International Civil Aviation Organization

The Second Meeting of the ICAO Asia/Pacific Search and Rescue Task Force (APSAR/TF/2)

Singapore, 27 – 30 January 2014

Agenda Item 3: Global update

COSPAS-SARSAT STATUS REPORT AND OPERATIONAL STATISTICS

(Presented by INTERNATIONAL COSPAS-SARSAT PROGRAMME)

SUMMARY

This paper presents the current status of the Cospas-Sarsat System and provides statistics on System performance and the performance of users of the System, including System operations, space and ground segments, beacons, false alerts and results of MCC-SPOC communication tests.

This paper relates to search-and-rescue.

Strategic Objectives:

A: ***Safety*** *– Enhance global civil aviation safety*

1. SYSTEM OPERATION

Summary

1.1 In 2012, based on preliminary information, Cospas-Sarsat alert data assisted in 634 distress incidents (644 in 2011) and 2,029 persons were rescued (2,313 in 2011). Since September 1982, the Cospas-Sarsat System has provided assistance in rescuing at least 35,055 persons in 9,665 SAR events.

1.2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2012 is presented in **Figure 1** and the distribution of all SAR events (maritime, aviation and PLB) for the period from January to December 2012 is shown at **Figure 2**. The use of PLBs increased from 28% of the total SAR events in 2011 to 30% in 2012. Participants often provide recent SAR cases supported by Cospas-Sarsat for publication on the Cospas-Sarsat Facebook page; ICAO APSAR participants are invited to monitor this page.

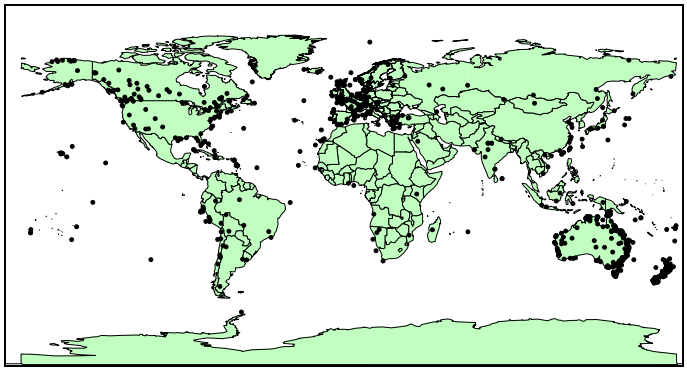

Figure 1: Geographic Distribution of SAR Events

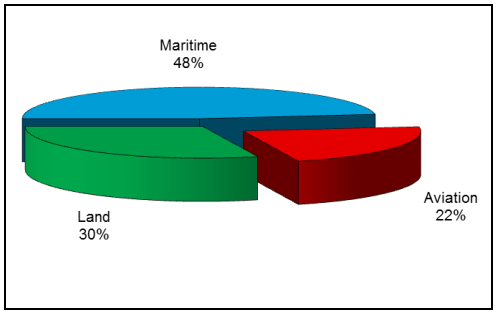

Figure 2: Type of SAR Events (2012)

1.3 **Figure 3** shows the number of SAR events and persons rescued with the assistance of Cospas-Sarsat alert data for the period from January 1994 to December 2012.

