Organización de Aviación Civil Internacional
Oficina para Norteamérica, Centroamérica y Caribe

NOTA DE ESTUDIO

ANI/WG/SAR/TF/2 — NE/02
30/08/21

Segunda Reunión del Grupo de Tarea de Búsqueda y Salvamento (SAR) del Grupo de Trabajo sobre implementación de Navegación Aérea para las Regiones NAM/CAR (ANI/WG/SAR/TF/2)

En línea,7 al 9 de septiembre de 2021

Cuestión 4 del Orden del Día: **Programa de Trabajo y Actividades del Grupo de Tarea**
4.1 Asuntos Mundiales y Regionales de Búsqueda y Salvamento (SAR)

INFORME SEPTIEMBRE DE 2021- ESTADO DEL SISTEMA COSPAS-SARSAT, OPERACIONES Y FUTUROS DESARROLLOS

(Presentada por Estados Unidos)

RESUMEN EJECUTIVO	
El **Apéndice** a esta Nota (*disponible únicamente en inglés)* contiene el informe a septiembre de 2021 sobre el estado, las operaciones y los desarrollos futuros del sistema COSPAS-SARSAT. La información se aplica a las operaciones SAR actuales y puede influir en contenido nuevo para el Plan SAR de la Región CAR.	
Acción:	Las Acciones Sugeridas se encuentran en la Sección 3.
Objetivos Estratégicos:	• Seguridad Operacional
Referencias:	• Informe final de la Primera Reunión del Grupo de Tarea d Implementacióne Búsqueda y Salvamento (SAR) del Grupo de Trabajo sobre implementación de Navegación Aérea para las Regiones NAM/CAR (ANI/WG/SAR/TF/1)

1. Introducción

1.1 La Conclusión 1 a) del Informe de la ANI/WG/SAR/TF1, especifica que el Grupo de Tarea de Implementación NAM/CAR ANI/WG SAR lleve a cabo una revisión exhaustiva del Plan de Búsqueda y Salvamento (SAR) de la Región del Caribe. El Apéndice a esta nota de estudio contiene información que los centros coordinadores de salvamento deberían tener a su disposición para las operaciones actuales y futuras relacionadas con las balizas de socorro de 406 MHz.

2. Antecedentes

2.1 El Grupo de trabajo conjunto OACI/Organización Marítima Internacional (OMI) sobre búsqueda y salvamento (ICAO/IMO JWG) tiene su reunión del 6 al 10 de septiembre de 2021. Una Nota de Estudio presentada a la vigésimo octava reunión del JWG OACI/OMI, “Septiembre de 2021 - Informe sobre el estado, operaciones y desarrollos futuros del sistema COSPAS-SARSAT ” se adjunta como Apéndice a esta Nota de Estudio.

2.2 La información contenida en el Apéndice debe ser revisada por los centros de coordinación de salvamento (RCC) y el Grupo de Tarea de Implementación SAR NAM/CAR ANI/WG para el contenido que debe incluirse en la próxima actualización del Plan SAR de la Región del Caribe.

3. Acciones sugeridas

3.1 Se invita a la Reunión a:

a) tomar nota de la información proporcionada;

b) considerar como esta información puede ser provista a los servicios SAR para uso en las operaciones actuales; y

c) proporcionar comentarios sobre el apéndice y remitirlo al Grupo de Apoyo a la Implementación SAR del NAM/CAR ANI/WG para evaluar el contenido que debería ser incluido en la próxima actualización del Plan SAR CAR.

