International Civil Aviation Organization

Seventh Meeting of the ICAO Asia/Pacific Search and Rescue Working Group (APSAR/WG/7)

Video Teleconference, 24 – 27 May 2022

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 2020, the latest year for which statistics have been compiled, Cospas-Sarsat alert data assisted in 951 distress incidents (1,032 in 2019) and 2,278 persons were rescued (2,774 in 2019). Since September 1982, the Cospas-Sarsat System has provided assistance in rescuing at least 53,790 persons in 16,514 SAR events (**Figure 1**).

1.2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2020 is presented in **Figure 2** and the distribution of all SAR events is 23% for aviation, 37% for land and 40% 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.

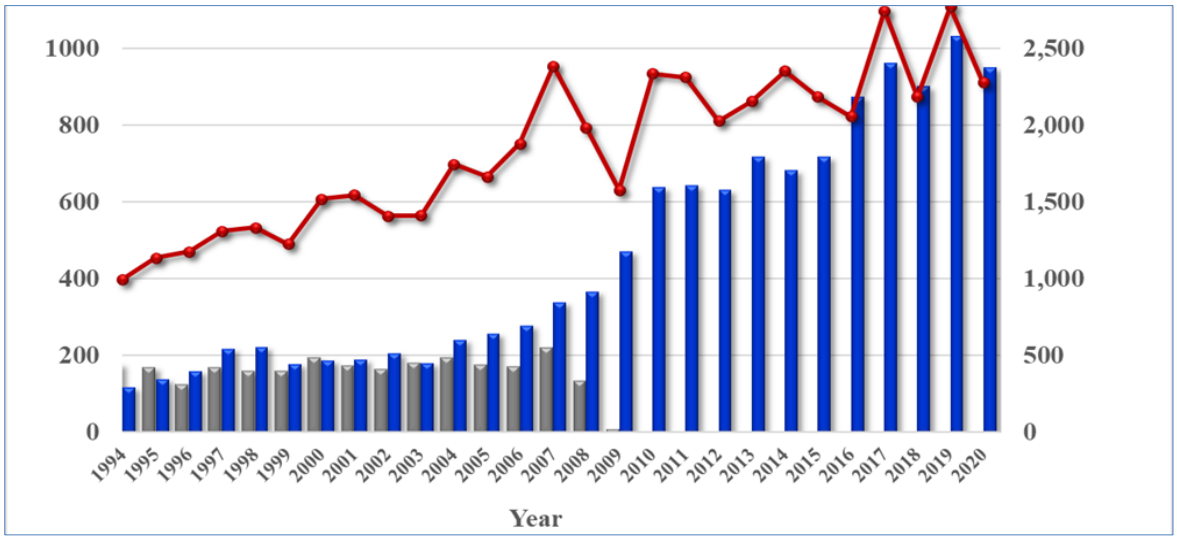

Figure 1: SAR Events with the Assistance of Cospas-Sarsat Data (Jan. 1994 - Dec. 2020)

