



ICAO

International Civil Aviation Organization

Fifth Meeting of the Asia/Pacific Regional Search and Rescue Working Group (APSARWG/5)

Video Teleconference, 09 – 11 June 2020

**Agenda Item 4: Asia/Pacific and inter-regional SAR planning, coordination and cooperation**

- *Cospas-Sarsat Q and A session (e.g.: reporting false alerts)*

**STATUS OF THE COSPAS-SARSAT PROGRAMME**

(Presented by Cospas-Sarsat)

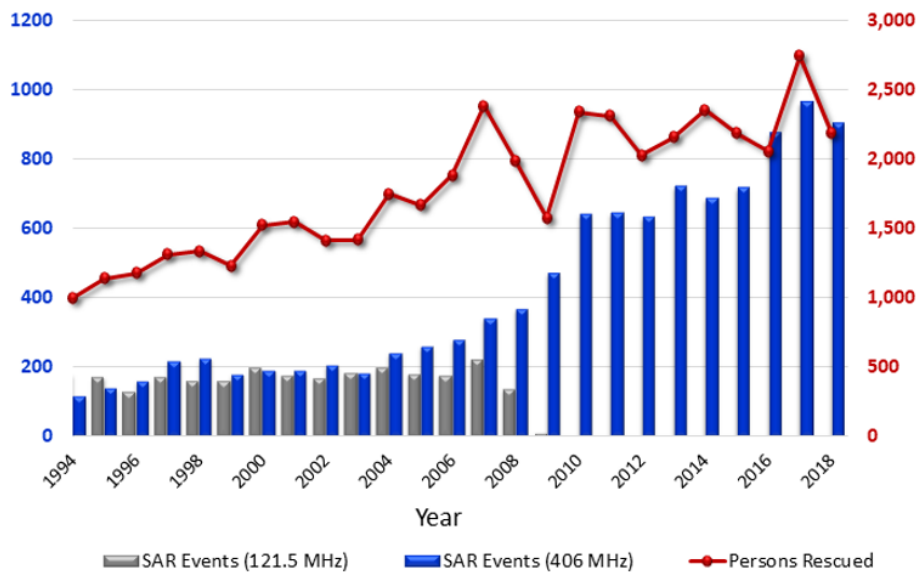
**SUMMARY**

This paper presents provides a status report on the Cospas-Sarsat System, including System operations, significant developments, space and ground segments, beacons, false alerts, reporting by RCCs on use of the distress alert data provided and results of MCC-SPOC communication tests, and seeks APSAR views on these matters.

