



**International Civil Aviation Organization**

# ***AFRICA AND INDIAN OCEAN SEARCH AND RESCUE PLAN***

***First Edition – Draft***

***Version 2.0***

***Prepared by the AFRICA AND INDIAN OCEAN (AFI) SEARCH AND RESCUE (SAR) TECHNICAL EXPERTS TEAM***

This Plan was developed by the AFI Search And Rescue Technical Experts Team – (SAR TET) based on the EUR template.

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**EASTERN AND SOUTHERN AFRICAN (ESAF) OFFICE OF ICAO**

**International Civil Aviation Organization (ICAO)**

United Nations Office at Nairobi Complex, Gigiri  
P.O. Box 46294-00100 GPO  
Nairobi, Kenya

E-mail: [icaoesaf@icao.int](mailto:icaoesaf@icao.int)

Tel: +254 20 7622395 / 6

Fax: +254 20 7621092

Web: <http://www.icao.int/ESAF>

**WESTERN AND CENTRAL AFRICAN (WACAF) OFFICE OF ICAO**

**International Civil Aviation Organization (ICAO)**

Aéroport International Léopold Sédar Senghor  
Boîte postale 38 050 DAKAR/YOFF  
Dakar, Sénégal

E-mail: [icaowacaf@icao.int](mailto:icaowacaf@icao.int)

Tel: +221 33 869 24 24

Fax: +221 33 820 32 59

Web: <http://www.icao.int/WACAF>

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<p><b>1<sup>st</sup> Draft Document June 2021</b></p> <p><b>2<sup>nd</sup> Draft Document August 2021</b></p>

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## 1. SCOPE OF THE PLAN

### Plan Structure

#### 1.1

The Africa and Indian Ocean (AFI) Search and Rescue (SAR) Plan (hereinafter referred to as the 'Plan') references different levels. At the higher level are global requirements established by ICAO Annex 12 to the ICAO Convention on International Civil Aviation (ICAO Doc 7300). Global guidance material is provided by the International Maritime Organization (IMO) and ICAO's joint publication, the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual. Beneath this is regional planning guidance primarily provided by this Plan and other regional guidance material, to enable States to define the goals and means of meeting objectives for State planning towards improving AFI States SAR System capability, such as Regional Air Navigation Plan (AFI ANP, ICAO DOC 7474) objectives.

1.2 The global air navigation perspective is guided mainly by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP, Doc 10004).

1.3 The scope of the Plan is the identification of:

- the current status of SAR preparedness of African Indian Ocean (AFI) Search and Rescue Plan, AFI Region States and State SAR arrangements;
- recommendations for SAR planning and preparedness enhancements, in terms of compliance with the Convention on International Civil Aviation, Annex 12, IAMSAR Manual guidance, and accepted best international practice; and
- recommendations to IMO for harmonised and interoperable delivery of both aeronautical and maritime SAR services

1.4 References in the Plan to 'States' are intended to include all AFI States.

### Plan Review

1.5 As an iterative process, the Plan requires regular updating to keep current with changes in ICAO Annexes and guidance material, the IAMSAR Manual, regional aviation activity, developments in the Air Traffic Management (ATM) system, new technology, political considerations, human performance, and lessons learned from actual SAR responses. Plan updates should also focus on the SAR system being an important component of an integrated regional and global air navigation system. It is intended that ICAO and its contributory bodies conduct a complete review every three years from 2023 (or a shorter period determined by the AFI Planning and Implementation Regional Group (APIRG) of the Plan to align with the review cycle of the IAMSAR Manual. The review should be guided by a consultative process involving States and relevant International Organisations such as the ICAO and IMO.

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## 2. OBJECTIVES

### Introduction

2.1 Africa and Indian Ocean States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of Annex 12. Increases in aviation traffic throughout the AFI Region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical SAR services.

2.2 The world's citizens, who frequently fly over AFI region, expect a timely and adequate SAR response to be provided should it be required. States in the region need to be adequately prepared for the provision of efficient and effective SAR services to their responsible Search and Rescue Regions (SRRs). To assist in achieving this, it is essential for States to cooperate, collaborate and in some cases assist with resources to neighboring and sub-regional RCCs after request from the appropriate RCC.

2.3 ICAO Regional Offices maintain a record, as reported to ICAO by the States themselves, of the status of individual State SAR compliance against Annex 12 requirements. There are significant variations in the level of State SAR capability across the region with significant gaps requiring urgent action, especially in high seas areas. The ICAO Universal Safety Oversight Audit Program – Continuous Monitoring Approach (USOAP-CMA) also provides a useful tool to States to self-assess their individual SAR system status.

2.4 There is a high risk of negative consequences to a State which does not provide an adequate SAR response to an aircraft or vessel in distress in their area of responsibility. The primary concern is the higher probability for loss of lives which may have been saved. The ability for news to spread rapidly in today's technologically connected world can result in damage to that State's reputation internationally and potential economic loss to sensitive State industries such as tourism and transport. Conversely, this same ability to communicate rapidly, also provides the opportunity to States to improve their response, and to quickly reach a global audience. However, the benefits of an effective and reliable SAR service offers many advantages to States. Besides reduction of loss of life and human suffering, other advantages include:

