International Civil Aviation Organization

Sixth Meeting of the ICAO Asia/Pacific Search and Rescue Working Group (APSAR/WG/6)

Video Teleconference, 03 – 06 May 2021

Agenda Item 3: Global update

STATUS OF THE COSPAS-SARSAT PROGRAMME

(Presented by the Cospas-Sarsat Secretariat)

SUMMARY

This paper presents 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

System Operation

1.1 In 2019, the latest year for which statistics have been compiled, Cospas-Sarsat alert data assisted in 1,032 distress incidents (904 in 2018) and 2,774 persons were rescued (2,185 in 2018). Since September 1982, the Cospas-Sarsat System has provided assistance in rescuing at least 51,512 persons in 15,563 SAR events (**Figure 1**).

1.2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2019 is presented in **Figure 2** and the distribution of all SAR events is 20% for aviation, 26% for land and 54% for maritime. Participants often provide synopses of recent SAR cases supported by Cospas-Sarsat for publication on the Cospas-Sarsat webpage and Facebook page. ICAO/IMO JWG-SAR working group participants are invited to monitor this page and contribute to it by sending stories to mail@406.org.

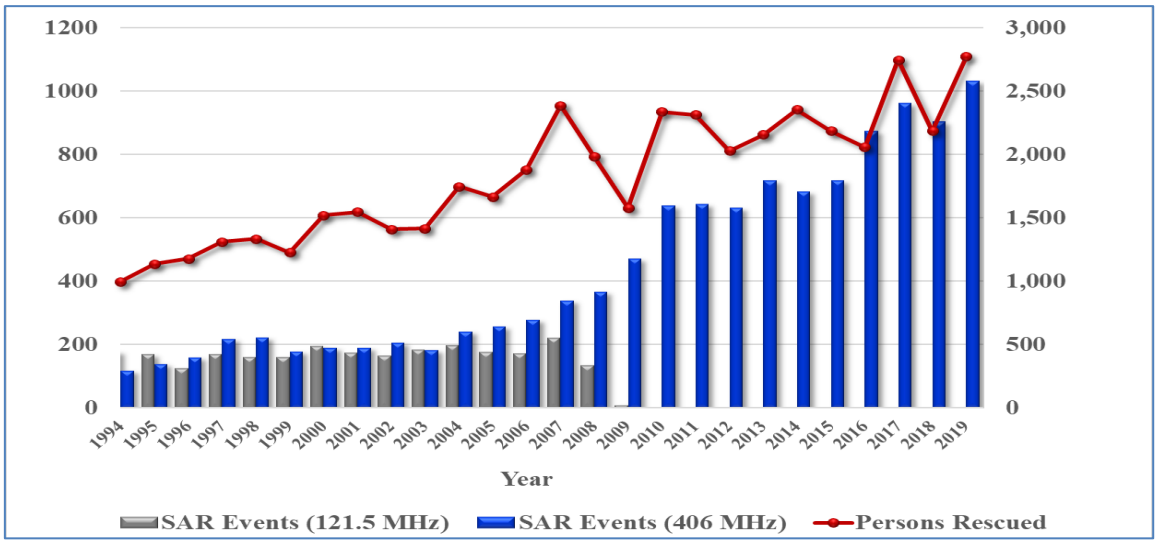

Figure 1: SAR Events with the Assistance of Cospas-Sarsat Data (Jan. 1994 - Dec. 2019)

