United Nations

General Assembly

A/AC.105/783

Distr.: General
9 September 2002

Original: English

**Committee on the Peaceful
  Uses of Outer Space**

Report on the United Nations/India Workshop on Satellite-Aided Search and Rescue

(Bangalore, India, 18-22 March 2002)

Contents

I. Introduction

A. Background and objectives

1. The International Satellite System for Search and Rescue (Cospas-Sarsat) is a satellite and ground system designed to provide distress alert and location information from emergency beacons to assist search and rescue (SAR) operations on land, at sea or in the air. Founded in the late 1970s by Canada, France, the Union of Soviet Socialist Republics and the United States of America, the system started operating on 1 September 1982. Since then, it has helped save over 13,000 lives worldwide and that number continues to grow by about 100 each month. It is expected that the number of worldwide rescues for 2001 will total about 1,100-1,200 once data are available from the reports submitted to the Cospas-Sarsat secretariat. 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 the programme, including the four parties to the international Cospas-Sarsat programme agreement, which provide and operate the space segment of the system.

2. The countries that now help operate the Cospas-Sarsat System will join its founders in celebrating its 20-year anniversary at the Cospas-Sarsat Council meetings in 2002. The importance of the System is continuing to grow as the number of countries joining the System to gain access to the advantages and benefits that it provides continues to rise.

3. With the use of state-of-the-art space technology services, SAR is receiving worldwide attention. Most of the "space-faring" nations, including India, have included it as one of their important programme elements. The Cospas-Sarsat System 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.

4. The System comprises:

   (a) A space segment operating in low-Earth orbit (LEO) and geostationary orbit (GEO);

   (b) A ground segment, consisting of satellite receiving stations, known as local user terminals (LUT) and data distribution centres, known as mission control centres (MCC);

   (c) Emergency radio beacons operating at 121.5 megahertz (MHz), 243 MHz and/or 406 MHz, the characteristics of which comply with provisions of the International Telecommunication Union and Cospas-Sarsat specifications.

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

5. For the last 12 years, the Indian Space Research Organization (ISRO) has been providing operational SAR alerting services to national and international users within the framework of the Cospas-Sarsat programme. With the implementation of mandatory international regulations for marine vessels and aircraft, the number of

users of the system is growing rapidly. Apart from ground system support, ISRO also provides a geostationary space segment (on the Insat-2B satellite), which is one of the important components of the Cospas-Sarsat System. The Organization will equip payloads of its next generation of geostationary communications satellites, Insat-3A and Insat-3D, with exclusive transponders for SAR operations. The Indian SAR hub station in Bangalore is linked to the four national rescue coordination centres at Chennai, Delhi, Kolkata and Mumbai, which in turn alert the national coast guard, navy or air force.

6.   The Indian SAR system has helped in 34 rescue incidents and saved 1,313 people over the last 10 years. The latest rescues were of two British schoolgirls on a Himalayan expedition in July 2001 and the crew of a Singapore oil tanker, which sank after an explosion.

7.   In India, the System is used mostly in ships and helicopters. It is a matter of concern to India, where disasters and emergencies strike often, that it has only 13,000 of the nearly 900,000 beacon users in the world. The reason for that situation is the present cost of a beacon, around 50,000 rupees. For a more widespread use of the beacons, their cost should come down by at least a factor of five. If mobile phones, which use a similar mechanism, cost as little as 1,000 rupees, the beacons could also be made affordable.

8.   In addition to India's national users, the Indian service area has a large base that includes seven neighbouring countries, Bangladesh, Bhutan, Maldives, Nepal, Seychelles, Sri Lanka and the United Republic of Tanzania. Those countries use the ISRO system for SAR alerting services with no financial commitment towards the operations and maintenance of the system. To enable them to benefit appropriately from the services, there was an urgent need for capacity-building in terms of education, training and policy-making.

9.   Improving use of the Cospas-Sarsat System was the key topic of the United Nations/India Workshop on Satellite-Aided Search and Rescue, held in Bangalore, India, from 18 to 22 March 2002 under the joint sponsorship of the Office for Outer Space Affairs of the Secretariat and ISRO. The prime objective of the Workshop was to promote awareness of the Cospas-Sarsat System and to establish a formal interface with user countries in the Indian Mission Control Centre service area with a view to building better understanding and coordination of the programme activities and operations. Representatives of various governmental institutions and private industry from developed and developing countries of the region of Asia and the Pacific were briefed on the practical and cost-effective space-based solutions currently available from the Cospas-Sarsat System.

10.   The Workshop was organized to provide countries within the footprint of the Cospas-Sarsat satellite receiving station in Bangalore with an opportunity to gain the necessary knowledge to enable them to lead their national authorities into action and to ensure their participation in the Cospas-Sarsat programme. The Workshop exposed participants to Cospas-Sarsat operations, including the procedure for distribution of alert signals, once they are received at the Bangalore station.

B. Programme

11. The Workshop was inaugurated by V. K. Aatre, Scientific Adviser to the Minister of Defence of India. The Director of the ISRO Satellite Communication Programme Office, K. N. Shankara, welcomed the participants and briefed them about satellite-aided SAR activities in India. The representative of the Office for Outer Space Affairs highlighted various activities supported by the Office, in particular as regards the use of space technology. The Director of the ISRO Satellite Centre, P. S. Goel, focused on the affordability of SAR technology to the end-user and requested the media to create awareness among the user community in the country and in the region as a whole. A message from the Chairman of ISRO, K. Kasturirangan, highlighting the importance of satellite-aided SAR services and the commitment of ISRO in that area was delivered by the Director of the ISRO Telemetry, Tracking and Command Network (ISTRAC), S. K. Shivakumar. The head of the Cospas-Sarsat secretariat, Daniel Levesque, presented the contribution made by Cospas-Sarsat in general and India in particular towards the development of the programme. In his keynote address the Director-General of the Indian Coast Guard, O. P. Bansal, emphasized the importance of SAR services and the role of the Indian Coast Guard.