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International Civil Aviation Organization

WORKING PAPER

ICAO/IMO JWG-SAR/28-WP.23
9 July 2021
ENGLISH ONLY

Agenda item 7

ICAO/IMO JOINT WORKING GROUP ON HARMONIZATION OF AERONAUTICAL AND MARITIME SEARCH AND RESCUE (ICAO/IMO JWG-SAR)

TWENTY-EIGHTH MEETING

SAR COMMUNICATIONS

September 2021 - Report on Cospas-Sarsat system status, operations and future developments

Presented by Cospas-Sarsat

SUMMARY

Executive summary:	This document provides information on the status of the International Cospas-Sarsat Programme as of 1 July 2021.
Action to be taken:	Paragraph 24

SYSTEM PERFORMANCE

1 In 2020, based on preliminary information, 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.

2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2020 is presented in Figure 1 and the distribution of all SAR events (maritime, aviation and land activities) for 2020 is shown at Figure 2. In addition to regular incident reports from Participants that are used to compile these statistics, the Cospas-Sarsat Secretariat additionally welcomes more detailed contributions to it from participants about recent SAR cases that illustrate the support provided by Cospas-Sarsat and that might be suitable for publication on the Cospas-Sarsat webpage and Facebook page. The ICAO/IMO JWG-SAR participants are invited to monitor and contribute to this page.

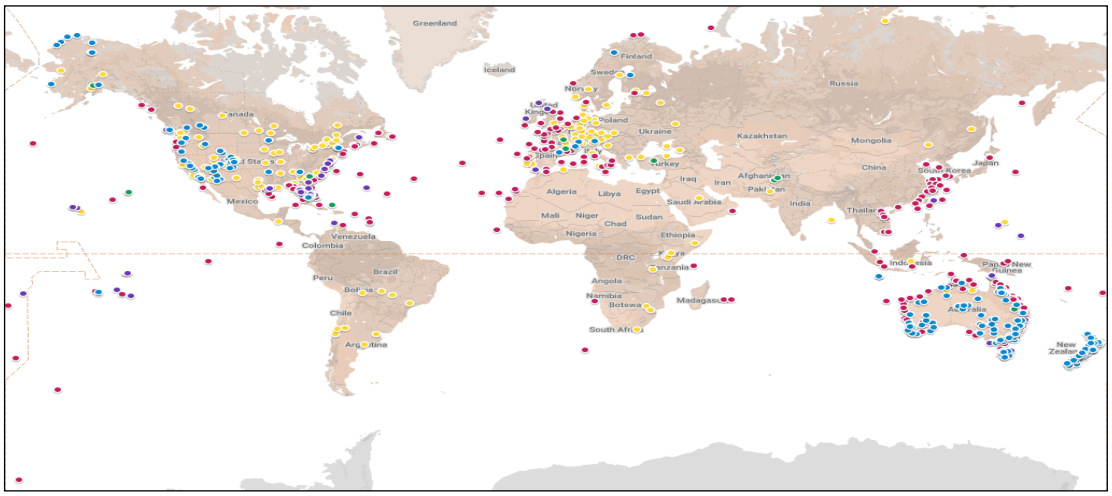

Figure 1: 2020 distribution of SAR events*

*Legend: ELTs (yellow), EPIRBs (red), Land PLBs (blue), Aviation PLBs (green), Maritime PLBs (purple)