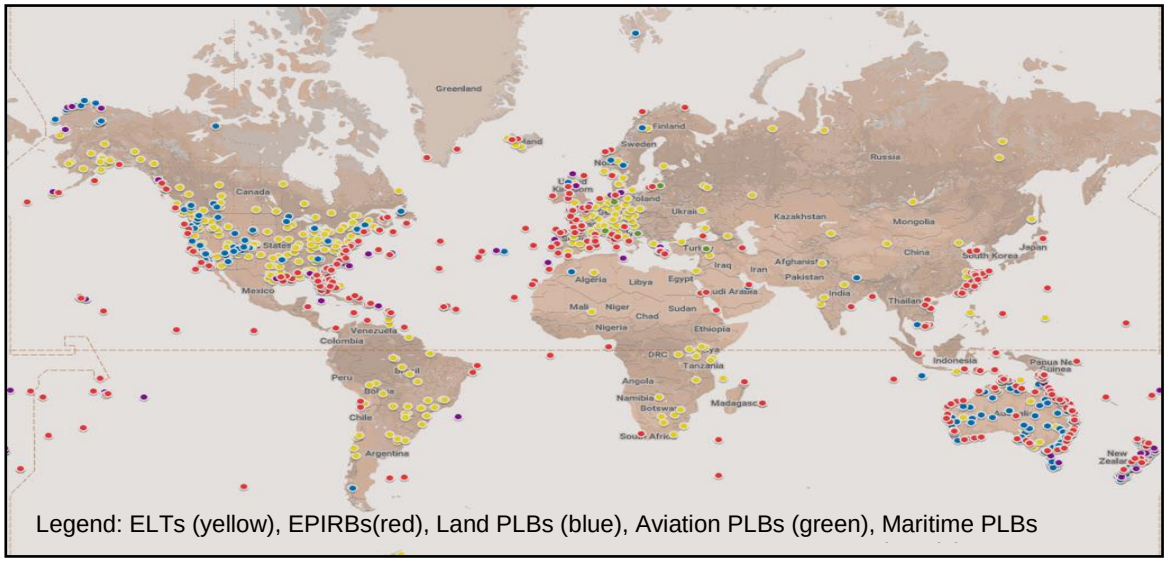

Figure 2: 2019 Geographic Distribution of SAR Events

2. DISCUSSION

406 MHz Beacons

2.1 Based on estimates made using beacon-registration data and the number of activated beacons that had been registered, there were about 2,492,620 Cospas-Sarsat beacons deployed worldwide at the end of 2019, an increase of about 10.7% over that reported in 2018 (2,249,273). We estimate that about 70% of beacons deployed globally are equipped with global navigation satellite system (GNSS) receivers that allow the beacon location to be reported in the distress message (in addition to independent localization of the beacon by trilateration of the Cospas-Sarsat System).

2.2 The Cospas-Sarsat Secretariat maintains an International Beacon Registration Database (IBRD) as an internet portal that is available for beacon registration for 167 Administrations (national and territorial) that allow its use in place of a national registration mechanism. The IBRD also allows bulk upload of national databases as a means of making the data easily available on a 24/7 basis. As at 9 February 2021, there were 93,102 beacons registered in the IBRD (82,704 at 1 October 2019) from 151 Administrations. Cospas-Sarsat is in the process of redesigning the IBRD user interface to accommodate new beacon types being developed (emergency locator transmitters for distress tracking of aircraft, ELT(DT)s), to meet new ICAO Convention Annex 6 requirements, and "second generation" beacons that use more modern "spread spectrum" transmission technology. The new IBRD, with a more user-friendly interface, should be available online in mid-2021.

The System

2.3 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).

2.4 At the end of 2020, twenty-four MEO earth stations (local user terminals known as MEOLUTs), MEOLUTs), providing 350 ground antenna channels for satellite tracking, were commissioned against early-operational-capability standards for MEO search-and-rescue satellite payloads (MEOSAR), and at least 21 more MEOLUTs (with multiple antennas each) are planned for between 2021 and 2024.

2.5 Full details of the operational space and ground segments are available on the Cospas-Sarsat website (406.org).

SPOC Communication

2.6 As a result of actions taken to address the matter of non-responsive single points of contact (SPOCs) for search-and rescue, Cospas-Sarsat started in 2008 regular testing of communications between Cospas-Sarsat mission control centres (MCCs) that distribute alerts received from satellites and receiving SPOCs. COMSAR 13 requested Cospas-Sarsat to report on these MCC/SPOC communication tests.

2.7 The following **Table 1** information is a summary of results for the period 2016-2020. For that period, 19 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. (2020 data is incomplete as all reporting has not yet been finalized.)

	2016	2017	2018	2019	2020	
					Number	Percent
Number of SPOCs tested by MCCs	163	157	154	161	141	
Non-responsive SPOCs (no response to tests)	7.98%	11.46%	8.44%	8.70%	13	9.22%
Rarely responsive SPOCs (less than 20% successful tests)	7.36%	8.28%	6.49%	5.59%	4	2.84%
SPOCs with low success ratio (between 20 and 50% successful tests)	7.98%	5.09%	10.39%	9.94%	17	12.06%
Insufficiently responsive SPOCs	**23.32%**	**24.84%**	**25.32%**	**24.22%**	34	**24.11%**

Table 1: SPOC Communication Test Results (2016 – 2020)

2.8 For the purpose of the statistics used to create the graphic in Figure 3, a successful test 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.