- a) Safer and more secure environment for aviation related industries, commerce, recreation, and travel. Increased safety may promote use and enjoyment of aviation environment, tourism, and economic development. This is especially true when the SAR system is associated with programs aimed at preventing or reducing the effects of mishaps, sometimes referred to as "Preventative SAR."
- b) Availability of SAR resources often provides the initial response and relief capabilities critical to saving lives in the early stages of natural and man-made disasters. SAR services offer an integral part of local, national, and regional emergency management systems.
- c) Well performed SAR operations can provide positive publicity about situations which may otherwise be viewed negatively. This can lead to improved public confidence in that State's reputation and commitment to providing a safe environment, leading to increased confidence to conduct activities beneficial to that State's economy.
- d) As SAR is a relatively non-controversial and humanitarian mission, it provides an excellent opportunity to enhance cooperation and communication in general between States and Organisations, not only for SAR. It can also foster better working relationships between States and Organisations at the local, national, and international levels, including civil/military cooperation.
- e) States should however, implement measures to prohibit and control the immediate spreading of Aviation accident on-scene footage by all media and should find a way to integrate the permission for such with the Annex 13 and Annex 19 requirements. (Protection of Safety Information)

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- f) ARCC/MRCC/JRCC must be manned by suitably qualified personnel, with a vast Aviation/Maritime background.

2.5 Previous accidents like Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 resulted in probably the largest and most expensive search response for a missing aircraft in human history. These tragedies have highlighted vulnerabilities in the current air navigation system, including the SAR system, which have hampered timely identification and localization of aircraft in distress, hindering effective response efforts. ICAO is taking measures to assist with addressing these vulnerabilities through the Global Aeronautical Distress and Safety System (GADSS) concept; however this also requires improvements in global SAR capability.

2.6 The Plan is designed to address both civil and military SAR authorities and has been developed in consultation with AFI States, SAR administrations and other technical bodies. States should consult with stakeholders nationally, regionally, and internationally as appropriate and determine actions to commit to achieving the objectives of this Plan to meet the minimum SAR service requirements in accordance with ICAO Annex 12. It is noted that where a State is unable to meet minimum SAR Standards and Recommended Practices (SARPs) of ICAO Annex 12, Article 38 to the ICAO Convention requires notification to ICAO of the differences between its own practice and that established by the international standards.

2.7 It is a common practice for the military to conduct or have a major role in SAR operations to fulfil or assist in fulfilling the State's obligation to provide SAR services. From the perspective of providing SAR services, civil-military coordination takes on many forms. This includes coordination during an actual SAR response, national coordination with other agencies to determine the military role, part of an international agreement or set of procedures with a neighbouring State to assist in SAR response, or other types of coordination. The Manual on Civil-Military Cooperation in Air Traffic Management (Doc 10088) is focused on airspace management and includes SAR matters relevant to civil-military coordination in airspace management.

2.8 The IAMSAR Manual, Volume II, Chapter 7 Multiple Aircraft Operations has guidance on establishing areas of SAR action to assist with the safe coordination and management of aircraft operations during SAR operations. SAR authorities should have procedures in place to rapidly notify airspace users of SAR operations and the establishment of any temporary airspace operation such as danger areas or restricted areas through appropriate State authorities. The combination of guidance in the IAMSAR Manual and ICAO Document 10088 should enable a State to have an appropriate plan in place for civil-military coordination and cooperation in readiness for efficient and effective SAR response.

2.9 States should aim to meet their obligations progressively in a strategically structured and planned manner with improvement goals set for short term, medium term and long term implementation. It may be more productive to make gains in small steps commencing with measures that are more easily achievable in the short term and have a minimal cost, progressing to measures which will take longer to implement over the medium to long term. Short term measures that may be implemented relatively easily include the establishment of a national SAR Committee and ensuring SAR Agreements (Appendix 2) are in place with neighboring States allowing for seamless cross-border transit of search assets engaged in SAR activity. A SAR agreement can be in the form of 'Letter of Agreement' (LOA) or a Memorandum of Understanding (MOU) for other acceptable term indicating a lower form of arrangement for operational matters between SAR service providers (such as RCCs and/or RSCs) or a more formal agreement for arrangements between governments concerned, according to the national legislation of every State.

2.10 A regional approach can reduce cost and improve distribution of distress alerts, coverage, and services. For example, it is usually less operationally complex, and more economical and effective, for States within a region to share the use and support of long-range terrestrial and satellite

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communications facilities and communications registration databases to support SAR. States can sometimes support each other with SRUs to reduce the total number of units needed for adequate coverage and readiness. Training and other types of resources can be shared to everyone's benefit. Nevertheless, participation in a regional system may not be the best approach for every State.

2.11 Each SRR is associated with an RCC. Search and rescue regions should, in so far as practicable, be coincident with corresponding flight information regions and, with respect to those areas over the high seas, maritime search and rescue regions. The purpose of having an SRR is to clearly define who has primary responsibility for coordinating responses to distress situations in every area of the world and to enable rapid distribution of distress alerts to the proper RCC. For this reason SRRs shall not overlap and neighboring regions shall be contiguous. Aeronautical SRRs often are aligned with FIRs for specific reasons but experience shows that in most areas there are operational advantages in harmonizing aeronautical and maritime SRRs.

2.12 A regional SAR plan is a way to provide a framework to guide national SAR authorities towards attaining this co-operation. Once a regional SAR plan is developed, high-level commitment between States can be reached by means of written agreement or through a multilateral MOU.

2.13 All States are encouraged to use the guidance provided within this Plan as a way forward, thus ensuring a timely, well-coordinated response to any aviation SAR incident within their area of responsibility, or during cooperative responses involving more than one Search and Rescue Region (SRR) and under coordination of the appropriate RCC.