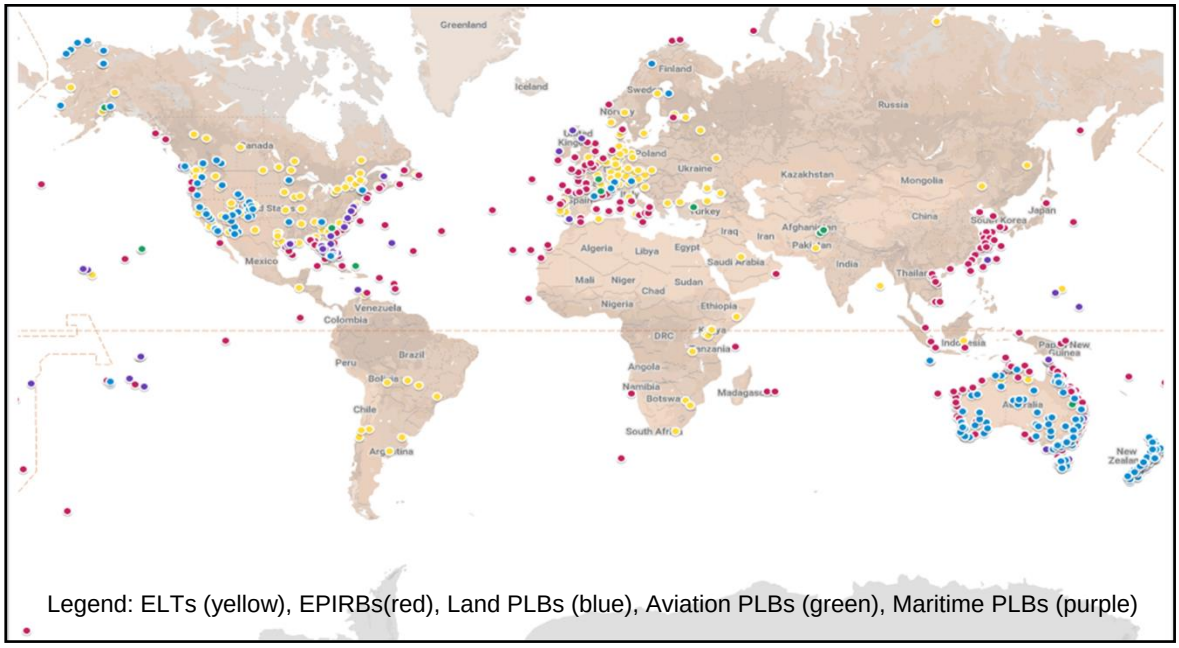

Figure 2: 2020 Geographic Distribution of SAR Events

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 2,534,000 Cospas-Sarsat beacons deployed worldwide at the end of 2020, an increase of about 1.6% over that reported in 2019 (2,493,000). We estimate that more than 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 185 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 of 15 April 2022, there were 100,047 beacons registered in the IBRD (93,102 on 1 October 2021). 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 later this year.

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 As of 15 April 2022, twenty-eight MEO earth stations (local user terminals known as MEOLUTs), capable collectively of simultaneously tracking up to 366 satellites, were commissioned for MEO search-and-rescue satellite payloads (MEOSAR), and at least 19 more MEOLUTs (with multiple antennas each) are planned between 2022 and 2025.

2.5 Full details of the operational space and ground segments are available at 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 2017-2021. 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.

	2017	**2018**	**2019**	**2020**	**2021**
Number of SPOCs tested by MCCs	157	154	161	165	171
Non-responsive SPOCs (no response to tests)	11.46%	8.44%	8.70%	7.23%	8.19%
Rarely responsive SPOCs (less than 20% successful tests)	8.28%	6.49%	5.59%	6.02%	3.51%
SPOCs with low success ratio (between 20 and 50% successful tests)	5.09%	10.39%	9.94%	7.23%	9.94%
Insufficiently responsive SPOCs	**24.84%**	**25.32%**	**24.22%**	**20.48%**	**21.44%**

Table 1: SPOC Communication Test Results (2017 – 2021)

2.8 For the purpose of the statistics used to create the graphic in Figure 3, a successful test meant that the requested human feedback (not a merely an automated 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.