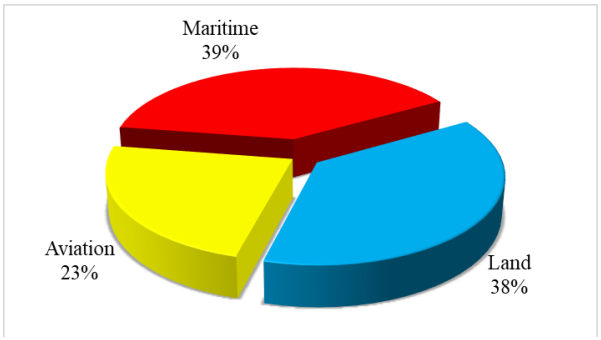

Figure 2: 2020 type of SAR events

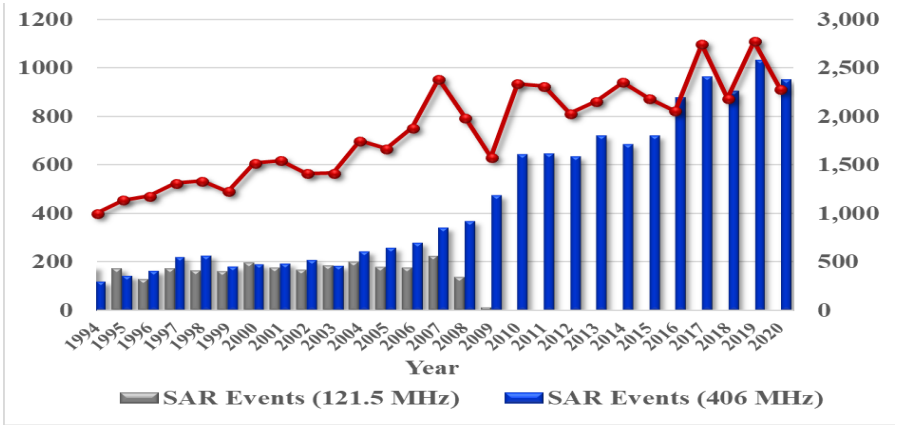

Figure 3: Number of SAR events and persons rescued with the assistance of Cospas-Sarsat alert data (January 1994 to December 2020)

False alert statistics

3 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 estimated beacon population) since 2016. In 2020, the SAR false alert rate was 95.55%, i.e. about one real alert in 24 alerts received. Training and educational outreach (including about the importance of owners registering their beacons) could reduce the number of false alerts.

Year	Rate
2016	96.68%
2017	96.75%
2018	96.85%
2019	96.65%
2020	95.85%

Table 1 : SAR false alert rate

Year	EPIRBs	ELTs	PLBs	ALL
2016	0.7%	4.2%	0.4%	1.1%
2017	0.9%	4.3%	0.4%	1.3%
2018	1.0%	4.2%	0.4%	1.3%
2019	0.9%	4.5%	0.4%	1.3%
2020	1.0%	4.2%	0.4%	1.3%

Table 2 : 406 MHz Beacon false alert rate

406-MHz beacon population and registration

4 The worldwide population of deployed beacons is estimated by two separate methods. One method uses a formula based on the reported number of registered beacons compared against the number of activated beacons that are registered (see Table 3 below). By this method it is estimated that there were about 2,540,000 beacons operating at 406 MHz in use worldwide at the end of 2020, an increase of about 1.7% over that estimated in 2019.

5 A metric which was 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 for 2020 and the four previous years.

Year	EPIRB		ELT		PLB		Totals	
	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percen (%)	Number of beacons registered / Number of detections	Percent (%)	Number of beacons registered / Number of detections	Percen (%)
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	9,280/ 13,250	70.0	2,121 / 2,831	74.9	18,924 / 25,581	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
2019	8,084 / 10,152	79.6	10,478 / 15,076	69.5	2,274 / 3,136	72.5	20,836 / 28,364	73.5
2020	8,302/ 10,246	81.0	9,731 / 13,953	69.7	2,546 / 3,465	73.5	20,579 / 27,664	74.4

Table 3: Percentage of detected beacons that are registered (2016 - 2020)

6 The other method of estimating the beacon population relies on an annual survey of beacon manufacturers and assumptions about the in-service life of beacons. By this method the global beacon population at the end of 2020 is estimated as slightly lower: 1,880,000. 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 approximately 90% in 2020 (88% in 2019, 86% in 2018, 65% in 2017 and 74% in 2016). We now estimate that about 72% of beacons deployed globally are designed to transmit encoded location data.

7 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 the administrative costs and inconvenience of managing their own database. Administrations may also avail themselves of the IBRD feature that allows them to upload their national beacon registration data to the IBRD to ensure that it is available 24/7 to other SAR services receiving an alerts originating in their SAR area of responsibility. As of 21 June 2021, there were 95,000 beacons registered in the IBRD (88,259 on 27 August 2020) from 152 Administrations. In 2020, on average, more than 500 SAR users per month logged into the IBRD to search for beacon registration information.

8 Cospas-Sarsat is in the process of redesigning the IBRD. A new user interface will be easier to understand and navigate, will allow registration of newly-developed beacon types (see paragraphs 17 to 19), and should be available online by late 2021.

