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

NOTA DE ESTUDIO

ANI/WG/SAR/TF/1 — NE/05
16/08/19

Primera 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/1)

Ciudad de México, México, 17 – 19 de septiembre de 2019

Cuestión 3 del Orden del Día: **Objetivo Regional de Performance (RPO) Mejorar los Servicios de Búsqueda y Salvamento (SAR) del Plan regional NAM/CAR de implementación de navegación aérea basado en la performance (RPBANIP) y el Plan SAR de la Región CAR**

3.2 Revisar el Plan SAR de la Región CAR

ACTUALIZACIÓN DE LA SECCIÓN COSPAS-SARSAT EN EL PLAN REGIONAL SAR PARA LA REGIÓN CAR

(Presentada por Estados Unidos)

RESUMEN EJECUTIVO	
Esta Nota de Estudio presenta el informe del estado actual del Programa Cospas-Sarsat y describe el contenido que puede ser apropiado para actualizar el Plan Regional de Búsqueda y Salvamento para la Región del Caribe.	
Acción:	Las acciones sugeridas se presentan en la Sección 3.
Objetivos Estratégicos:	• Seguridad Operacional
Referencias:	• Informe de la Quinta Reunión del Grupo de Trabajo sobre Implementación de Navegación Aérea para las Regiones NAM/CAR (ANI/WG/5), Ciudad de México, México, 27 al 31 de mayo de 2019

1. Introducción

1.1 El Grupo de trabajo conjunto OACI/Organización Marítima Internacional (IMO) sobre Búsqueda y Salvamento (ICAO/IMO JWG) generalmente se reúne en septiembre o principios de octubre de cada año. El Programa Cospas-Sarsat proporciona al ICAO/IMO JWG su "Informe del estado, operaciones y desarrollo futuro del Sistema Cospas-Sarsat" (presentado como **Apéndice** (*disponible únicamente en inglés*) a esta nota de estudio y *disponible únicamente en inglés*): El contenido de este Apéndice debe ser revisado para consideración en la actualización del contenido del Sistema Cospas-Sarsat en el Plan Regional SAR para la Región CAR.

2. Antecedentes

2.1 El Plan Regional SAR para la Región CAR tiene una sección del “Sistema Cospas-Sarsat”. El Programa Cospas-Sarsat ha proporcionado una actualización reciente, presentada como Apéndice a esta nota de estudio, que tiene secciones adicionales y contenido nuevo que puede ser apropiado para considerarse su inclusión en el Plan Regional SAR para la Región CAR. El sistema Cospas-Sarsat tiene dos cambios mayores con impacto significativo en el futuro próximo – la evolución continua en el satélite MEOSAR y el sistema de tierra, y la segunda generación de balizas de socorro que transmiten en la frecuencia 406 MHz. Podrían ser de particular interés las siguientes partes del Apéndice:

a) Los párrafos 11 y 12 sobre el sistema MEOSAR. Además de actualizar la información y/o proporcionar el sitio web Cospas-Sarsar para detalles completos, podría ser necesario incluir consejos para enmendar los procedimientos y prácticas actuales del Centro Coordinador de Salvamento (CCS), ya que MEOSAR proporciona alertas repetidas en tiempo real y el faro de segunda generación puede proporcionar 2 posiciones.

b) El párrafo 18 sobre los acuerdos/arreglos con Centros de Control de Misión. Es de notar la buena participación en las Regiones NAM/CAR.

c) El párrafo 20 sobre el material de capacitación y las relaciones públicas. El Cospas-Sarsat ha visto repetidamente falta de conciencia de los Estados y organizaciones con referencia a las capacidades y asuntos operacionales del Cospas-Sarsat. Pone a disposición material de capacitación y mantiene un programa de relaciones públicas, como se describe en estos párrafos para permitir a otros permanecer informados. Además, el Centro de Control de Misión de Estados Unidos realiza un taller anual en el que participan varios, pero no todos los Estados de la Región CAR.