### **Plan Objective**

2.14 The objective of this SAR Plan is to provide a framework to assist AFI States to meet their SAR needs and obligations accepted under the Convention on International Civil Aviation and to improve the cooperation between aeronautical and maritime SAR services, within their area of responsibility and across other ICAO regional boundaries, where applicable.

2.15 The Plan is to be consistent with the SARPs of Annex 12 - and aligned where appropriate with the SAR technical and operational standards and guidance of the IAMSAR Manual.

2.16 The Plan recognizes that ICAO serves as the forum for the implementation of practical and achievable measures to improve SAR services for international civil aviation. The Plan also recognizes that the IMO provides a similar forum for SAR services to maritime shipping.

2.17 Both ICAO and IMO share the same goal of ensuring that SAR services are available globally wherever people sail or fly. The SAR services that ICAO and IMO promote are complementary and offer tangible opportunities to derive mutually beneficial efficiencies for both the aviation and maritime transportation SAR systems globally, regionally, and nationally. For this reason ICAO and IMO jointly developed the IAMSAR Manual and working together under ICAO/IMO Joint Working Group on SAR (ICAO/IMO JWG) to assist State authorities to economically establish effective SAR services, to promote harmonization of aeronautical and maritime SAR services, and to ensure that persons in distress will be assisted without regard to their locations, nationality, or circumstances. State authorities are encouraged to promote, where possible, harmonization of aeronautical and maritime SAR services.

2.18 The objective of this Plan includes encouraging States to take advantage of such efficiencies. States should, where practicable, align their SAR systems with the guidance provided by the IAMSAR Manual, which also provides the benefit for standardised SAR coordination between RCCs and across SRR lines of delineation.

2.19 State SAR plans describe how SAR services will be provided, organized, and supported for States to meet their obligations under the relevant Conventions. Search and Rescue Administrations and SAR managers oversee and implement these plans. National SAR plans should be signed by all

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Government agencies which can provide or support SAR services. These agencies should all be represented on the State's Search and Rescue Coordinating Committee (SCC), which oversees these plans.

## **Plan Development**

2.20 The Plan was developed as part of a requirement of the AFI Plan by the AFI SAR TET. In addition, the Plan should consider the AFI ATM Master Plan, the Air Traffic Flow Management (ATFM) Framework and the Regional Contingency Arrangements, so the Plan should not be considered in isolation.

2.21 The Plan is expected to provide guidelines and recommendations for AFI States to consider for the enhancement and improvement of national, sub-regional and regional SAR capability including:

- a) compliance with ICAO Annex 12 SARPs;
- b) identification and addressing of deficiencies in SAR capability;
- c) continuous and coherent development of SAR capability;
- d) harmonisation of aeronautical and maritime SAR services;
- e) civil/military cooperation and coordination (including SAR response, information sharing and use of airspace);
- f) remote high seas SAR response capability (including provision for Mass Rescue Operations (MRO));
- g) establishment and review of arrangements between neighboring States to expeditiously facilitate SAR coordination, operations and cooperation across regional boundaries including contingency procedures;
- h) facilitation of the implementation of SAR systems and services including the establishment of JRCCs where suitable and practicable;
- i) supporting the sharing of SAR information, data and expertise;
- j) integration with ATM systems and future ATS developments, where appropriate;
- k) monitoring of outcomes from APIRG Sub-Groups, other ICAO Region SAR groups, ICAO/IMO Joint Working Group on Harmonisation of Aeronautical and Maritime SAR (JWG) and related forums for issues that may affect the Plan;
- l) facilitation of a continuous reporting mechanism of State SAR capability, ICAO Annex 12 compliance and SAR performance data to the AFI Regional Offices through appropriated contributory groups;
- m) implementation of a SAR System Improvement and Assessment measures, including Safety Management System, Quality Assurance program and risk assessment;
- n) coordinating the introduction of new technology affecting the regional SAR system;
- o) sharing future research and development concepts;
- p) seeking efficiencies, through the coordination and facilitation of concurrent regional SAR meetings, seminars, workshops, and exercises, including joint ICAO and IMO, and sub-regional forums where practicable; and
- q) conducting efficient SAR Exercises (SAREXs) that identify improvements and latent problems.

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2.22 The Plan elements should be periodically reviewed by ICAO and the TET members to ensure that they remain relevant to the SAR system, particularly for new technology developments and alignment with other relevant global SAR plans.

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### 3. EXECUTIVE SUMMARY

**This summary is under review:**

3.1 ICAO reported the following statistics regarding global civil aviation in 2020

- ? billion passengers;
  - Africa ? market share (? million passengers.)
- ? million tons of freight;
- ? scheduled airlines; and
- ? aircraft in service.

DECEMBER 2019 (% YEAR-ON-YEAR)	WORLD SHARE	RPK	ASK	PLF (%-PT)	PLF (LEVEL)
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#### Total Market

#### AFI

*RPK: Revenue Passenger Kilometers measures actual passenger traffic;*

*ASK: Available Seat Kilometers measures available passenger capacity;*

*PLF: Passenger Load Factor is % of ASKs used.*

*Source: IATA*

3.2 AFI States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services to their area of responsibility per the requirements of Annex 12 - Search and Rescue. Increases in aviation traffic throughout the AFI region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical SAR services.

3.3 Considering that some AFI States have the challenging responsibility for providing a SAR service over vast and remote areas, the importance for States with high seas to cooperate, collaborate and share resources with their neighboring and regional/sub-regional RCCs is essential.