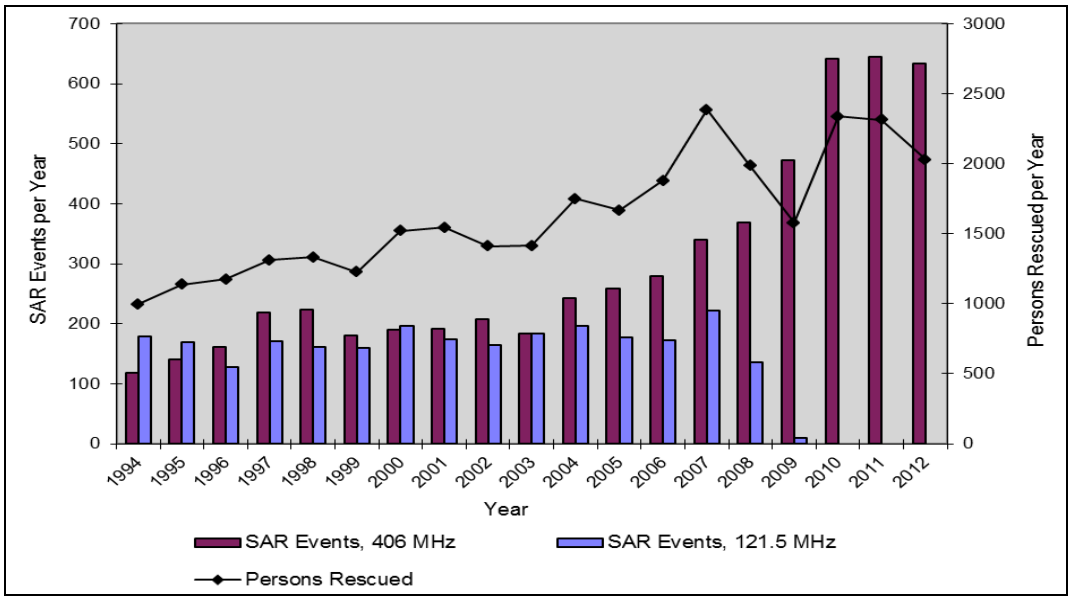

Figure 3: SAR Events/Persons Rescued with Cospas-Sarsat Alert Assistance (1994 – 2012)

False Alerts

1.4 Based on the data provided by Participants, Cospas-Sarsat calculates two false alert rates, identified for convenience as the "SAR false alert rate" and the "beacon false alert rate". The SAR false alert rate, which characterises the impact of false alerts on SAR services, is the percentage of false alerts plus undetermined alerts (no person in distress found; no beacon found) over the total number of alerts transmitted to SAR authorities. Table 1 below shows the evolution of the false alert rate computed from a SAR perspective. Table 2 below shows the evolution of the 406 MHz beacon false alert rate (ratio of false plus undetermined alerts over the beacon population) since 2008. In 2012, the false alert rate was 96%, i.e. about one real alert in 25 alerts received.

Year	Rate
2008	96.0%
2009	96.7%
2010	95.3%
2011	96.3%
2012	96.0%

Table 1: SAR False Alert Rate

Year	EPIRBs	ELTs	PLBs
2008	1.2%	8.0%	0.9%
2009	1.2%	8.5%	0.6%
2010	1.2%	8.4%	0.6%
2011	1.1%	5.3%	0.6%
2012	0.9%	4.9%	0.4%

Table 2: 406 MHz Beacon False Alert Rate

Performance Measurement: Cospas-Sarsat Assisted SAR Events

1.5 As part of its Quality Management System, and to meet the goals and objectives of its strategic plan, Cospas-Sarsat developed a set of performance measures. Because the purpose of Cospas-Sarsat is to assist in the saving of lives, a performance measure of the evolution of the number of SAR events annually where Cospas-Sarsat assisted and provided the only alert was developed to evaluate the relevance of the System.

1.6 **Figure 4** provides twenty years of data and clearly indicates the continued relevance of the Cospas-Sarsat System, even though SAR services have noted an increasing number of alerts are originating through other means of communication.