3. Acciones Sugeridas

3.1 Se invita a la Reunión a:

a) revisar de manera general el Apéndice “Informe del estado, operaciones y desarrollo futuro del Sistema Cospas-Sarsat”, para ver contenido que pudiera ser apropiado para actualizar el Plan Regional SAR para la Región CAR; y

b) revisar en particular las secciones del Apéndice discutidas en la Sección 2 de esta nota de estudio, para ver contenido que pudiera ser apropiado para actualizar el Plan Regional SAR para la Región CAR.

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International Civil Aviation Organization

INFORMATION PAPER

ICAO/IMO JWG-SAR/26-IP.9
7 August 2019
ENGLISH ONLY

Agenda item 7

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

TWENTY-SIXTH MEETING

Vina del Mar, Chile, 9 to 13 September 2019

SAR COMMUNICATIONS

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 at 9 August 2019
Action to be taken:	Paragraph 21

System Operation

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.

2 The geographic distribution of all reported SAR events for which Cospas-Sarsat alert data was used in 2018 is presented in Figure 1 and the distribution of all SAR events (maritime, aviation and PLB) for the period from January to December 2018 is shown at Figure 2. 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.

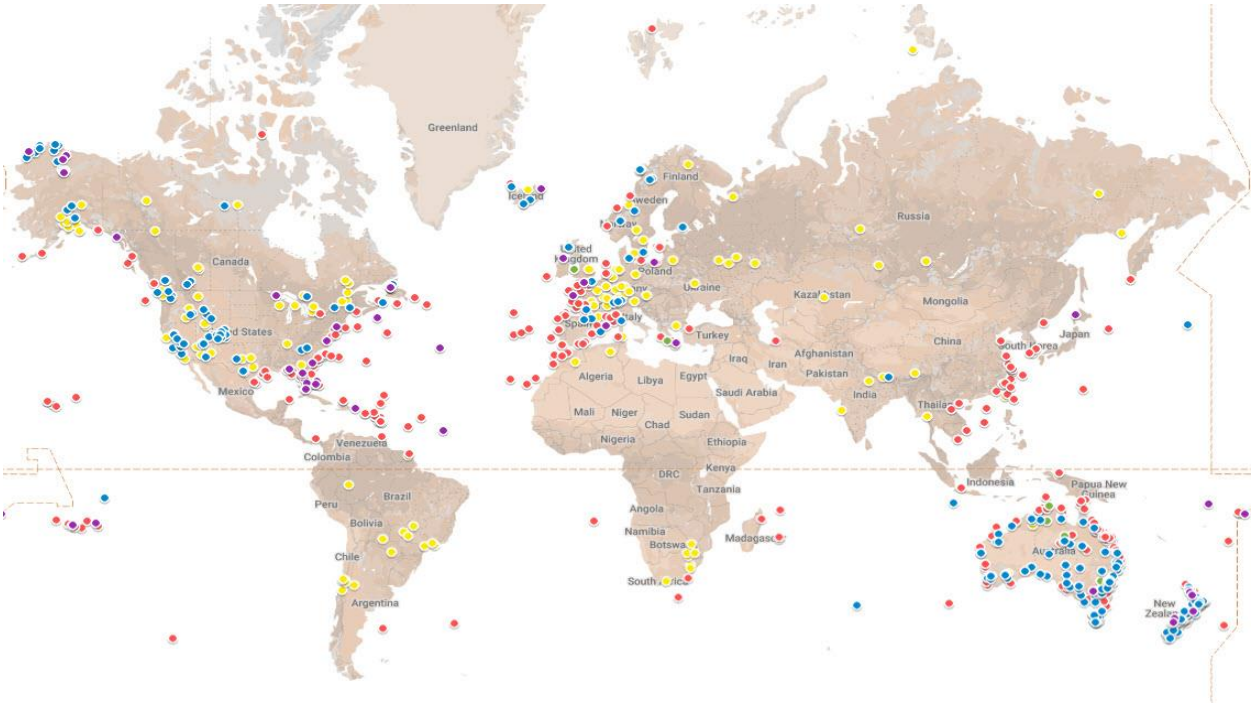

Figure 1: 2018 Distribution of SAR Events*

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

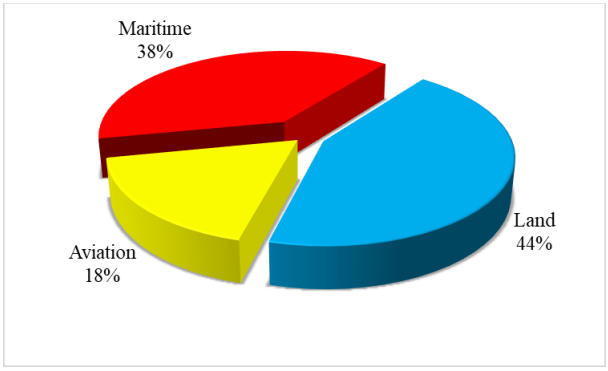

Figure 2: 2018 Type of SAR Events

3 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. As historically has been the case, aviation ELTs have false-alert rates several times greater than EPIRBs and PLBs. Past evidence has indicated that this is a persistent issue of pilot or maintenance-crew error, where ELTs are activated for test, rather than properly following the test-function procedures prescribed by the manufacturer in the operating manual.

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

4 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 2018.

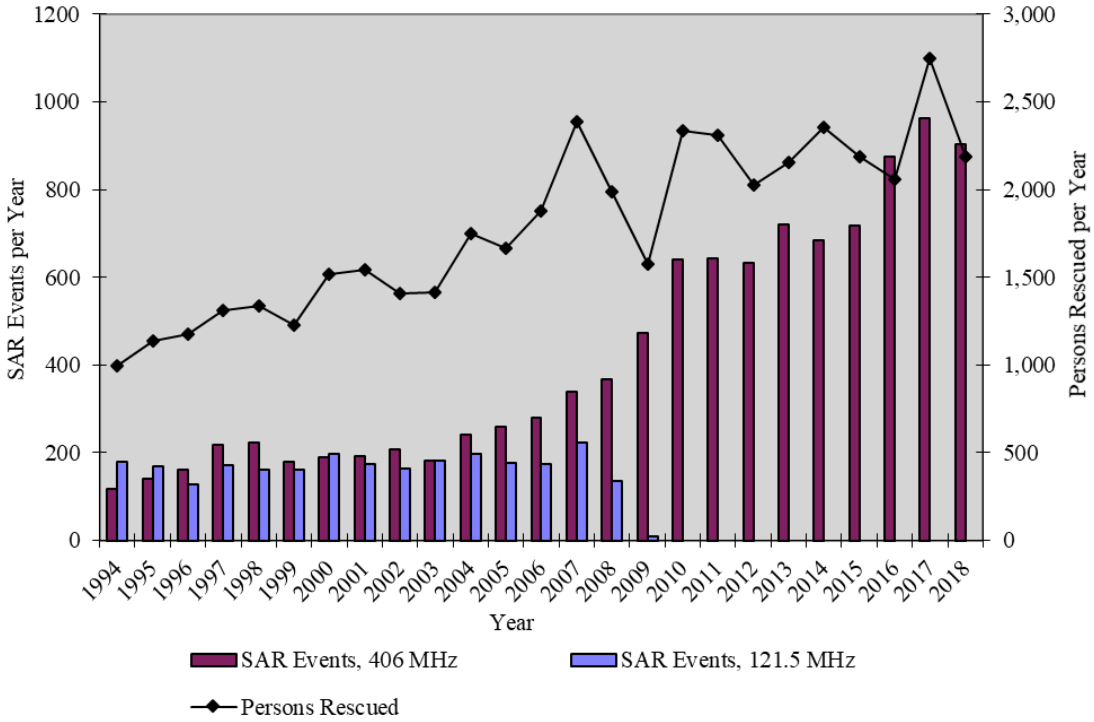

Figure 3: Number of SAR Events and Persons Rescued with the assistance of Cospas-Sarsat alert data (January 1994 to December 2018)

406 MHz beacons

5 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).