3.4 High-level support might be necessary from regional bodies that can effectively support the Plan's implementation, such as the:

- COSPAS-SARSAT
- Galileo Search and Rescue (SAR) Service;
- Search and rescue AFI – Annual Regional Summit;

#### SAR System Funding

3.5 The level of funding provided for effective SAR systems is a matter of concern for all senior decision-makers. The resources should be sufficient to develop and/or maintain the required SAR service per their obligations as signatories to the relevant aeronautical SAR conventions. This may require the development of business cases to governments outlining where additional funding is required.

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3.6 Such business cases should include consideration of amendments to existing State SAR arrangements which may provide more efficient delivery of the SAR service by better utilisation of existing resources (for example by establishing Joint RCCs (JRCCs), or additional funding sources where required (for example charging a levy to aircraft operators for providing the SAR service or seeking company sponsorship for SRUs).

### **Joint Rescue Coordination Centres (JRCCs)**

3.7 Where practicable, States are encouraged to examine the potential benefits that may be derived by the establishment of JRCCs to incorporate the aeronautical and maritime SAR activities and/or facilities of ARCCs/ARSCs and MRCC/MRSCs. JRCCs have the potential to not only provide a more effective SAR service to both the aeronautical and maritime industries, but also offer potential financial efficiencies by releasing funds for improvements in other SAR areas.

*Note: Where JRCCs are not practicable, development of facilities and procedures which provide and/or enhance effective SAR coordination and collaboration between the ARCCs and MRCCs in support of each other, to provide an efficient and integrated State SAR system for both aeronautical and maritime SAR incident response.*

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#### 4. ABBREVIATIONS AND ACRONYMS

ACO	aircraft co-ordinator
ADT	Autonomous Distress Tracking
ANSP	Air Navigation Service Provider
<b>AFI</b>	<b><i>Africa and Indian Ocean</i></b>
APIRG	AFI Planning and Implementation Regional Group
<b>AANDDD</b>	<b><i>Air Navigation Deficiency Database</i></b>
ARCC	Aeronautical Rescue Coordination Centre
ARSC	Aeronautical Rescue Sub-Centre
A/SMC	Assistant SMC
ASPOCS	Administrative Single Point of Contact for SAR
ATC	Air Traffic Control
ATS	Air Traffic Services
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CONOPS	Concept of Operations
COSPAS-SARSAT	International Satellite System for Search and Rescue
SARSAT Search and	Rescue Satellite-Aided Tracking
EI	Effective Implementation
ELT	Emergency Locator Transmitter
ELT(DT)	Emergency Locator Transmitter (ELT) Distress Tracking
GADSS	Global Aeronautical Distress and Safety System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
IAMSAR	International Aeronautical and Maritime SAR (Manual)
IMO	International Maritime Organization
iSTARS	Integrated Safety Trend Analysis and Reporting System
JRCC	Joint (aeronautical and maritime) Rescue Coordination Centre
JWG	ICAO/IMO Joint Working Group on the Harmonisation of Aeronautical and Maritime Search and Rescue
LOA	Letter of Agreement
MCC	Mission Control Centre
MEOSAR	Medium-altitude Earth Orbit Search and Rescue
MRCC	Maritime Rescue Coordination Centre
MRO	Mass Rescue Operations
MRSC	Maritime Rescue Sub-Centre
OJT	On-the-Job Training
OSC	On-scene Co-ordinator
<b>APIRG</b>	<b>ICAO – Planning and Implementation Regional Group</b>
PQs	Protocol Questions
PSCS	Preferred SAR Capability Specifications
RCC	Rescue Coordination Centre
RPK	Revenue Passenger Kilometres
RPAS	Remotely Piloted Aircraft Systems
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SAREX	SAR Exercise
<b>SC</b>	<b>SAR Coordinator</b>
SCC	Search and Rescue Coordinating Committee
SMC	Search and Rescue Mission Coordinator

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SMS	Safety Management System
SPOC	SAR Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SWIM	System Wide Information Management
USOAP-CMA	Universal Safety Oversight Audit Programme – Continuous Monitoring Approach
VSP	Variable Set Parameter

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## 5. BACKGROUND INFORMATION

### Improvement Drivers

5.1 The ICAO USOAP-CMA focuses on a State's capability in providing safety oversight by assessing whether the State has effectively and consistently implemented the critical elements of a safety oversight system and determining the State's level of implementation of ICAO's safety –related SARPs, including Annex 12 Search and Rescue, and associated procedures and guidance material.

5.2 ICAO AFI Regional Offices maintain an Air Navigation Deficiency Database (AANDD). The AANDD is based on the uniform methodology for identification, assessment and reporting of such deficiencies in the APIRG Handbook. By identifying and addressing specific deficiencies, APIRG and its Sub-groups facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary.

5.3 The ANS Deficiency information had been populated into the ICAO *iSTARS* (Integrated Safety Trend Analysis and Reporting System) database and was accessible through the ICAO Secure Portal. The intention is to merge this data with the CMA Data, and manage the deficiencies using a single web-based process.

### AFI SAR System Monitoring

5.4 Significant Annex 12 compliance weaknesses had been identified within the AFI region based upon information provided (and in many cases not provided) by States to the ICAO Regional Offices. This regional information status of the SAR capability and SAR agreements was recorded in tables made available to AFI States, which was expected to be enhanced with the integration of SAR elements into the Seamless ATM on-line monitoring system.

### ICAO Global Aeronautical Distress and Safety System (GADSS)

5.5 The tragedies of Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 had highlighted vulnerabilities in the current air navigation system which had hampered timely identification and location of aircraft in distress, particularly remote oceanic areas. This had significantly hindered effective SAR efforts and recovery operations.