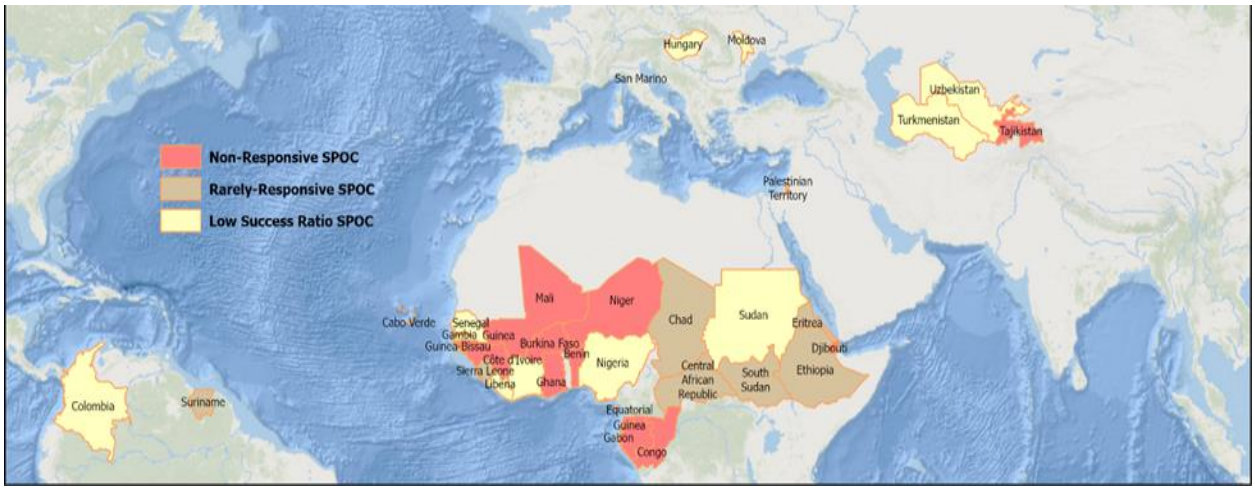

Figure 3: Map of Non-Responsive and Poorly Responsive SPOCs (2021)

2.9 Cospas-Sarsat remains deeply concerned about the failure of some countries to respond consistently or to respond at all to test calls/messages and/or real alerts of life-threatening distress. Results for 2021 indicate that the percentage of SPOCs that are insufficiently responsive or non-responsive to communication tests remains consistent with prior years. Despite extensive efforts to directly engage the countries with poor performance there has not been meaningful remediation. Because mariners' lives are at risk when these calls/messages/alerts go without a response, the matter must be further addressed with urgency.

2.10 Cospas-Sarsat invites Member States to provide proposals for improving the reliability in communications between Cospas-Sarsat MCCs and their supported SPOCs (usually RCCs) both during tests and for transmission of real distress alerts, particularly taking into account the statistics above. As one measure to facilitate improved distress-alert communications, Cospas-Sarsat encourages Member States to enter into agreements or understandings (depending on the degree of formality that the signatories are comfortable with) between SPOCs and their supporting MCCs and to provide a copy of such agreements/understandings to the Cospas-Sarsat Secretariat. A model agreement/arrangement can be found on the Cospas-Sarsat website (https://www.cospas-sarsat.int/en/documents-pro/document-templates).

2.11 The ICAO Dakar Regional Office hosted a seminar on satellite-aided distress tracking on 15 to 16 September 2021 using a virtual meeting platform. The aim of the seminar was to improve the ability of rescue coordination centres (RCCs) to effectively respond to distress alerts sent by Cospas-Sarsat and to reduce the poor response rate to test messages sent to SPOCs. States in the West Africa area were invited, and course content was provided by experts from the ICAO/IMO JWG and the Cospas-Sarsat Secretariat and supporting MCCs. Over 130 different sign-ins to the virtual meeting platform were recorded. A condition of attendance at the seminar was the development and completion of an MCC-SPOC agreement/arrangement, using the template available from the Cospas-Sarsat website.

2.12 We believe that proper implementation by SPOCs and States of the information delivered through the seminar will result in an improvement in SPOC test response rates. To that end, a follow-on seminar is being planned to be held in Senegal in September 2022.

2.13 As of 15 April 2022, nine new agreements (bolded in the list provided in section 2.14) had been deposited with Cospas-Sarsat Secretariat since APSAR-6 meeting.

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

- Chilean MCC – Republic of Paraguay
- French MCC – CROSS Gris-Nez
- French MCC – JRCC Tahiti
- French MCC – La Reunion
- French MCC – RCC Münster, Germany
- French MCC – Tunis ACC, Tunisia
- **French MCC – MRCC Rabat, Morocco**
- **French MCC – ARCC Lyon, France**
- **French MCC – Switzerland**
- **French MCC – Austrocontrol, Austria**
- Italian MCC – Republic of North Macedonia
- Italian MCC – Republic of Serbia
- Italian MCC – Sudan Civil Aviation Authority
- **Italian MCC** – **Somalia**
- Norwegian MCC – Swedish Maritime Administration
- Saudi Arabian MCC – Lebanon
- **South African MCC – Mozambique**
- **Spanish MCC – Ghana**
- **Spanish MCC – Benin**
- **Spanish MCC** – **Gambia**
- 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

2.15 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.