6 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.

7 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
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)

8 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 1 August 2019, there were 81,851 beacons registered in the IBRD (77,397 at 1 August 2018) from 147 Administrations (new in 2019 was Nauru). Since 2015, on average 402 SAR users per month have logged into the IBRD to search for beacon registration information.

9 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 technology "second generation beacons" (SGBs) and 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 by late 2019/early 2020.

The System

10 As of 1 August 2019, five LEOSAR and eight GEOSAR spacecrafts were in operation, supported by 55 LEOLUTs, 26 GEOLUTs and 31 MCCs (Figure 4). 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, Malaysia and Qatar is currently under development.

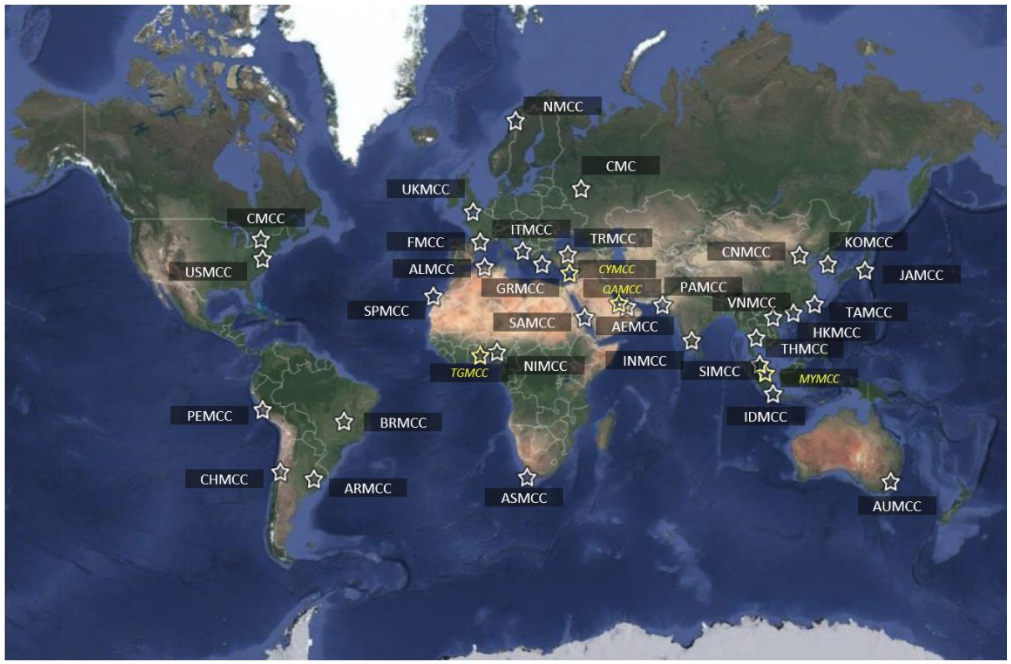

Figure 4: Locations of commissioned mission control centres

11 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 five commissioned MEOSAR-capable MCCs (in Australia, France, Norway, Spain and the United States). Seventeen MEOLUTs (with up to 281 channels) are commissioned at EOC and at least 20 more MEOLUTs are planned for between 2018 and 2020.

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

Performance measurement: Cospas-Sarsat assisted SAR events

13 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.