5.6 As part of the response to the Conclusions and Recommendations from the ICAO Multi-disciplinary Meeting on Global Tracking, ICAO developed a Concept of Operations (CONOPS) for a Global Aeronautical Distress and Safety System (GADSS). The implementation of this target concept will have implications for the provision of services such as air traffic control, SAR, and accident investigation. It contained many measures targeting improvements in SAR system response integrated within the wider ATM and aviation operations systems.

5.7 The CONOPS noted that the effectiveness of the current alerting and SAR services should be increased by addressing several key improvement areas. The CONOPS also included aspects which potentially involve use of different distress systems, including for example 406 MHz Emergency Locator Transmitters (ELTs) and the COSPAS-SARSAT system as part of the proposed GADSS solution.

5.8 Guidance on the aircraft tracking function is provided in Circular 347, *Aircraft Tracking Implementation Guidelines*. Chapter 8 outlines procedures to be followed when an operator notifies an ATSU of a missed aircraft 15 minute tracking report. This circular is for aircraft operators and civil aviation authorities, and applies to the aircraft tracking function. Of particular relevance is Section 8.2 and Appendix C *Missed 4D/15 Position Report Form for Operator*. The operator is required to notify the air traffic services unit (ATSU) of a missed aircraft 4D/15 tracking report (four-dimensional position of individual aircraft in

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flight at 15-minute intervals). The information that the operator has to provide the ATSU closely aligns with what the ATSU has to provide the RCC. The ATSU can provide its information to the RCC by means of the ICAO alerting (ALR) message via an aeronautical communications link. However, joint and maritime RCCs may not be familiar with the ALR message and how to understand its information, and may not have the aeronautical communications link.

5.9 The ADT device notifies the aircraft operator (the airline) of the last known position of an aircraft that may be in a distress condition in flight. ADT activation is a notification, not a distress alert. This would be at one-minute intervals while the aircraft is in flight. The operator is responsible to make the position information available to the ATSUs and RCCs. ICAO is leading the effort to create an ADT Location of Aircraft in Distress Repository (LADR) as a database for storing the ADT information. The LADR would then notify the aircraft operator, and if subscribed, the ATSU and RCC that ADT information relevant to them is in the LADR for those stakeholders to pull the data.

5.10 The ATS unit may already be informed by other means of an emergency situation, such as from the aircrew. The aeronautical alerting process is based on the ATS unit making the decision about whether or not the aircraft is in distress and, if determined to be a distress situation, must notify the RCC immediately before contacting the operator per Annex 11. ICAO has not prescribed a specific technology for the ADT device but one of the technologies will be a new version of the aeronautical 406 MHz emergency locator transmitter – the ELT Distress Tracking ELT(DT).

5.11 ADT notifications from the ELT(DT) will also be delivered directly to SAR services using the existing Cospas-Sarsat ground segment infrastructure.

5.12 Having the ADT notifications from the ELT(DT) going directly to an RCC was not the original intent of ICAO and is a major change in the aeronautical alerting process envisaged under the GADSS. RCCs need to prepare for the ADT capability and that the aircraft could remain in flight across multiple SAR regions. Appendix 1 contains specific guidance on RCC procedures for ADT signals.

5.13 Since ADT notifications from the ELT(DT) route directly to an ARCC - RCCs may need to update SAR practices and procedures for concerns such as:

- accurate delimitation of SAR regions to ensure proper transfer of the SAR operation to the next responsible RCC;
- effective and efficient coordination between the ATS unit (or aeronautical RCC) and the maritime RCC;
- harmonized operations between aeronautical and maritime SAR services; and
- initial response to an ADT notifications from the ELT(DT) includes contact between the ATS unit and RCC to confirm if the aircraft is in distress. The ATS unit and RCC can determine what would be the appropriate amount of time to wait for the ATSU to complete its checks before notifying the RCC.

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## **COSPAS-SARSAT System**

5.14 COSPAS-SARSAT had been developing two major enhancements to its distress- alerting System of value to all System users, including the aviation industry. One is the introduction over the period of approximately 2016 to 2018, and beyond, of a new space-segment architecture based primarily on Medium-altitude Earth Orbit Search and Rescue (MEOSAR) payloads aboard the European Commission's Galileo system, the Russian Federation's Global Navigation Satellite System (GLONASS) and the United States' Global Positioning System (GPS) satellites.

5.15 This architecture would permit determination of a distress incident location (independent of any location data transmitted in the beacon message) beginning with the first burst from the distress beacon. This could mean near real-time and very frequent delivery of distress alerts.

5.16 The SAR/Galileo and SAR Glonass space segment, and SAR/Galileo ground segment would also provide a Return Link Service (RLS) that, among other possible future uses, would provide an acknowledgment back to the beacon to confirm when the distress message has been received.

5.17 The technical specifications for the second generation 406 MHz distress beacon has been approved, including ELTs. This new generation of beacons should further improve speed and accuracy in locating an activated distress beacon. The period from beacon activation to first transmission was expected to be reduced from 50 seconds to three seconds. The specification would consider a specific type of in-flight triggered ELT (ELT (DT)) designed to be activated prior to a crash when certain flight parameters were exceeded and to function in compliance with the ICAO GADSS requirements for the Location of an Aircraft in Distress Repository.

5.18 States needed to continue to ensure that aviators were aware that 121.5 MHz and 243 MHz beacons cannot be detected by the global COSPAS-SARSAT System and the low-power 121.5 MHz signal on the 406 MHz distress beacon was only intended as a final homing signal.