The system

9 As of 21 June 2021, five LEOSAR and ten GEOSAR spacecraft were in operation, supported by 63 LEOLUTs, 29 GEOLUTs, and 32 MCCs (Figure 4). Mission control centers (MCCs) in Chile, Greece and Turkey were upgraded to fully support MEOSAR in Q4-2020 and early 2021. The Nigerian MCC is currently not operational, and Nigeria is supported as a SPOC

of the Spanish MCC. New ground segment equipment is currently under development in Malaysia and Togo.

Figure 4: Locations of commissioned mission control centres

10 The MEOSAR system was declared at the early operational capability (EOC) phase in December 2016 and its space segment currently comprises payloads aboard 24 fully operational Galileo satellites (and two RLS-only capable satellites) provided by the European Commission and 18 GPS satellites (with an S-band downlink) provided by the United States. Payloads aboard three Glonass satellites provided by the Russian Federation are available for test and development. In addition, payloads aboard three United States GPS III satellites and six BeiDou satellites provided by China are under test in preparation for integration with the Cospas-Sarsat System. The full MEOSAR constellation ultimately is anticipated to comprise more than 90 satellites. MEOSAR distress alerts are distributed by twelve formally commissioned MEOSAR-capable MCCs, each associated with one or several MEOLUTs (in Algeria, Australia, Cyprus, France, Japan, Norway, Qatar, Singapore, Spain, Turkey, United Kingdom and the United States). Twenty-six MEOLUTs are commissioned at MEOSAR EOC or initial operational capability (IOC) performance level and at least 19 more MEOLUTs are planned for commissioning between 2021 and 2025 (with up to a total of 360 MEOLUT antenna channels).

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

SPOC Communication

12 As a result of actions taken to address the matter of non-responsive SAR points of contact (SPOCs) for search-and rescue, Cospas-Sarsat started in 2008 regular testing of communications between Cospas-Sarsat MCCs that distribute to appropriate SPOCs the alerts received from satellites. IMO's COMSAR 13 meeting (January 2009) requested Cospas-Sarsat to report to it on these MCC/SPOC communication tests.

13 Table 4 provides a summary of results for the period 2016-2020. For that period, 19 of 31 operational MCCs reported results of MCC/SPOC communication test results. Some MCCs do not support SPOCs outside of their country and therefore are not required to conduct these tests.

	2016	2017	2018	2019	2020	
					Number	Percent
Number of SPOCs tested by MCCs	163	157	154	161	165	
Non-responsive SPOCs (no response to tests)	7.98%	11.46%	8.44%	8.70%	12	7.28%
Rarely responsive SPOCs (less than 20% successful tests)	7.36%	8.28%	6.49%	5.59%	9	5.45%
SPOCs with low success ratio (between 20 and 50% successful tests)	7.98%	5.09%	10.39%	9.94%	13	7.88%
Insufficiently responsive SPOCs	**23.32%**	**24.84%**	**25.32%**	**24.22%**	**34**	**20.61%**

Table 4: SPOC communication test results (2016 – 2020)

14 For the purpose of the statistics used to create the graphic in Figure 5, 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.

