCC to RCCs, MCC to , SPOCs and MCC to MCC), Assessment of Cospas-Sarsat alerts and guidelines for alert follow-up, Responsibility of users.



Chairman's Remarks:

- The importance of Bangalore LUT & Lucknow LUT with Data Distribution procedures among various regions of the world were neatly explained.
- Explanation of COSPAS-SARSAT alert message decoding was good.

Session – VII: Presentations by Indian RCCs and Regulatory Authorities

Date & Time: - 19th March 2002, 14:00 – 15:00 & 15:30 – 17:00 hrs.

Chaired by: - Prof. Julio Melian, Spain
Supported by: - Mr. N.K. Shrivastava, INMCC
Speakers: - DIG S.P. Sharma Director Operations, Indian Coast Guard
Mr. V.K. Shroff Addl. General Manager, ATM, Airports Authority of India
Capt. L.K. Panda, Dy. Nautical Advisor, Directorate General of Shipping

Subject material covered: -

Indian Coast Guard:

Coastguard operations in general and existing system, Application of Cospas-Sarsat alerts in SAR operations, SAR statistics.

Airports Authority of India:

Indian SAR (RCC) network and interagency interfaces, Existing SAR systems, follow-up procedure and RCC Operations, Sources of distress alerting, Existing aviation regulations (ICAO), monitoring and implementation, Application of Cospas-Sarsat alerts in SAR operations, SAR statistics.

Directorate General of Shipping:

Existing maritime regulations (IMO, GMDSS & Cospas-Sarsat) monitoring and implementation, EPIRB registration regulations & monitoring.

Chairman's Remarks: -

- Information about loss of marine lives without SAR equipment's will be useful to implement safety regulations for fishermen and others
- Need for computerized RCC initiated alert follow up procedures
- Registration of EPIRB should be made compulsory and monitored strictly
- Design of low cost beacons for fishermen and others
- Online ship database is planned to be placed on DGS website

Session – VIII: Radio Beacons-I

Date & Time: - 20th March 2002, 09:00 – 10:30 hrs.

Chaired by: - Gr.Capt. N. K . Upadhya , Indian Air Force.
Supported by: - Mr. A. Karuppaiyan, ISTRAC
Speakers: - Mr.G. Jagannath Das, ISTRAC
LCDR Paul Steward, US Coastguard

Subject material covered: -

Brief description of radio beacon (block diagram, and functioning) , Beacon types and their uses for different applications, Beacon specifications, New generation GPS-based beacons, Problems with 121.5/243 MHz beacons and phase out plan, Benefits of 406 MHz beacons, SAR incidents: case studies of interesting events.





Session – IX: Radio Beacons-II

Date & Time: - 20th March 2002, 11:00 – 12:30 hrs.

Chaired by: - Dr. K.N. Shankara, Director SCP, ISRO HQ
Supported by: - Mr. M.N. Rao, ISTRAC
Speakers: - Mr. D. Levesque, Head Cospas-Sarsat Secretariat
Mr. Ajay Mehta, SARSAT Programme Manager, NOAA/USA

Subject material covered: -

Beacon protocols, and Coding procedures, 406 MHz beacon Registration database, requirements/ and registration procedures), Beacon exercise/qualification testing, Type approval, False alarms and RF interference (causes, impact on the system and corrective measures), General guidelines to users (Dos and don'ts).

Session: - X: Presentation of National Reports

Date & Time: - 20th March 2002, 13:30 – 16:30 hrs.

Chaired by: - Mr. Ajay Mehta, SARSAT Program Manager
Supported by: - Mr. N. Sengupta, ISTRAC
Speakers: - Representatives of Bangladesh, Maldives, Bhutan, Nepal, India, Saudi Arabia, Madagascar, Seychelles, Mauritius, Sri Lanka and Tanzania.

Subject material covered: -

Representatives of the participating countries presented their National report on SAR status with specific reference to Cospas-Sarsat.

The reports covered following:

Existing structure of SAR organization, Rough estimate of Cospas-Sarsat beacons in use (ELTs/EPIRBs/PLBs) and proposed for future (approx. population growth by end of 2008), Current policies/regulations followed, Single SAR contact point for distribution of distress alerts, National RCCs with Contact details, Area map of each country's SAR responsibility, Contact details of Maritime and Aviation regulatory authorities. The contact details to include: telephone number (work & home), Fax no., telex no., AFTN (if applicable), email, 24h contact no. for RCCs, mobile, and the details of contact authority with designation.

Session – XI: Visit to Aerospace Museum, Visit to ISAC (ISRO Satellite Centre).

Date & Time: - 21 March 2002, 09:00 – 12:30 hrs.

Visit to Aerospace museum setup by Hindustan Aeronautics Limited and ISRO Satellite Center (Satellite design and development center).