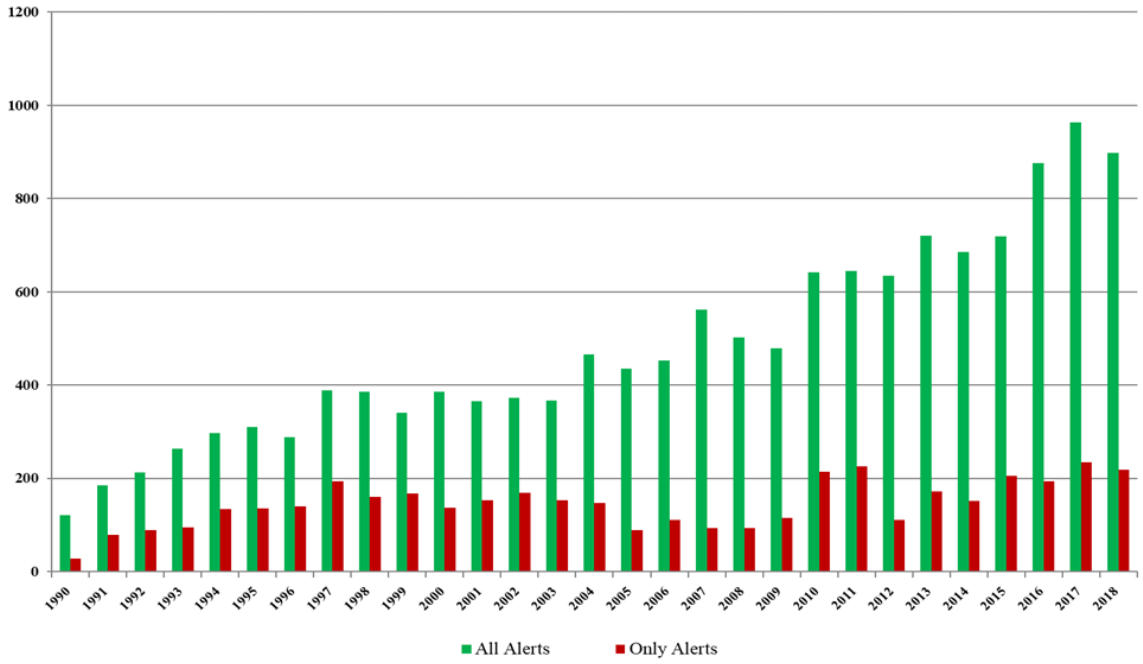

Figure 5: Annual Number of SAR events where Cospas-Sarsat assisted or provided the only alert (1990 - 2018)

SPOC communication

14 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 2014-1018. 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, 2860 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%
Insufficiently-responsive SPOCs	**25.6%**	**23.56%**	**23.32%**	**24.84%**	39	**25.32%**

Table 4: SPOC communication test results (2014 - August 2018)

15 For the purpose of the statistics in Table 4, 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.

Non-responsive SPOCs	Rarely responsive SPOCs	SPOCs with low success ratio
(No response to tests)	(Less than 20% successful tests)	(Between 20 and 50% successful tests)
Benin (Republic of)	Côte d'Ivoire (Republic of)	Bulgaria (Republic of)
Central African Republic	Eritrea	Burkina Faso
Chad (Republic of)	Ethiopia (Federal Democratic Republic of)	Cameroon (Republic of)
Congo (Republic of the)	Ghana	Cape Verde (Republic of)
Djibouti (Republic of)	Liberia (Republic of)	Hungary (Republic of)
Equatorial Guinea (Republic of)	Moldova (Republic of)	Kazakhstan (Republic of)
Gambia (Republic of the)	Palestine (In accordance with Resolution 99 Rev. Antalya, 2006)	Mauritania (Islamic Republic of)
Gabonese Republic	Senegal (Republic of)	Namibia (Republic of)
Guinea (Republic of)	Sierra Leone	Niger (Republic of the)
Guinea-Bissau (Republic of)	Suriname (Republic of)	Romania
Mali (Republic of)		Rwanda (Republic of)
Sao Tome and Principe (Democratic Republic of)		Somali Democratic Republic
South Sudan		Syrian Arab Republic
Tajikistan		Togolese Republic
		Turkmenistan
		Yemen (Republic of)