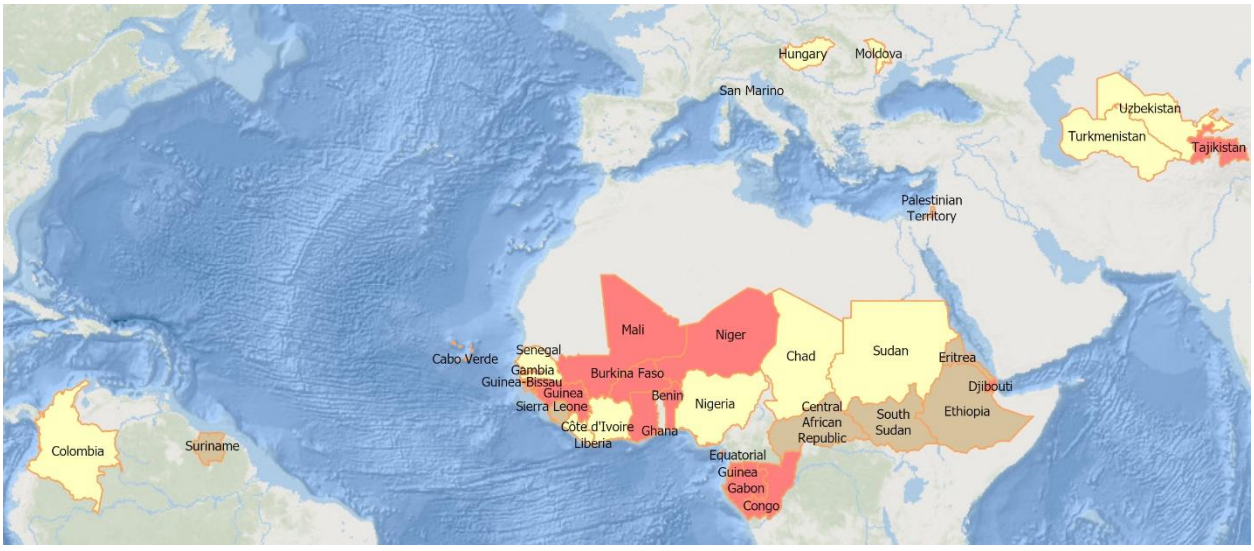

Figure 5: 2020 map of non-responsive SPOCs

15 Results for 2020 indicate that the percentage of SPOCs that are insufficiently responsive or non-responsive to communication tests remains consistent with that of 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.

16 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

System enhancement

17 In 2021, enhancements to system operations (Figure 6) continue to primarily focus on development of technical specifications and space segment assets and ground segment equipment change implementation for the next-generation MEOSAR space segment, ELTs for (in-flight) distress tracking (ELT(DT)s) in time for ICAO's mandatory equipage deadline of 1 January 2023, the Return Link Service (RLS) and second-generation beacons (SGBs).

18 RLS allows people in distress to receive automatic acknowledgement (e.g., a light or text display) on their RLS-capable beacon, usually within 10 minutes, that their signal has been well received and located by the system (the indication does not mean that a rescue has yet been organized by a rescue coordination center or SAR units have been launched).

19 The Cospas-Sarsat Council, at its sixty-fourth session in March 2021, decided to declare effective 26 March 2021 the RLS at full operational capability (FOC) within Cospas-Sarsat. Currently at least 32 administrations from all over the world have notified the Cospas-Sarsat Secretariat that RLS beacons are allowed to be programmed with their country codes (see 406.org/en/beacon-ownership/rls-enabled-beacon-purchase).