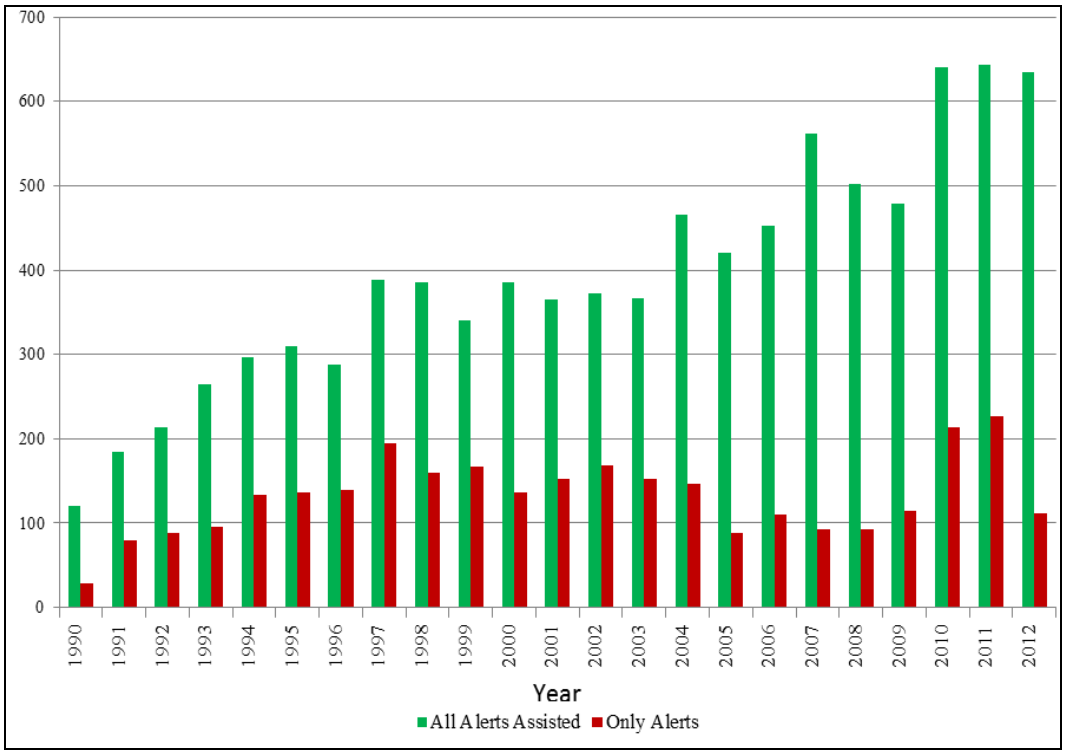

Figure 4: Annual SAR Events where Cospas-Sarsat Assisted or Alerted (1990 – 2012)

2. 406 MHZ BEACONS

Population

2.1 Based on information received from manufacturers on beacon production and a standard assumption made about beacons removed from the market at the end of an assumed ten-year service life, there were approximately 1,315,000 406 MHz beacons in use worldwide at the end of 2012, up 9.5% from 2011. The production of beacons capable of acquiring position data from radio navigation satellites (such as GPS and Glonass) and encoding this position information into the transmitted alert data ("location protocol beacons") increased marginally from 56.4% in 2011 to 61.4% in 2012. A new performance measure was instituted by Cospas-Sarsat in 2009, "percentage of detected beacons that are registered". This data is shown in **Table 3**.

Year	EPIRB		ELT		PLB		Totals	
	Beacons registered / Number of detections	%	Beacons registered / Number of detections	%	Beacons registered / Number of detections	%	Beacons registered / Number of detections	%
2009	4221 / 5619	75.2	5244 / 8724	60.1	604 / 751	74.8	10321 / 15478	66.7
2010	4,911 / 6,624	74.1	6,147 / 9,438	65.1	773 / 977	79.1	11,831 / 17,039	69.4
2011	4,879 / 6,264	77.9	6,631 / 10,102	65.6	699 / 909	76.9	13,000 / 18,325	70.9
2012	5,383 / 6,699	80.4	6,616 / 10,056	65.8	952 / 1,242	76.6	12,957 / 18,003	72.0

Table 3: Percentage of Detected Beacons that were Registered (2009 - 2012)

Beacon Registration

2.2 Cospas-Sarsat operates the International 406 MHz Beacon Registration Database (IBRD, www.406registration.com) which is freely available to users with no access to national registration facilities. By allowing their beacon users to register beacons in the IBRD, Administrations help to facilitate proper registration by beacon owners while avoiding administrative costs and inconvenience to their governments. Administrations may also avail themselves of the facility to upload their national beacon registration data to the IBRD to ensure that it is available 24/7 to other SAR services when they receive alerts from active beacons in their SAR area of responsibility. As at 1 August 2013, there were 38,991 beacons registered in the IBRD (30,928 at 1 August 2012) from 118 Administrations. On average 375 SAR users per month log into the IBRD to search for beacon registration information.