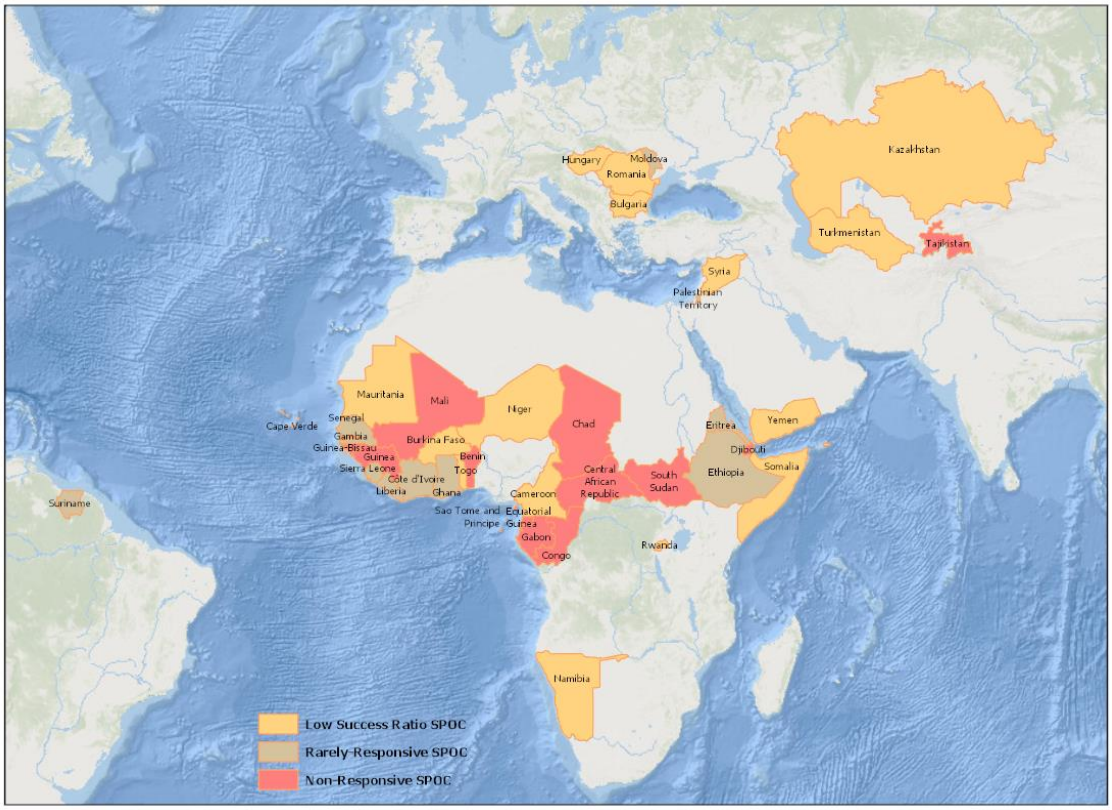

Table 5: 2018 List and map of non-responsive SPOCs

16 Results for 2018 indicate that the percentage of SPOCs that are insufficiently responsive or non-responsive to communication tests SPOCs rates remains consistent with prior years, despite extensive efforts at international meetings to engage directly the countries with poor performance. As a relatively new measure to prompt better response, Cospas-Sarsat in 2015 (drawing from the efforts of South Africa and other countries, and working with ICAO) 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).

17 Since the implementation of the first SPOC agreement/arrangement based on the model, concluded between the Italian MCC and Serbian SPOC and Sudanese SPOCs, comparative results for these SPOCs are noted below:

ITMCC/SPOC	**2016**	**2017**	**2018**
Serbia	100%	100%	95%
South Sudan	0%	16%	68%

The SAMCC experienced complete failures with the SPOCs below in 2017 communication tests but somewhat recovered in 2018:

SAMCC/SPOC	2016	2017	2018
Syrian Arab Republic	45%	0	33%
Yemen (Rep. of)	73%	0	25%
Kuwait (State of)	82%	0	67%