**1. INTRODUCTION**

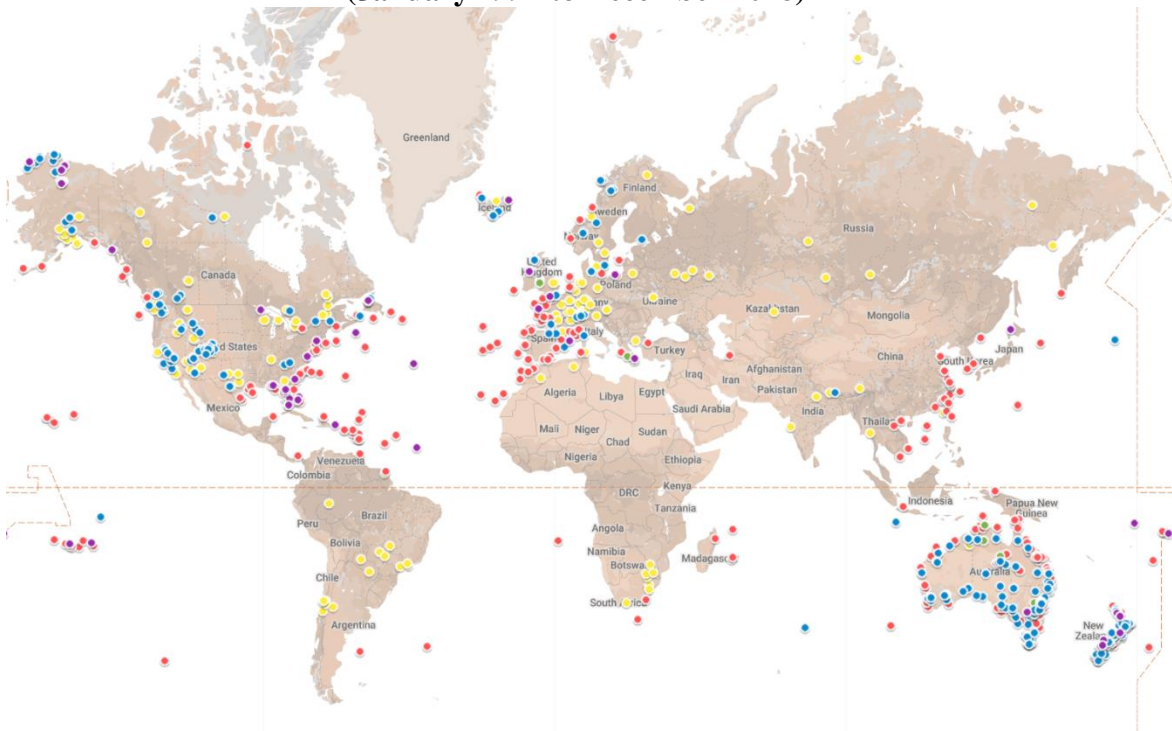
1.1 In 2018, based on preliminary information, Cospas-Sarsat alert data assisted in 904 distress incidents (934 in 2017) and 2,185 persons were rescued (2,554 in 2017). Since September 1982, the Cospas-Sarsat System has provided assistance in rescuing at least 48,738 persons in 14,531 SAR events (**Figure 1**).

1.2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2018 is presented in Figure 2 and the distribution of all SAR events (maritime, aviation and PLB) for the period from January to December 2018 is shown at Figure 3. Participants often provide synopses of recent SAR cases supported by Cospas-Sarsat for publication on the Cospas-Sarsat webpage and Facebook page. APSAR participants are invited to monitor this page and contribute to it by sending stories to mail@406.org.



**Figure 1: Steady Growth and Exponential Success**

### Number of SAR Events with the Assistance of Cospas-Sarsat Alert Data (January 1994 to December 2018)



**Figure 2:** 2018 Geographic Distribution of SAR Events  
Legend: ELTs (yellow), EPIRBs(red), Land PLBs (blue), Aviation PLBs (green),  
Maritime PLBs (purple)



**Figure 3:** 2018 Type of SAR Events and Persons Rescued  
(Aviation 17%, Land 42%, Maritime 41%)

## 2. SYSTEM STATUS

### False Alert Rates

2.1 Based on the data provided by Participants, Cospas-Sarsat calculates two false alert rates, distinguished 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 SAR 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 estimated beacon population) since 2014. In 2018, the SAR false alert rate was 96.85%, i.e. about one real alert confirmed in 32 alerts received.

Year	Rate
2014	96.5%
2015	96.3%
2016	96.7%
2017	96.8%
2018	96.8%

**Table 1:** SAR False Alert Rate

Year	EPIRBs	ELTs	PLBs	ALL
2014	0.8%	4.5%	0.4%	1.2%
2015	0.7%	4.2%	0.4%	1.1%
2016	0.8%	4.2%	0.4%	1.1%
2017	0.9%	4.4%	0.4%	1.3%
2018	1.0%	4.3%	0.4%	1.3%

**Table 2:** 406 MHz Beacon False Alert Rate

### 406 MHz Beacon Population

2.2 Based on estimates made by Administrations using a formula based on beacons registered, modified by a calculated registration rate, there were about 2.2 million (2,249,273) beacons operating at 406 MHz in use worldwide at the end of 2018, an increase of about 7% over that reported in 2017 (2,104,989).