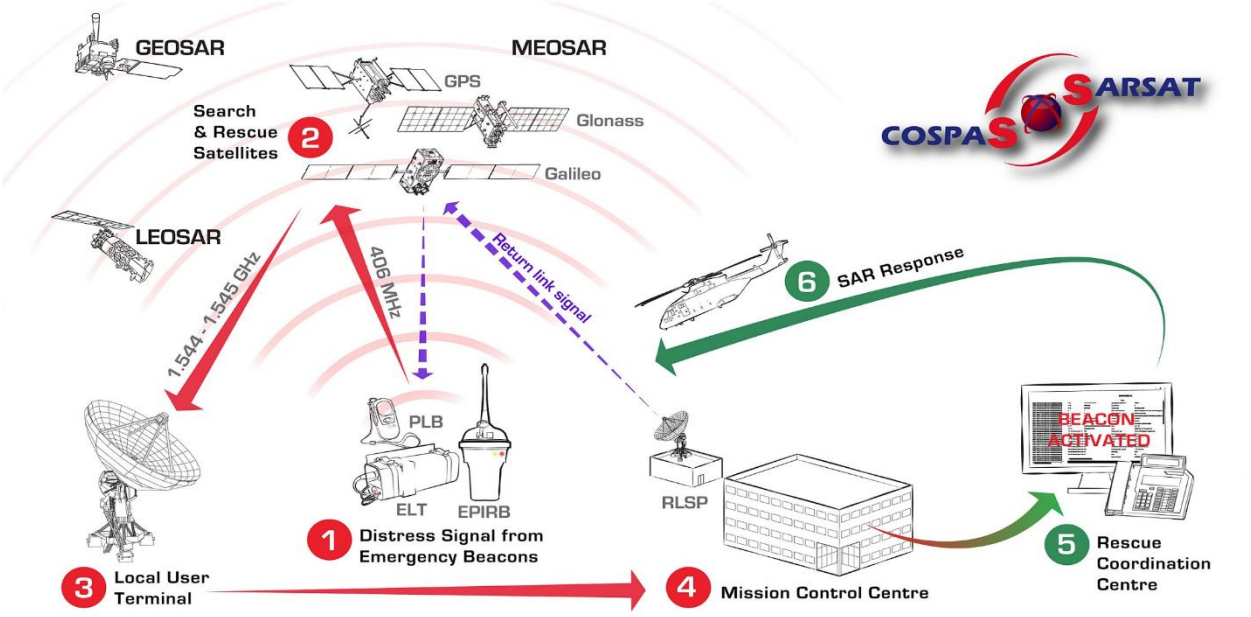

Figure 6: The Cospas-Sarsat system concept, including the new Return Link Service

2021 End-to-end system test of new beacon technologies

20 Cospas-Sarsat conducted an end-to-end system test in June 2021 to validate the performance of new beacon technologies, including ELT(DT)s and SGBs of various types, with anticipated submission of a report on results to the 35th Meeting of the Joint Committee scheduled for November 2021. The specific objectives of these tests were 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 beacons,

- ensure that the ground segment can detect, decode and distribute, in a timely and accurate manner, the incident alert messages resulting from the activation of these new beacons, including (when appropriate) distribution to ICAO's planned Location of an Aircraft in Distress (LADR) repository for data received from an aircraft in distress,

- 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 existing 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 near-simultaneously received and processed per specifications.

Training material and public relations

21 A new "MCC Handbook" document was developed to complement existing 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". The MCC Handbook, document C/S G.010, includes more technical information for use in Mission Control Centre training programs, allowing MCC operators to better support RCCs. Development of video material continues with the creation of a series of video FAQs. All videos are available free-of-charge on YouTube, subtitled in the three official languages of Cospas-Sarsat (English, French and Russian), as well as other languages in some cases (https://406.org/en/search-and-rescue/programme-videos-en).

22 Cospas-Sarsat is in the process of modifying the SIT 185 format, in which 406 MHz alert data is provided to RCCs (see related input document from France), and is working with ICAO and UNOOSA to develop training workshops to promote better understanding at the RCC level of recent System developments.

23 The NCSR 8 report contains a statement from Cospas-Sarsat which was supported by many delegations during the meeting (NCSR 8/14/1, annex 36):

> "Cospas-Sarsat has identified inconsistencies in certain data maintained in Cospas-Sarsat databases and in GISIS, both of which receive relevant national data from Member States. It is of great importance that the national/territorial data of Member States is kept accurately up to date and consistent between the databases of the two organizations. The accuracy of this data, particularly with respect to allowed beacon coding methods, may affect the likelihood of a successful rescue in a distress event. Accordingly, Cospas-Sarsat invites Member States to update their information in GISIS in particular under GISIS tab 10: "Cospas-Sarsat MCCs and LUTs" and tab 11: "EPIRB Data.""

Action requested of the JWG

24 The JWG is invited to:

.1 note the information provided on the status of the Cospas-Sarsat Programme and comment on future developments of the system, as appropriate;

.2 provide comments on the need for possible training workshops to promote better understanding of recent developments in the Cospas-Sarsat System, and the distress alert and location information provided to RCCs;

.3 encourage JWG members to:

.1 update their information in the GISIS module on GMDSS in particular under tab 10: "Cospas-Sarsat MCC and LUT" and tab 11: "EPIRB Registration Data";

.2 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

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