Change in Statistical Methodology

2.3 In 2011 a new method of estimating total beacon population was adopted:

Registered beacon population / Registration rate (%) x 100 = Total Beacon Population, where Registration Rate = Number of Detections / Number of Detected Beacons that are Registered.

2.4 This new methodology particularly affected the ELT population, where division of the registered population by the low registration rate shown in some cases for ELTs resulted in a large increase in the beacon population. In 2012, very low registration rates (those calculated to be less than 40%) were replaced with a standard registration rate of 70%, when other data did not indicate the real registration rate was very low. These changes in calculation of ELT population had a significant impact on the ELT false alert rate; however, the ELT false alert rate remains much higher than that of other beacon types.

3. THE OPERATIONAL LEOSAR AND GEOSAR SYSTEMS

3.1 As of 1 August 2013, six LEOSAR spacecraft were in operation: Sarsat-7, Sarsat-8, Sarsat-10, Sarsat-11, Sarsat-12 and Sarsat-13. Sarsat-13 (Metop-B) was launched on 17 September 2012. Planned LEOSAR launches include the Russian Cospas-13 and Cospas-14 in 2015 and 2017 respectively, and the USA's planned launch of Polar Free Flyer 1 in August 2016.

3.2 For the GEOSAR space segment, the geostationary satellite MSG-3 (Meteosat-10 of Eumetsat) was launched on 5 July 2012 and its SAR payload is currently operating at IOC at position 0º. The SAR payload of EUMETSAT's MSG-2 operated at 0º until 21 January 2013, then was reactivated at 9.5ºE on 31 January 2013. MSG-1 (Meteosat-8) was switched off on 31 January 2013. The USA operated the geostationary satellites GOES-15 (West) at a location of 135º W and GOES-13 (East) at a location of 75º W. The Indian communication satellite INSAT-3A was operational at 93.5ºE longitude and new satellite INSAT-3D was launched to position 83.5°E on 26 July 2013. The Russian geostationary satellites Electro-L1 (at full operational configuration – FOC) and Louch-5A (under test, New Zealand investigating tracking possibilities) operated at positions 76ºE and 167ºE respectively. Russia plans to launch geostationary satellites Electro-L2 in 2013 and Louch-5V in 2014. The GEOSAR constellation will be maintained with the anticipated launch of MSG-4 (2015), GOES-R (2015) and GOES-S (2016).

3.3 As at 1 December 2013, 58 LEOLUTs, 22 GEOLUTs and 31 MCCs were in operation.

4. SPOC COMMUNICATION TESTS

4.1 Search-and-rescue Points of Contact (SPOCs) are the unique point of contact within a government for the delivery of distress alerts 24 hours a day, seven days a week. SPOCs receive their distress alert data from a supporting Cospas-Sarsat Mission Control Centre (MCC), which may be hosted by a different government. To ensure that MCCs have the correct contact data for the SPOCs that they support, and to ensure that SPOCs react with appropriate urgency to alerts (that may involve an imminent threat to human life), periodic tests are conducted, usually on a monthly basis. These tests require that the SPOC respond to the test transmission with human intervention (not merely a machine-generated acknowledgement). In some cases the test transmissions have revealed very poor responses to what may be a life-threatening situation.