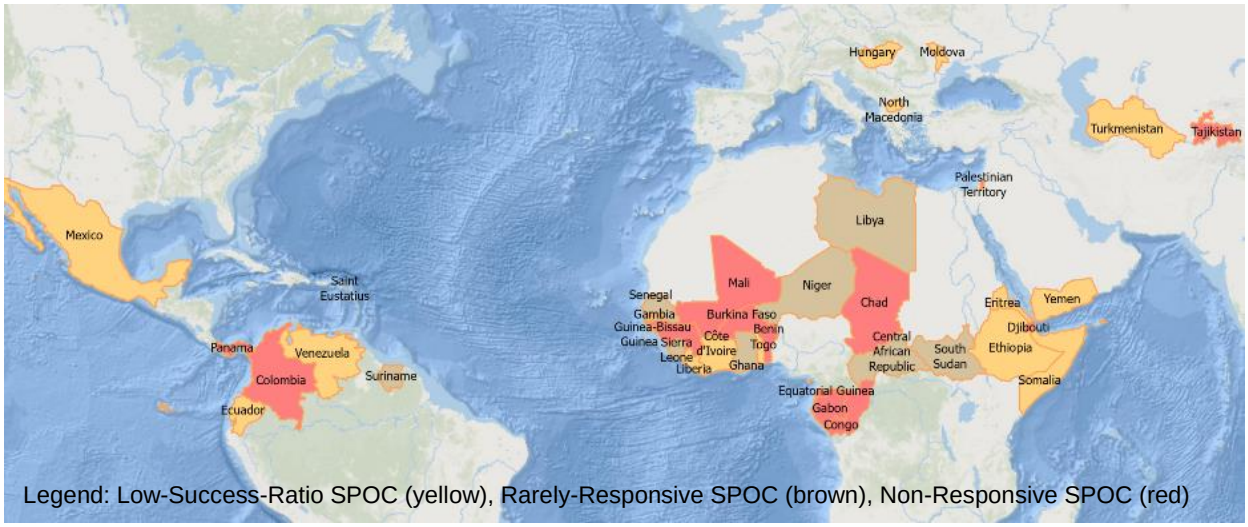

Figure 3: 2019 Map of Non-Responsive SPOCs

2.9 Results for 2020 indicate that the percentage of SPOCs that are insufficiently responsive or non-responsive to communication tests remains consistent with prior years, despite extensive efforts, 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). In 2020, five new SPOC agreements were signed between MCCs and SPOCs, and deposited with the Secretariat.

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

- Chilean MCC – Republic of Paraguay
- France MCC – CROSS Gris-Nez
- France MCC – JRCC Tahiti
- France MCC – La Reunion
- France MCC - RCC Münster, Germany
- France MCC – Tunis ACC
- Italian MCC – Republic of North Macedonia
- Italian MCC – Republic of Serbia
- Italian MCC – Sudan Civil Aviation Authority
- Norwegian MCC – Swedish Maritime Administration
- Saudi Arabia MCC - 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
- Vietnam MCC – Cambodia
- Vietnam MCC - Laos

Providing Feedback on Actions Taken by an RCC

2.11 At its 27th meeting in September 2020, the ICAO/IMO Joint Working Group (JWG) on the Harmonization of Aeronautical and Maritime Search and Rescue provided draft amendments to the IAMSAR Manual, Volume II, appendix B, to provide sample ELT(DT) alerts and cancellation messages. Cospas-Sarsat is working in 2021 to develop modifications to the message format used to transmit distress alert messages to RCCs to clarify the information provided to RCCs. The JWG encouraged active participation of interested SAR authorities in the work of Cospas-Sarsat on this topic, in coordination with their national Cospas-Sarsat representatives.