12. The Workshop was divided into 13 sessions and was supported by 15 speakers from India and abroad. In addition, nine reports on the status of Cospas-Sarsat usage in the countries of the Bangalore hub station footprint were presented. The 12 technical sessions of the Workshop covered the following topics: the 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; and future System developments. The final session of the Workshop was devoted to observations and recommendations. The actual operation of the System was demonstrated for participants at the Indian Satellite Tracking Centre and an exhibition organized alongside the Workshop demonstrated various types of SAR-oriented equipment to participants and other visitors.

13. Representatives of each participating country submitted a national report providing highlights of SAR operations and activities in their country. To assess the overall outcome of the Workshop, a feedback form was designed for submission by each individual participant.

14. The technical documentation provided by speakers was compiled in a hardbound file as well as on CD-ROM and distributed to participants, together with promotional material provided by ISRO and the Cospas-Sarsat secretariat. The proceedings of the Workshop are also accessible on the ISRO web site (www.istrac.org/inmcc), with a link to the web site of the Office for Outer Space Affairs (www.unvienna.org/OOSA), with free access to the international community.

C. Attendance

15. Participants held senior managerial positions with decision-making authority in national institutions related to navigational security and SAR operations. Around 125 participants from the following countries and international organizations attended the Workshop: Bangladesh, India, Madagascar, Maldives, Mauritius, Nepal, Saudi Arabia, Seychelles, Singapore, Sri Lanka, Spain, United Republic of Tanzania and United States of America; Office for Outer Space Affairs and Cospas-Sarsat. Indian participants were from Indian user agencies such as airport authorities, the Coast Guard, shipping and defence authorities and ISRO.

16. Within the limited financial resources available to the co-sponsors (the Office for Outer Space Affairs and ISRO), 12 selected participants from developing countries were offered financial support to attend the Workshop. Funded participants were provided with a round-trip air ticket and room and board expenses for the duration of the Workshop by the Office for Outer Space Affairs. ISRO provided organizational and technical support, local hospitality and logistic arrangements.

II. Summary of proceedings

A. Observations

17. The experts and participants made the following observations during the Workshop:

(a) The user countries understood the Cospas-Sarsat System, with its interfaces, requirements and protocols, well enough to use the SAR alerting information efficiently;

(b) Appropriate contacts had been established for distribution of information and coordination of follow-up;

(c) The national reports provided an opportunity to learn how SAR operations were organized in participants' countries and what needed to be done to strengthen such activities further;

(d) The Workshop provided an opportunity to develop stronger regional cooperation, without which SAR activities were not possible;

(e) Direct exchange of information among user countries was a valuable step towards organizing and restructuring the operations and activities of the participating countries;

(f) The Workshop provided an opportunity to develop closer interaction between representatives of ISRO and Cospas-Sarsat, which would assist in planning future development of the space system and would enhance cooperation through greater participation in programme activities;

(g) The interaction between representatives of the Office for Outer Space Affairs and Cospas-Sarsat benefited both in terms of understanding priorities and planning future action to promote programme activities in other parts of the world.

B. Recommendations

18.   Those present at the Workshop made the following recommendations:

(a)   There should be follow-up to the Workshop to assess and further improve upon Cospas-Sarsat operations in the region. Participants might consider hosting such follow-up meetings in their respective countries. The Office for Outer Space Affairs was requested to organize national-level awareness programmes in coordination with local authorities. The Office might consider providing experts for such awareness programmes at the national level as a follow-up activity;

(b)   The three-tier structure of the Workshop in terms of technical presentations was considered adequate and should be maintained in future similar events, to include:

(i)   General presentations on the Cospas-Sarsat System and programme, including basics on satellites;

(ii)   Presentations on practical aspects of using the System (alert messages, beacon registration, etc.);

(iii) Presentations by participants on their own SAR organization and preparedness to accept Cospas-Sarsat alert data;

(c)   Beacon registration is a very important aspect of the System. As was pointed out during a technical presentation, 70 per cent of false alarms were resolved with the help of registration database information. It was thus necessary to implement registration of 406 MHz beacons at the national level and that information should be made available to the Indian Mission Control Centre and SAR agencies when needed. In addition, beacon carriage requirements should be developed nationally and periodic monitoring and testing of the emergency locator transmitters and emergency position-indicating radio beacons for nominal performance should be carried out in each country;

(d)   The participants recognized the urgent need for low-cost beacons for users such as fishermen who could afford 406 MHz beacons at their current retail prices. It was recommended that Cospas-Sarsat continue its efforts to lower the cost of 406 MHz beacons;

(e)   Awareness of the Cospas-Sarsat programme was considered generally insufficient. An awareness and promotional programme should therefore be set up to allow more users worldwide to benefit from the System and to encourage countries to participate in its humanitarian programme;

(f)   The representatives of Cospas-Sarsat identified the following regions for possible future workshops on satellite-aided SAR and requested that the Office for Outer Space Affairs to consider supporting such workshops: Central America and the Caribbean; the Middle East; South-East Asia; and Southern Africa;

(g)   The National Oceanic and Atmospheric Administration of the United States proposed to organize, with the Office for Outer Space Affairs, a similar workshop on the use of the Cospas-Sarsat System for the benefit of the countries of Central America at its Mission Control Center in Miami, Florida (United Sates), in 2003;

(h)   The Office for Outer Space Affairs and Indian Space Research Organization would consider cooperation in organizing such workshops in future.

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