5.19 States also need to ensure the critical requirement to provide for a suitable, clear, and simple means for aircraft owners to register and keep updated their 406 MHz distress beacon details.

### *System Operation*

#### *406-Mhz Beacons*

5.20 Based on information received from manufacturers on beacon production and a standard assumption made about beacons removed from the market at the end of an assumed ten-year service life, there were approximately 1.7 million 406-MHz beacons in use worldwide at the end of 2015, an approximate 8% increase from the prior year. Using a different method of estimation, based on registration rates reported by Administrations, the total beacon population is over two million (up 12%), with over 300,000 ELTs.

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*Note: Information on beacon registry is in C/S S.007 Handbook of Beacon Regulation, Information on national Beacon Registration Point of Contact is at:*

*<http://www.cospas-sarsat.int/en/contacts-pro/contacts-details-all>*

*Information on IBRD is at:*

*<http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals>*

5.21 Entries in the beacon register should be available to both aeronautical and maritime RCCs on a 24 hour basis (Annex 12 – *Search and Rescue* refers, although Annex 10 establishes the registration requirement). States should note that Annex 12 should be read in conjunction with elements of the following ICAO Annexes:

*Annex 6 – Operation of Aircraft;*

*Annex 10 – Aeronautical Telecommunications;*

*Annex 11 – Air Traffic Services; and*

*Annex 14 – Aerodromes.*



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6.2 From this analysis, it appeared that the major areas of weakness is in coordination with adjacent States and their appropriate RCCs , effective SAR oversight, and training of SAR staff that provide the SAR services in their area of responsibility. Therefore, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other coordination mechanisms, including updates of SAR agreements was vital. Finally, there was a need for improved systemic approaches to training for both national SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAR exercises that test systems and personnel.

6.3 The overall SAR capability matrix table of AFI States, ICAO Annex 12 compliance, is indicated in **APPENDIX C**. The information presented in the table should be updated regularly by the States.

#### *AFI SAR Coordination Forums*

6.4 The AFI Region will benefit from the cooperation and coordination of States and ICAO involved in the AFI SAR TET. After the AFI SAR TET completes its tasks, the establishment of permanent Regional SAR Forums to enable collaboration and cooperation on high seas, including adjacent ICAO regions should be considered, such as:

- a) ICAO/IMO JWG;
- b) COSPAS-SARSAT;
- c) Regional SAR TET; and
- d) ICAO inter-regional SAR workshop

6.5 There were several regional initiatives for cooperative support and development already being undertaken in the AFI Region to assist with aeronautical SAR capability enhancement. These meetings are rotated between the different Regions and are endeavoring a recurring schedule mostly biennial.

6.6 Such improvement programs could result from a request by a State needing assistance, or from ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) Online Framework, or by the users of the SAR system itself (RCCs), that identifies weaknesses in the State's SAR capability. The programs can be conducted by a 'Go Team' that normally consists of external SAR experts from ICAO, or through a cooperative effort by several States or external agencies such as COSPAS-SARSAT.

#### **CHALLENGES**

6.7 The following potential *challenges* should be considered to ensure they do not become barriers to the achievement of the expected SAR capability:

- a) absence of established appropriate legal framework designating, recognizing, supporting and giving authority to national SAR authorities, RCCs and SMCs;
- b) inadequate funding and equipping of SAR authorities and in particular, resourcing of RCCs;
- c) absence of an appropriate SAR organizational framework;
- d) absence of a national SAR committee;
- e) lack of clarity of responsibilities for each component of the SAR system;
- f) absence of bilateral/multi-lateral/international SAR Agreements;

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- g) inadequate civil/military cooperation;
  - h) complacency about, or lack of recognition of, the importance or priority given to SAR; and
  - i) absence of alleviation for civil SAR aircraft from the 'rules of the air';
  - j) *low number of qualified SAR regulators/inspectors in the AFI Region;*

## **Global and Regional SAR Issues**

6.8 States should monitor outcomes from global and regional ICAO SAR forums to ensure their State SAR authorities are updated on relevant SAR developments, otherwise State planning may not be synchronized with external international expectations, including users. Such forums may include APIRG and its Sub-Groups, other ICAO Region SAR groups, the ICAO/IMO JWG, ICAO High Level Safety Conferences, etc.

6.9 The provision of sufficient resources was critical in their area of responsibility (national responsibility), including:

- a) Financial:
  - funding for 24 hour RCC facility and staff;
  - funding for use/hire of search and rescue units; and
  - Provision of a suitable administrative process enabling financial support including the ability for SAR authorities to quickly authorise payments required for emergency response aircraft, vessels and supporting logistics such as fuel or other legal issues.
- b) RCC personnel- a suitable number of trained and skilled staff, supplemented by a pool of trained RCC support staff where appropriate;
- c) RCC facilities:
  - appropriate RCC facility space;
  - minimum RCC tools (such as current charts, plotting equipment, documentation, etc.);
  - identify and task available SRUs;
  - Aircraft and vessel tracking information, Automatic Identification System, etc.;
  - reliable and rapid H24 communications, and a suitable means to-
    - receive and communicate distress alerts
    - communicate with ATS units, other RCCs/RSCs, Coast Radio Stations, COSPAS-SARSAT Mission Control Centres (MCCs), military units, medical services, meteorological offices, etc.;
  - information technology:
    - RCC workstation computers;
    - Software including basic databases, drift modelling, incident management, etc.;
- d) Contingency- back-up RCC facility, or arrangement with another RCC or other national operation Centre as a contingency against inability to operate from the primary RCC due to the need to evacuate or loss of systems, etc.;
- e) Search and Rescue Units (SRUs):
  - available and suitable SAR units (e.g. aircraft, helicopters, vessels, land units, medic teams etc.);
  - funding arrangements/agreements for hiring/payment/sharing of SRUs to permit rapid deployment; and
  - Available and suitable SAR survival equipment for delivery by aircraft to survivors and to assist SAR coordination efforts (e.g.: droppable life rafts and survival supplies, etc.);