System Enhancements

2.12 Future enhancements to System operations continue to focus primarily on refinement and enhancement of technical specifications for MEOSAR, ELT(DT)s, a Return Link Service (RLS), now operating at full operational capability, that provides an acknowledgement to the beacon user that the distress signal has been received and located, and the "second-generation" beacons that will transmit more information in their distress message and have greater location accuracy, while also being smaller. In 2020 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 of all beacon types, including ELT(DT)s and RLS-capable beacons (**Figure 4**).

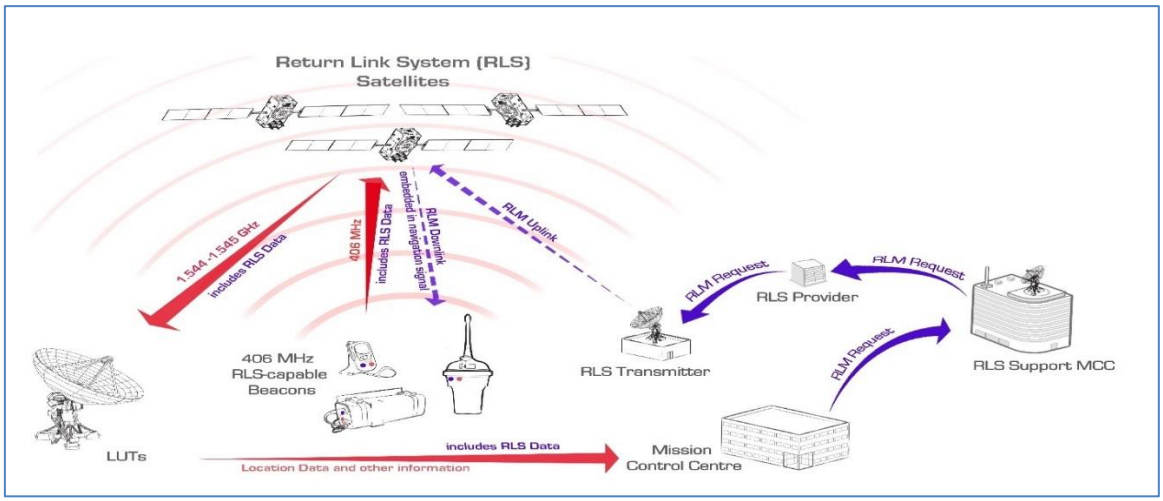

Figure 4: The Return Link Service and the Cospas-Sarsat System Concept

Training Material and Public Relations

2.13 A new document is under approval to complement Cospas-Sarsat document C/S G.010, "Mission Control Center Handbook", 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 in English on YouTube (406.org/en/search-and-rescue/programme-videos-en) with subtitles in the French and Russian languages available. 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.

2021 Beacon System Test

2.14 Cospas-Sarsat plans to conduct a System test to address the implementation of service for new beacons, including First-Generation Beacons (FGB) ELT(DT)s and all types of Second-Generation Beacons (SGB), including SGB ELT(DT)s. The specific objectives of these Beacon System Tests are to evaluate the operation of the Cospas-Sarsat System with each of the new beacon types, in order to:

- Ensure that the MEOSAR system (and the LEOSAR and GEOSAR systems, where applicable) can detect, decode and successfully process the messages from the planned FGB ELT(DT) beacons, and all types of SGBs, including SGB ELT(DT) beacons,;
- Ensure that the Ground Segment can create and correctly distribute, in a timely manner, the incident alert messages resulting from the activation of these new beacons, including (when appropriate) distribution to the ICAO LADR (a data repository);
- Confirm that these new beacon alert messages do not create any anomalies or degradation in the operations of the Ground Segment, including anomalies or degradation for other beacon types in any elements of the Ground Segment; and
- Further assess the SGB system capacity of the Ground Segment, i.e., the number of SGB beacons that can be received and processed per the specification.

2.15 The test will be conducted in mid-2021, with submission of a report on status and results to the 35th Meeting of the Joint Committee in November 2021.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information provided on the status of the Cospas-Sarsat Programme;

b) provide feedback on notifications about Cospas-Sarsat System developments;

c) provide feedback on the video library made available publicly for use by SAR professionals, including any online access issues that might have been noted;

d) participate in the development of modifications to the message format used to transmit distress alert messages to RCCs, in coordination with national Cospas-Sarsat representatives; and

e) provide details of any existing MCC-SPOC agreements/arrangements, and proposals for improving MCC-SPOC communications during tests and real alerts.

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