2.3 Based on an annual survey of beacon manufacturers, the ratio of production of beacons capable of acquiring position data from GNSS satellites (such as GPS, Glonass and Galileo) and encoding this position information into the transmitted alert data (“location protocol beacons”) increased to 87.4% in 2018 (65.4% in 2017, 74% in 2016, and 70.5% in 2015). We now estimate that about 63% of beacons deployed globally are coded with location protocols that report the location in the message. Additionally, Cospas-Sarsat calculates the location independently (by trilateration) for all received beacon signals, including from beacons without an encoded location, thereby providing location data for beacons without a GNSS position report, and location-data redundancy for those that do.

### Beacon Registration

2.4 A performance measure instituted by Cospas-Sarsat in 2009 assesses “percentage of detected beacons that are registered” using data collected from Participants. This data is shown in Table 3.

Year	EPIRB		ELT		PLB		Totals	
	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)
2014	4,933 / 6,414	76.9	7,007 / 10,451	67.0	1,179 / 1,582	74.5	13,119 / 18,447	71.1
2015	5,672 / 7,412	76.5	7,606 / 11,276	67.5	1,363 / 1,907	71.5	14,641 / 20,595	71.1

Year	EPIRB		ELT		PLB		Totals	
	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percent (%)
2016	5,875 / 7,446	78.9	7,778 / 11,356	68.5	1,629 / 2,157	75.5	15,282 / 20,959	72.9
2017	7,515 / 9,489	79.2	9,266 / 13,236	70.0	2,119 / 2,829	74.9	18,900 / 25,554	74.0
2018	7,885 / 9,619	82.0	9,462 / 13,504	70.1	2,064 / 2,733	75.5	19,411 / 25,856	75.1

**Table 3:** Percentage of Detected Beacons that are Registered (2014 - 2018)

2.5 Cospas-Sarsat operates the International 406 MHz Beacon Registration Database (IBRD, <https://406registration.com/>) which is freely available to users residing in nations that do not provide their own 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. The IBRD is available for 406-MHz beacon registration for 165 Administrations (national and territorial). As at 10 October 2019, there were 82,704 beacons registered in the IBRD (77,869 at 1 September 2018) from 148 Administrations (new in 2019 was Nauru). In 2018, there were, on average, 513 logins to the IBRD by SAR services. In 2019, the average SAR logins per month (Jan thru Sept) increased to 562. This consistently growing registration rate is a positive trend, due in part to efforts of the Cospas-Sarsat Programme to more widely publicize the benefits of beacon ownership and the importance of registration, both through “save” event reporting on its website and through a growing suite of on-line videos illustrating how the System works..

2.6 Cospas-Sarsat is in the process of redesigning the IBRD user interface. The user interface will be easier to understand and navigate, will provide better support for new technologies, such as “second generation beacons” (SGBs) and the Return Link Service (RLS) functionality that provides confirmation to a user that their beacon distress signal has been successfully received. The new IBRD should be available online in 2020.

### The System

2.7 Cospas-Sarsat relies on three satellite-constellation types: the original low-altitude Earth orbiting satellites (LEO); geostationary Earth orbiting satellites (GEO); and the newest-technology payloads aboard medium-altitude Earth orbiting satellites (MEO). As of 10 October 2019, five LEOSAR and eight GEOSAR spacecraft were in operation, supported by 55 LEOLUT and 26 GEOLUT earth stations, and 31 mission control centres (MCCs) (Figure 4), that route distress alerts received by the earth stations. The Nigerian ground segment is currently not operational, and Nigeria is supported as a SPOC of the Spanish MCC. New ground segment equipment in Cyprus and Malaysia is currently under development. In 2019, Qatar and the United Kingdom commissioned MEOSAR-capable MCCs, joining Australia, France, Norway, Spain and the USA as having the capability to process alerts from the newest Cospas-Sarsat satellite payloads.