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

- Chilean MCC – Republic of Paraguay
- Italian MCC – Republic of Macedonia
- Italian MCC – Republic of Serbia
- Italian MCC – Sudan Civil Aviation Authority
- Norwegian MCC – Swedish Maritime Administration
- United Kingdom Maritime and Coast Guard – Irish Coast Guard
- United States MCC - Corporación Centroamericana de Servicios de Navegación Aérea (COSESNA)
- United States MCC - Government of Bermuda
- United States MCC – Republic of Ecuador
- United States MCC – Republic of Haiti
- United States MCC – Trinidad and Tobago
- United States MCC - Dominican Republic
- United States MCC – Dutch Caribbean Coastguard
- United States MCC - Republic of Panama

System enhancements

19 Future enhancements to System operations (Figure 7) continue to focus primarily on development of technical specifications for the next-generation space segment (MEOSAR), ELTs for (in-flight) distress tracking (ELT(DT)s), the Return Link Service (RLS) and second-generation beacons (SGBs). 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.

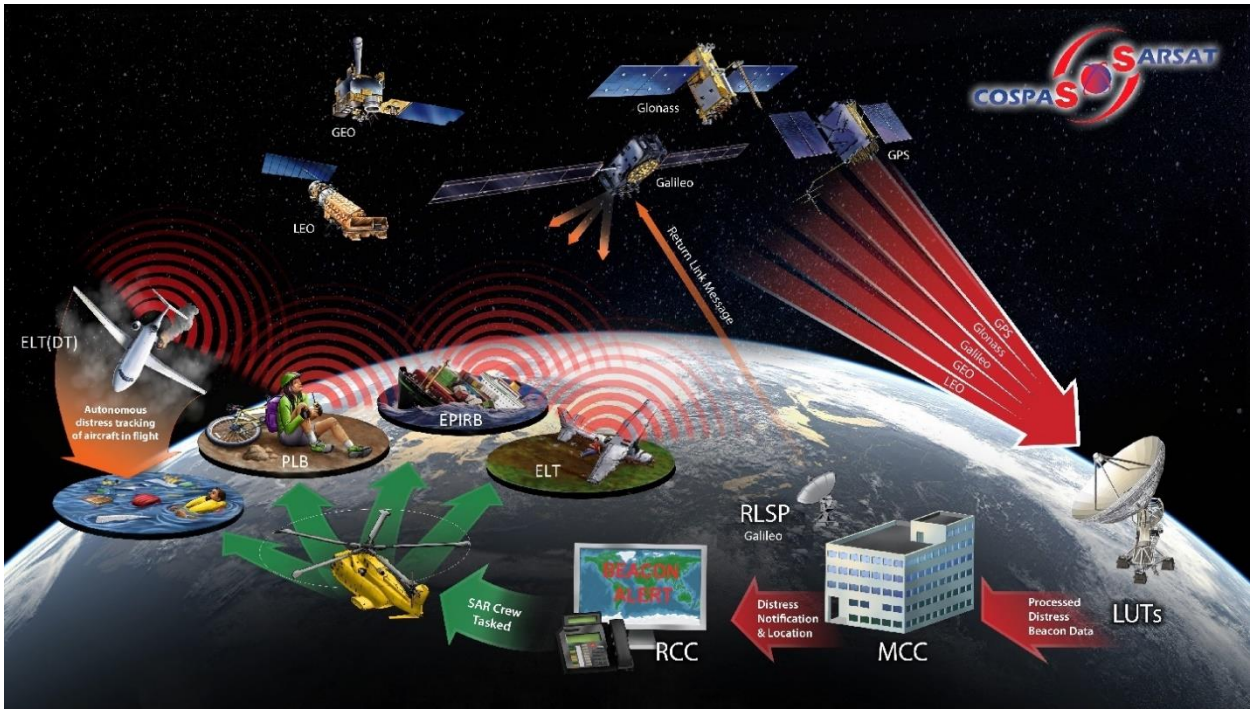

Figure 7: The Cospas-Sarsat System concept

Training material and public relations

20 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). Cospas-Sarsat is investigating means to host the videos in a manner which will make them accessible to Administrations that do not allow access to YouTube.

Action requested of the JWG

21 The JWG is invited to note the information provided on the status of the Cospas-Sarsat Programme and comment on future developments of the System, as appropriate.