Session - XII: Visit to INMCC/ISTRAC

Date & Time: - 21st March 2002 14:30 – 18:30 hrs.

Visit to INMCC and ISTRAC facility, System was demonstrated live through test beacon radiation from INMCC, Bangalore.



Session - XIII: Discussion and Feedback Session

Date & Time: - 22nd March 2002 ,09:00 – 10:30 & 11:00 – 12:30 hrs.

Chaired by: - Mr. Viktor Kotelnikov , Political Affairs Officer, UN-OOSA.
Supported by: - Mr. K. Somasundaram , ISTRAC.
Speakers: - Representatives of
Bangladesh, India, Maldives, Madagascar, Mauritius, Nepal, Saudi Arabia,
Seychelles, Sri Lanka, Tanzania.

Participants covered following points in the feedback: -

- Each Participant provided an oral and written feedback on the overall assessment of the workshop.
- Whether the workshop could meet its objectives in terms of providing adequate knowledge and understanding of the Cospas-Sarsat system
- Suggestions to be incorporated in future workshops
- Specific areas that need to be further strengthened
- How India/UN/Cospas-Sarsat can help strengthen SAR system in their country
- Participants interacted with Indian counterparts (SAR agencies) to discuss specific proposals (if any) on bilateral cooperation
- Guidelines for formulation of National regulatory policies by mutual discussion
- Observations and Recommendations





ANNEXURE-3A

SAR Points of Contact (provided by the participants in their national report)

MID	COUNTRY NAME	NAME OF SAR POINT OF CONTACT	TELEPHONE	FASCIMILE	AFTN	E-Mail	MAILING ADDRESS
405	Bangladesh	Chairman, CAAB	+880-2-8911122 632210CCAABBJ (Telex)	+880-2-8913322	--	--	Zia International Airport Dhaka-1229, Bangladesh
		Member (Ops & plan)	+880-2-8914105	+880-2-8914709	--	--	---- do ----
		Director (ATS & Aerodromes)	+880-2-8911125	--	--	--	---- do ----
		Director Flight Safety & Regulations	+880-2-8911126	--	--	--	---- do ----
		RCC/ACC Dhaka	+880-2-8914137 +880-2-8914870 to 74 Extn:3410,3465	--	VGZRZQZX	--	---- do ----





410	* Bhutan	Dept. of Civil Aviation	+975-8-271909 +975-8-271910	+975-8-271911	--	--	Director Dept. of Civil Aviation Paro, Bhutan
419	India	INMCC, Bangalore	ISTRAC/ISRO	+91-80-8094546	+91-80-8094248	VOBGYCYX	Inmcc@istrac.vsnl.net.in ISRO/ISTRAC, Department of Space, Govt. of India A-1-6, Peenya Industrial Estate, Bangalore 560 058. Indi
		RCC Chennai	Airports Authority of India.	+91-44-2341740/ 2342620	+91-44-2347079	VOMMYCYX	--- Director, Chennai Airpo Airports Authority of India, Meenambakam Chennai 600 029.
		RCC Mumbai	Airports Authority of India.	+91-22-6156305/ 6156562 +91-22-6156466 (EPBAX)	+91-22-6156007	VABBYCYX	--- Director, Mumbai Airpo Airports Authority of India,Sahar,Vile Parle(East), Mumbai400 099
		Rcc Kolkata	Airports Authority of India.	+91-33-5119520/ 5502998 +91-33-5119600 (EPBAX)	+91-33-5119520	VECCYCYX	--- Director, Netaji Subhash Chandra Bose Airport, Airports Authority of India, Kolkata 700 028.
		Rcc New Delhi	Airports Authority of India.	+91-11-5653283/ 5654367 +91-11-5653471-79 (EPBAX)	+91-11-5653284	VIDPYCYX	aai@mons.com Director, IGI Airport, Airports Authority of India, Palam, New Delhi 110 037.





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MRCC Chennai	Indian Coast Guard	+91-44-5366206/ 5362639	+91-44-5365437/ 5363442	---	----	Coast Guard Region(East Fort Street George, Coast Guard Regional Headquarters, Chennai 600 009





455	Maldives							
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	MRCC	NSS Coast Guard	+960-325981, 322607/325797/ 325981	+960-310054			Coast Gaurd Building Boaduthakurufannu Magu Male' , Rep. of Maldives	
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	Maritime Regulation	Maritime Section	+960-323993	+960-323994		admin@transport.gov.mv	Ministry of Transport And Civil Avation 1 st floor,Huravee Building Ameer Ahmed Magu, Male' Rep. of Maldives	





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	RCC Antananarivo	+261-20-2244410, +261-20-2245909	+261-20-2245909	FMMIYCYX	---	Representation ACM Ivato aeroport, 105 Antannarivo, Madagascar