4.2 As a result of actions taken to address the matter of non-responsive SPOCs, Cospas-Sarsat started the regular testing in 2008. IMO's COMSAR 13 requested Cospas-Sarsat to report on these MCC/SPOC communication tests. The following information is a summary of results for the period October 2008 to August 2013. For that period, 20 of 31 operational MCCs reported results of MCC/SPOC communication tests results (some MCCs do not support SPOCs outside of their country and therefore are not required to conduct these tests). A total of 9,599 unique tests have been conducted to date.

	% (2013)	% (2013)	% (2012)	% (2011)	% (2010)
Number of SPOCs tested by MCCs	161/236	68.2			
Non-responsive SPOCs (no acknowledgements)	14	8.7	10.1%	10.0%	7.8%
SPOCs with less than 20% successful tests	10	6.2	4.7%	6.8%	10.3%
SPOCs with successful tests between 20% and 50%	13	8.1	9.5%	7.5%	7.2%

Table 4: SPOC Communication Test Results (2010 - 2013)

4.3 For the purpose of these statistics, a success means that the requested positive feedback (not an automatic acknowledgement) was received from the SPOC. Non-responsive SPOCs were those SPOCs which did not provide any response. When available, several communication links (e.g., AFTN, Fax, Phone, E-mail, FTP, Telex, X.25) were tested each month. In many cases, each available link was tested separately and counted as a unique test. The list of non-responsive SPOCs is provided in **Table 5** below.

Non-Responsive SPOCs (No response to tests)	**Rarely Responsive SPOCs** (Less than 20% successful tests)	**SPOCs with Low Success Ratio** (Between 20 and 50% successful tests)
Guinea (Republic of)	Angola	Ascension Island
Guinea-Bissau	Benin	Colombia
Sao Tome and Principe	Cameroon	Democratic Rep of the Congo
Tajikistan	Central African Republic	Dominican Republic
	Congo (Republic of the)	FYROM
	Cape Verde	Ecuador
	Côte d'Ivoire	Ethiopia
	Equatorial Guinea	Gambia
	Gabonese Republic	Honduras
	Ghana	Iraq
	Hungary	Kenya
	Liberia	Lesotho

	Mali Mauritania Mongolia Namibia Senegal Sierra Leone	Liberia Malawi Mexico Panama Swaziland Zimbabwe
Non-Responsive SPOCs (No response to tests)	**Rarely Responsive SPOCs** (Less than 20% successful tests)	**SPOCs with Low Success Ratio** (Between 20 and 50% successful tests)
	Sudan (Republic of the) Togolese Rep. Turkmenistan Zambia	

Table 5: 2013 List of Non-Responsive SPOCs

4.4 14 Available results clearly show that about 25% of all tested SPOCs remain insufficiently responsive or non-responsive. The majority of less responsive SPOCs are found in the African region. Ecuador and Gambia seem to have improved their response rates and are no longer listed as non- or rarely-responsive, though both remain on the list of SPOCs with a low success ratio.

4.5 15 The Cospas-Sarsat Secretariat submitted to COMSAR 16 the document COMSAR 16/5/2 on the status of the Cospas-Sarsat Programme, including a request for consideration of the matter of possible actions to be taken in the case of SPOCs non-responsive to communications tests. The COMSAR 16 Report to the Maritime Safety Committee (MSC) included the conclusions that there was unanimous support by COMSAR 16's SAR Working Group for advising Cospas-Sarsat to continue with the SPOC communications-test programme as it indicated the weaknesses in SAR service capabilities in some countries and/or regions. COMSAR 16 reported that several options existed to encourage Administrations of countries with low response rates to ensure a higher response rate to Cospas-Sarsat test calls. The MSC was invited by COMSAR 16 to remind Member States with a low response rate of the importance of a reliable test-call response by their SPOCs, and the MSC was requested to inform the IMO's Technical Co-operation Committee of the perceived need by some countries for capacity building and technical assistance to help ensure timely response of their SPOCs upon receiving distress alerts. The Secretariat provided SPOC communication test results to IMO in document COMSAR 17/5/3. Unfortunately, the matter was not discussed at the COMSAR 17.

5. ACTION BY THE MEETING

5.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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