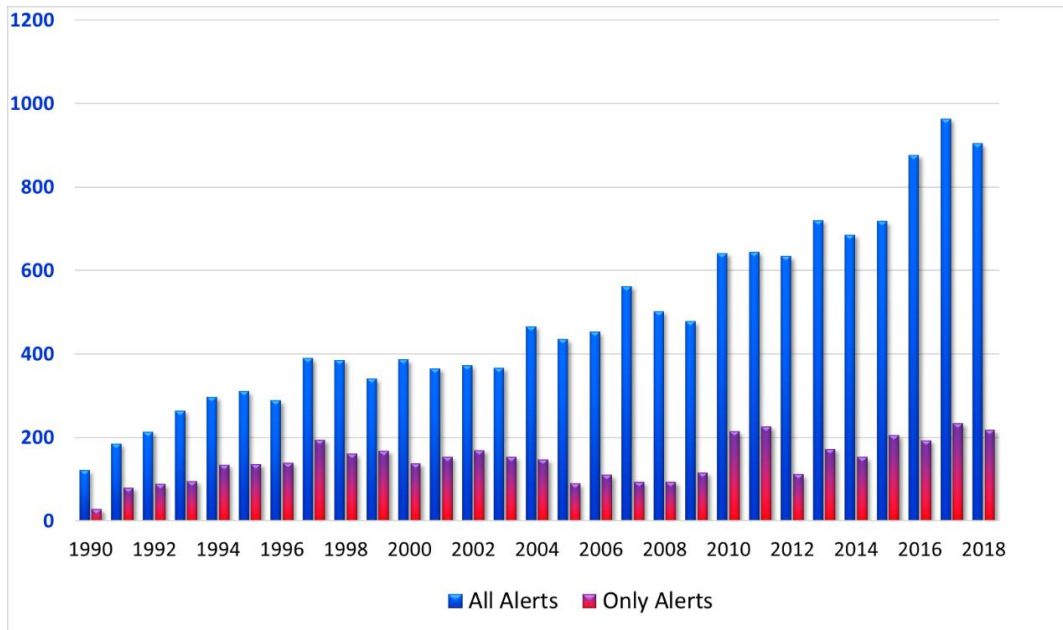
**Figure 4.** Locations of Commissioned Mission Control Centres

2.8 The MEOSAR system was declared at the early operational capability (EOC) phase in December 2016 and its space segment currently comprises 22 fully operational “Galileo” satellites provided by the European Commission (+4 at initial operational capability) and 19 “GPS” satellites (with S-band downlinks) provided by the United States. Two Russian “Glonass” satellites are available for test and development. The full MEOSAR constellation will comprise more than 70 satellites. The MEOSAR system is currently supported by the five commissioned MEOSAR-capable MCCs (in Australia, France, Norway, Spain and the USA). Seventeen MEOLUT earth stations (capable collectively of tracking up to 281 satellites) are commissioned at EOC, and at least 20 more MEOLUTs (with multiple antennas each) are planned for between 2018 and 2020.

2.9 Full details of the operational space and ground segments are available on the Cospas-Sarsat website ([406.org](http://406.org)).

Performance Measurement: Cospas-Sarsat Assisted SAR Events

2.10 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 or provided the only alert was developed to evaluate the relevance of the System. Figure 5 provides twenty-five years of data and clearly indicates the continued relevance of the Cospas-Sarsat System. It is important to note that these statistics significantly undercount the instances when Cospas-Sarsat contributed to saving one or more lives, because the Programme only tabulates cases when a reliable report has been received back through reporting channels from rescuers on the scene. (See paragraph 2.15)