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- f) Training support:
- SCs, SMCs and OSCs staff – basic and ongoing;
  - Operational facilities which need training include:
    - aeronautical units
    - maritime units
    - land units
    - specialized units (para-rescue, paramedical, desert rescue, mountain rescue, urban SAR teams that deploy to disasters), divers, etc.
    - supply depots; and
  - RCC support staff – basic and refresher.
  - SAR inspectorate staff– basic and ongoing.

## 8. PERFORMANCE IMPROVEMENT PLAN

7.1 *Legal Framework and Structure Planning*: All States should develop statutes and related provisions that establish or enhance the legal foundation for a State SAR organization and its framework, resources, policies, and procedures to, where appropriate to:

- a) ensure that it is party to, and/or aligned with the following Conventions, Regional Agreements, Manuals as applicable:
  - i. Convention on International Civil Aviation 1944 and its Annexes;
  - ii. Regional Air Navigation Agreement approved by ICAO Council;
  - iii. AFI SAR Regional Agreement approved by ICAO Council; and
  - iv. IAMSAR Manual
- b) unless delegated by written agreement between States, establish an entity that provides, on a 24-hour basis, aeronautical SAR services within its territories and designated area of responsibility/SRR;
- c) establish a national SAR coordinating committees (SCCs) consisting of SAR system stakeholders to enable a whole-of-government approach;
- d) empower SAR Mission Coordinators with the authority to adequately carry out their responsibilities;
- e) establish an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office;
- f) conduct studies to check the feasibility for, and develop an implementation plan if practicable, the integration of aviation and maritime SAR activities, when applicable, and as far as practicable, civil and military activities, including joint training and familiarisation of staff and review of documentation to ensure harmonisation of procedures, and joint exercises;
- g) conduct studies to align, as far as practicable, aeronautical, and maritime Search and Rescue Regions (SRRs); and SRRs and Flight Information Regions (FIRs); and
- h) establish a single State SAR Plan that:
  - i. designates the responsible RCC(s), RSC(s) and 24-hour SPOC/ASPOC;
  - ii. describes the relevant SRRs, including the coordinates and geographical chart depiction of the SRR and neighboring SRRs;
  - iii. details the National SAR Committee;

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- iv. details the governmental and non-governmental agencies with authority and responsibility for SAR coordination within its territories and designated area of responsibility;
  - v. details required and available SAR facilities, personnel, and equipment;
  - vi. details the SAR manuals, plans and procedures for national and regional cooperative SAR response arrangements;
  - vii. details the SAR personnel training and competency programme, qualification standards, SAR certification if applicable and SAR cooperation training;
  - viii. details the SAR agreements required;
  - ix. is electronic and accessible on the Internet, such details to be submitted to the ICAO AFI Regional Offices; and
  - x. is monitored by quality assurance processes.

7.2 SAR Standards and Procedures: All States should take into consideration:

- a) establish aerodrome emergency plans that provide for co-operation and co-ordination with RCCs;
- b) establish SAR agreements with States having adjoining SRRS or FIRs, including trans-regional neighbors;
- c) provide up to date cross-border information on SAR capability in GEN. 3.6 of Aeronautical Information Publication. (pre-arrange procedures for cross-border SAR responses (this should be included in bilateral SAR agreements);
- d) establish a program for regular SAREX, which may be a desktop communications exercise, a co-ordination exercise with simulated response to a crisis based on a series of scenarios, a full exercise (this expectation may be fulfilled by participating in a sub-regional SAREX that tests the State's SAR system; and
- e) ensure adjacent RCCs periodically execute SAREX exercises together to develop and maintain efficient co-operation and co-ordination between their services. These exercises need not always be on a large scale, but at least those SAR units which are likely to operate together should engage periodically in co-ordinating exercises. Much may be learned by exchanging information on training methods (e.g., programmes, literature, and films) and visits between staff of adjacent SRRs. It is essential that these exercises be coordinated from the appropriate RCC which is responsible for the SRR.
- f) establish RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans;
- g) establish arrangements or MOUs with States or other national agencies and include in the SAR Operations Plans:
  - i. procedures for cooperation and deployment of foreign SRUs or other national services;
  - ii. provision for translators/liaison Officers/Embassy Officers for the daily tasking of the SRUs at the RCC;
  - iii. provision of information for logistic and administrative support (hotels, fuel, security passes, food, medicine, etc.);
  - iv. instructions on communication (ops normal reports, sightings, etc.) for search planning, command and control to foreign SRUs;
  - v. daily end of day report by SRUs to the RCC (via mobile, email, fax, etc.); and
- h) establish SAR Alerting procedures which:

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- i. are tested and fully integrated with RCC procedures so that RCCs are rapidly notified of any SAR event 24 hours a day in their area of responsibility;
  - ii. include procedures for joint aeronautical and maritime distress alert notification, including reliable delivery and acknowledgement of COSPAS-SARSAT distress alerts, support and response to both aviation and maritime SAR incidents (for JRCC) or accordingly; and
  - iii. where applicable, include protocols for civil and military support and sharing of information.