2.16 Distress-alert messages are sent to SAR authorities in the "SIT 185" human-readable text format. As the Cospas-Sarsat System developed, the size and content of the distress messages increased, but no significant changes were made to the message format. Beginning in 2023, distress information will be delivered to Cospas-Sarsat SPOCs in a revised SIT 185 message, designed for greater clarity after consultation with RCCs by their supporting MCCs. The goal of this reorganisation was to use clear terminology and labelling and to provide distress position information in a more readily usable order. Two significant changes were to use the term "MCC Reference position" instead of "Confirmed position", and to use the term "GNSS position" to replace "Encoded position". Full details of the new SIT 185 message format can be found in the RCC Handbook, document C/S G.007, section 1.4.5, and sections 5 and 6 available at https://cospas-sarsat.int/images/stories/SystemDocs/Current/G007-MAR-25-2022.pdf.

System Enhancements

2.17 Future enhancements to System operations are focused primarily on advancing the MEOSAR system to its next operational phases and beginning operational phases for ELT(DT)s and "second-generation" beacons (that will transmit more information in their distress message and have greater location accuracy). This work principally involves commissioning of new or upgraded ground-segment equipment within Cospas-Sarsat Participant states and territories to augment global coverage.

2.18 The Return Link Service (RLS), that provides an acknowledgement to the user of a beacon (with the RLS feature (**Figure 4**)) that the distress signal has been received and located, was declared at full operational capability (FOC) within Cospas-Sarsat effective 26 March 2021.

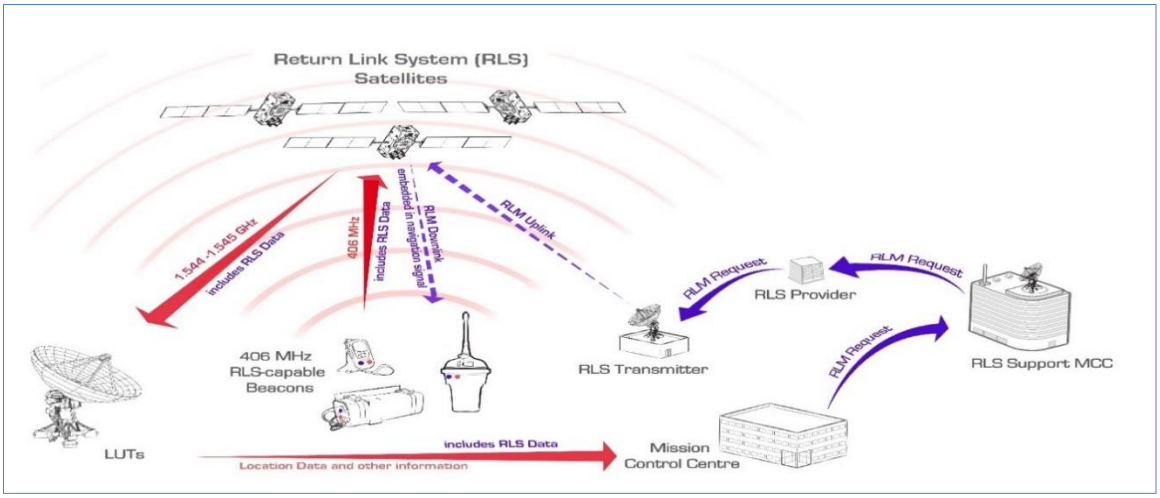

Figure 4: The Return Link Service and the Cospas-Sarsat System Concept

Training Material and Public Relations

2.19 A new document, Cospas-Sarsat document C/S G.010 "Mission Control Center Handbook" was approved in March 2021. It includes more technical information for use in Mission Control Centre training programs, allowing MCC operators to better support RCCs.

2.20 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. After being informed that some Administrations have information-technology security policies may not allow access to YouTube, the videos and other training material have been made available on an alternate platform (https://moodle.406.org/).

2021 Beacon System Test

2.21 Cospas-Sarsat conducted 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 were to evaluate the operation of the Cospas-Sarsat System with each of the new beacon types, in order to:

a) 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;

b) 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);

c) 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

d) 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.

2.22 The test was conducted in June 2021 and January 2022, with submission of a report on status and results to the 35th Meeting of the Joint Committee in November 2021 and to the Cospas-Sarsat Council at its 66th Session in March 2022.

2.23 The results showed that Cospas-Sarsat System has demonstrated the capability to receive, process and distribute messages from FGB ELT(DT)s, SGB ELT(DT)s and other SGBs, and that the introduction of these new beacon types would not adversely affect the performance of the existing parts of the System. Connectivity and distribution of distress data to the ICAO LADR has not been tested because this repository was still under development.

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; and

d) 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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