**Figure 5:** Annual Number of SAR Events where Cospas-Sarsat Assisted or Provided the Only Alert (1990 - 2018)

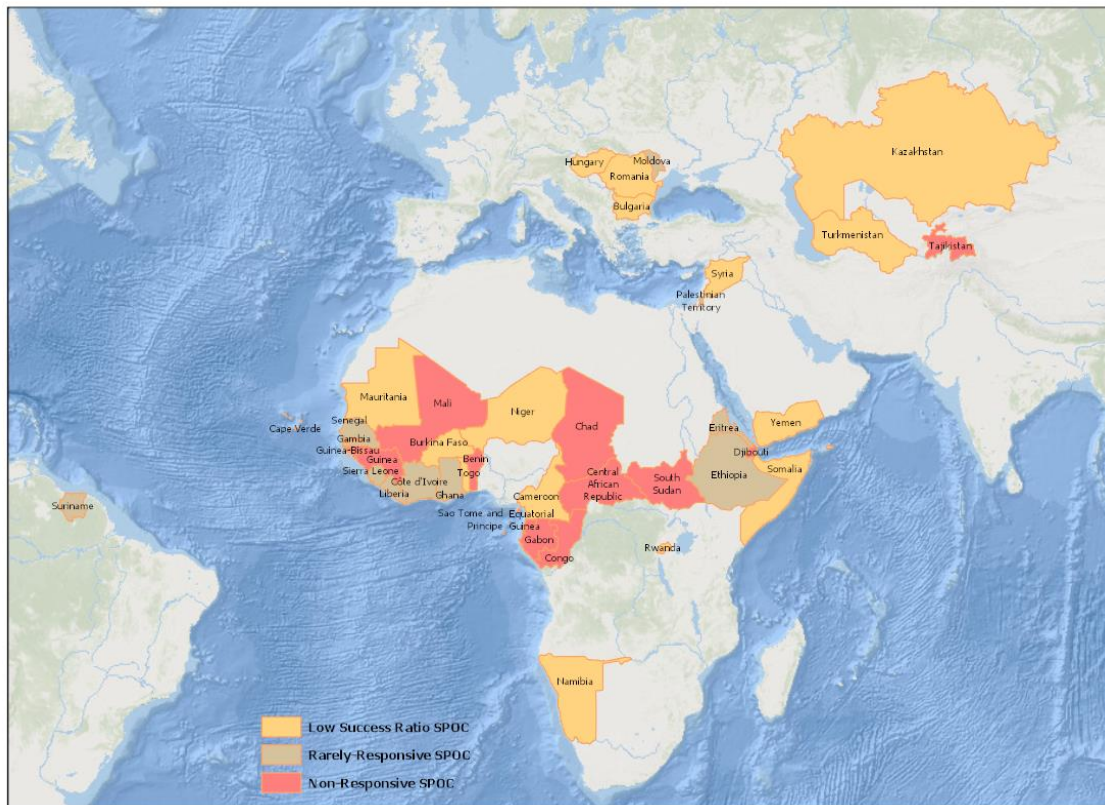
SPOC Communication

2.11 As a result of actions taken to address the matter of non-responsive SPOCs, Cospas-Sarsat started in 2008 regular testing of MCC/SPOC communications. COMSAR 13 requested Cospas-Sarsat to report on these MCC/SPOC communication tests. The following information is a summary of results for the period 2014-2018. For that period, 22 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). In 2018, the last year for which there is complete data, 2,860 unique tests were conducted and a total of 25,005 unique tests have been conducted for the entire test period.

	2014	2015	2016	2017	Number 2018	Percent 2018
Number of SPOCs tested by MCCs	152	157	163	157	154	
Non-responsive SPOCs (no response to tests)	12.5%	12.1%	7.98%	11.46%	13	8.44%
Rarely-responsive SPOCs (less than 20% successful tests)	3.9%	4.46%	7.36%	8.28%	10	6.50%
SPOCs with low success ratio (between 20 and 50% successful tests)	9.2%	7.0%	7.98%	5.09%	16	10.39%
<b>Insufficiently-responsive SPOCs</b>	<b>25.6%</b>	<b>23.56%</b>	<b>23.32%</b>	<b>24.84%</b>	<b>39</b>	<b>25.32%</b>

**Table 4:** SPOC Communication Test Results (2014 - 2018)

2.12 For the purpose of the statistics used to create the graphic in Figure 6, 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.



**Figure 6:** 2018 Map of Non-Responsive SPOCs

2.13 Results for 2018 indicate that the percentage of SPOCs that are insufficiently responsive or non-responsive to communication tests remains consistent with prior years, despite extensive efforts at international meetings, including at the IMO, to engage directly the countries with poor performance. As an approach to prompt better response, Cospas-Sarsat in 2015 prepared a “model” written “agreement”/”arrangement” or understanding (depending on the degree of formality that the signatories are comfortable with) that can be executed between MCCs and their supported SPOCs. The model agreement/arrangement can be found on the Cospas-Sarsat website ([406.org/en/documents-pro/document-templates](http://406.org/en/documents-pro/document-templates)).