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ANNEXURE-3B

Estimate of COSPAS-SARSAT Radio Beacons

(as provided by the participants in their national reports)

Country /Usage		ELTs on Aircraft		EPIRBs on Ships		PLBs by Pilots/Individuals	
		121.5 MHz	406 Mhz	121.5 MHz	406 Mhz	121.5 MHz	406 MHz
Bangladesh	In Use	30		20			
	By 2005						
	By 2008	36		30			
Maldives	In Use	-	29	-	20	-	-
	By 2005	-	38	-	24	-	-
	By 2008	-	53	-	28	-	-
Madagascar	In Use	56	15	74	15	-	-
	By 2005	65	70	110	60	-	15
	By 2008	45	115	125	120	-	25
Mauritius	In Use						
	By 2005						
	By 2008						
Nepal	In Use						
	By 2005						
	By 2008						
Seychelles	In Use	30	6	20	3	8	0
	By 2005	30	21	15	75	0	10
	By 2008	20	30	0	300	0	12
Sri Lanka	In Use						
	By 2005						
	By 2008						
Tanzania	In Use						
	By 2005						
	By 2008						
Bhutan (not participated)	In Use						
	By 2005						
	By 2008						



ANNEXURE-3C

Status of SAR Facilities available at SPOCs

Country	SAR Point of Contact Available	SAR Facilities	Use of Cospas-Sarast	Beacon Registry	Regulations	Problems
Bangladesh	Y	Y	N	N	N	Y
Madagascar	Y	Y	Y	Y	Y	-
Maldives	Y	Y	Y	Y	Y	--
Mauritius	Y	Y	Y	Y	Y	--
Nepal	Y	Y	N	Y	N	Y
Seychelles	Y	Y	Y	Y	Y	--
Sri Lanka	Y	Y	N	N	Y	Y
Tanzania	Y	Y	Y	Y	Y	Y

Y → YES

N → NO





ANNEXURE-5

UN-INDIA WORKSHOP ON SASAR BANGALORE, INDIA 18-22 MARCH 2002

FORMAT OF THE NATIONAL REPORT TO BE PRESENTED BY THE PARTICIPATING COUNTRIES

- 1. National Report for the Country:**
- 2. Submitted by:**
- 3. Signature:**
- 4. Date:**
5. Existing structure of SAR organization in the country:
6. Current policies/regulations being followed for carriage requirements of radio beacons by Aviation users:
7. Current policies/regulations being followed for carriage requirements of radio beacons by Maritime users:
8. If above is not applicable, any plan to implement radio beacon carriage requirements for maritime and aviation users:
9. Contact agency for implementation of aviation regulations:
(Name, mailing address, phone, fax, Email)
10. Contact agency for implementation of maritime regulations:
(Name, mailing address, phone, fax, Email)
11. Name of the agency currently maintaining ELTs and EPIRBs record/database:
12. Does your country receive Cospas-Sarsat distress alerts?
13. If yes, from which agencies:
14. Provide your area of SAR responsibility (SAR boundaries)
15. Please attach area boundaries of your country's SAR responsibility:





16. Provide single contact point/agency for coordinating Cospas-Sarsat (SAR) related matters including policy matters and operations:

Name of the agency	
Mailing address	
Phone	
Fax	
Mobile	
E-mail	
Any other contacts	
Name of Contact person	
Designation	
Contact details (phone, FAX, E-mail)	
You may include any additional information if you wish	

17. Nominate an agency to control, monitor and coordinate 406 MHz radio beacon coding, registration and database:

Name of the agency	
Mailing address	
Phone	
Fax	
Mobile	
E-mail	
Any other contacts	
Name of Contact person and designation	
Contact details (phone, FAX, E-mail)	





18. Details of National Rescue Coordination Centres (Identify prime RCC, which would serve as nodal RCC for receiving Cospas-Sarsat alerts:

Note: Please include separate table for each RCC

Name of the RCC	
Agency and Mailing address	
Phone	
Fax	
AFTN	
X.25	
Mobile	
E-mail	
Availability/Access to Internet	
Capability to receive alert data through FTP-Internet	
Web-site address (if available)	
Any other contacts	
Is the RCC is prime for receiving Cospas-Sarsat alert?	
Name of Contact person	
Designation	
Contact details (phone, FAX, E-mail)	
You may include any additional information if you wish	
Detailed description of RCC (facilities and mode of operations)	

19. Rough estimate of the Cospas-Sarsat radio beacons:

	ELTs on aircraft		EPIRBs on ships		PLBs used by individual/ pilots	
	121.5 MHz	406 MHz	121.5 MHz	406 MHz	121.5 MHz	406 MHz
In use						
By 2005						
By 2008						





ANNEXURE-6

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