2.14 The Secretariat currently holds copies of agreements/arrangements between:

- Chilean MCC – Republic of Paraguay
- France – Tahiti
- France – La Reunion
- India - Nepal
- Italian MCC – Republic of North Macedonia
- Italian MCC – Republic of Serbia
- Italian MCC – Sudan Civil Aviation Authority
- Norwegian MCC – Swedish Maritime Administration
- Saudi Arabia - Lebanon
- UK Maritime and Coast Guard Agency – Irish Coast Guard
- USA MCC - Corporación Centroamericana de Servicios de Navegación Aérea

(COSESNA)

- USA MCC - Government of Bermuda
- USA MCC – Republic of Ecuador
- USA MCC – Republic of Haiti
- USA MCC – Trinidad and Tobago
- USA MCC - Dominican Republic
- USA MCC – Dutch Caribbean Coastguard
- USA MCC - Republic of Panama
- Viet Nam – Cambodia
- Viet Nam - Laos

#### Providing Feedback on Actions Taken by an RCC

2.15 At its 26<sup>th</sup> meeting in September 2019, the (ICAO/IMO) Joint Working Group (JWG) on the Harmonization of Aeronautical and Maritime Search and Rescue discussed the need for RCCs to provide feedback on actions taken in response to distress alerts delivered to them by GMDSS mobile satellite service providers. Cospas-Sarsat appreciates the efforts historically undertaken by supported RCCs to provide feedback to Cospas-Sarsat and encourages RCCs to strengthen their efforts to ensure the best possible statistics can be provided to IMO and ICAO. Cospas-Sarsat is interested in any feedback that might be useful in improving the reporting process, including use of surveys, web-based tools or forms.

#### System Enhancements

2.16 Future enhancements to System operations (Figure 7) continue to focus primarily on refinement and enhancement of technical specifications for MEOSAR, ELTs for (in-flight) distress tracking (ELT(DT)s), the Return Link Service (RLS) and second-generation beacons (SGBs) that will transmit more information in their distress message and have greater location accuracy, while also being smaller. In 2019 the Programme devoted most of its efforts towards the commissioning of Space and Ground Segment assets for MEOSAR, to continue the fastest possible advancement towards continuous global coverage.



**Figure 7: The Cospas-Sarsat System Concept**

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### Training Material and Public Relations

A new document is in development to complement Cospas-Sarsat document C/S G.007, “Handbook on Distress Alert Messages for Rescue Coordination Centres (RCCs), Search and Rescue Point of Contacts (SPOCs) and IMO Ship Security Competent Authorities”, that will include more technical information for use in Mission Control Centre training programs, allowing MCC operators to better support RCCs. Development of video material continued with the creation of a series of video FAQs. All videos are available free-of-charge on YouTube ([406.org/en/search-and-rescue/programme-videos-en](https://www.youtube.com/search-and-rescue/programme-videos-en)). Cospas-Sarsat is investigating means to host the videos in a manner which will make them accessible to Administrations when information-technology security policies may not allow access to YouTube.

### **3. ACTION BY THE MEETING**

The meeting is invited to:

- 3.1 note the information provided on the status of the Cospas-Sarsat Programme;
- 3.2 provide feedback on notifications about Cospas-Sarsat System developments;
- 3.3 provide feedback on the video library made available publicly for use by SAR professionals, including any online access issues that might have been noted;
- 3.4 recommend possible improvements that could be made to ensure more reliable reporting by RCCs (back through the reporting chain) about events after receipt of a distress alert has been delivered to them by GMDSS mobile satellite service providers, including Cospas-Sarsat; and
- 3.5 provide details of any existing MCC-SPOC agreements/arrangements, and proposals for improving MCC-SPOC communications during tests and real alerts.

- END -