## **SAR Facilities and Resources**

7.3 *RCC Facility:* All States should ensure that RCCs are of sufficient size with adequate provision for operational positions designed in accordance with human factors principles (such as human machine interface) for a major search involving civil and military assets where applicable, and facilities such as:

- a) Workstations, telephones (with international access), plotting tables, wall notice/status boards, computer, and communications equipment and systems, briefing/debriefing areas room for storage including incident records and recorders, RCC staff break and rest facilities;
- b) computer resources which may provide support to RCCs with incident management, plotting, search planning, mapping, contact databases, web-based information, etc.;
- c) charts, electronic or paper, which:
  - i. apply to SAR (aeronautical, nautical, topographic and hydrographic);
  - ii. depict SRR, neighbouring SRRs, FIR(s), SAR resources and made available for all relevant aeronautical and maritime RCCs, ATS units, aircraft operators; and
  - iii. provide a means of plotting;
- d) ability to reliably receive and acknowledge distress alerts 24 hours a day;
- e) maritime broadcast facilities, if applicable;
- f) a means of recording, playback and archiving of communications;
- g) shipping/vessel communications and maritime broadcast facilities such as Coast Radio Stations, RCC radio and satellite communications, marine radio networks, if applicable;
- h) aircraft communications – via ATS units, aircraft operators, satellite communications or direct between RCC and aircraft;
- i) access to aircraft and ship tracking data, e.g., Automatic Identification System allowing rapid identification of potential aircraft and vessels that may divert to assist if applicable;
- j) a means of obtaining meteorological information – forecast, present and historical data;
- k) if applicable drift modelling software;
- l) if applicable, ocean data including sea temperature, currents, winds, tides, etc.;
- m) if applicable, SAR Datum Buoys, preferably with satellite tracking capability; and
- n) RCC documentation and reference material such as plans of operation, procedures manuals, guidance material, ICAO and IMO references, SAR agreements; and
- o) COSPAS-SARSAT equipment and reference material.

7.4 *Personnel and Training*

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All States should, maintain a 24 hour service:

- a) provide adequate ATC resources to allow timely SAR alerts and information to RCCs;
- b) provide sufficient RCC staffing;
- c) provide a sufficient number of trained specialist RCC officers including SMCs and Assistant SMCs (A/SMCs);
- d) develop SAR personnel job descriptions that detail responsibilities and eligibility criteria for recruitment of operational staff;
- e) develop a comprehensive training programme that includes SAR training for:
  - i. RCC SAR Mission Coordinators (SMCs) based on a competency-based assessment approach to ensure technical and English language proficiency, cyclical (periodic) instruction that provides continuous training to ensure competency is maintained, and a system for maintaining training records; and
  - ii. SRU staff, including military personnel.
- f) facilitate RCC staff to be proficient in the English language; and
- g) facilitate a programme of regular liaison visits between relevant RCCs, ATC units and airline operating centres to understand those organizations, facilities, and capabilities (reference Annex 12, paragraph 3.1.9).

7.5 *Oceanic Capability*: Where applicable, States should establish additional oceanic SAR capability as far as practicable to ensure a timely and adequate SAR response is available to all oceanic areas of their SRRs. This may be met through cooperative arrangements with neighbouring States or other RCCs and such regions shall not overlap and shall be contiguous.

7.6 *Search and Rescue Units*: All States should establish capabilities enabling:

- a) availability and deployment of suitably crewed, trained and equipped SRUs, public and/or private, civil and military, for rapid SAR response;
- b) availability and deployment of SRU that may be in use for another primary purpose but made available to RCCs for SAR purposes on an as needed emergency basis (vessels, aircraft and land units );
- c) protocols for civil SAR authorities to request the assistance of military assets, and similarly military SAR authorities to request civil assets;
- d) a communication means and information protocols between the State's Aeronautical and Maritime SAR Authorities;
- e) cooperative use and/or sharing of SAR assets with protocols incorporated within National SAR Plans and bilateral SAR Agreements;
- f) pre-arranged government authority for funding of costs associated with hiring of SRUs, and payment for critical supporting logistics such as fuel, to avoid any delays in response availability, if needed;
- g) aircraft with the ability and regulatory approval to safely conduct SAR missions.

*Note: guidance material on SAR aircraft capability is found in the IAMSAR.*

7.7 *Distress Beacons*: All States should:

- a) where separate ARCCs and MRCCs exist with responsibility for coincident aviation and maritime SRRs, coordinate distress beacon alert procedures to ensure both RCCs are aware of any distress beacon activations within their areas to avoid duplication of

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response. For example, MRCCs should ensure their procedures alert ARCCs and ATS units to any EPIRB activations;

- b) have a reliable distress beacon registration system that:
  - i) provides a readily-accessible mechanism (preferably one that is available by Internet as well as other conventional means) to enable distress beacon owners to fulfil their obligation to register ELTs, EPIRBs and PLBs, and update the registration data as information changes (e.g., change in ownership);
  - ii) is available to RCCs 24 hours a day and includes up-to-date registration details for all national civil and military ELTs, EPIRBs and PLBs;
- c) take steps (including education) required to prepare for, and to implement changes related to, the introduction of next generation beacons (e.g.: update beacon registration systems to be compatible with new beacon hexadecimal identifications) and the transition to the MEOSAR satellite architecture (e.g.: update local user terminals and mission control centres to properly receive and manage MEOSAR data), in accordance with COSPAS-SARSAT specification documents (<http://www.cospas-sarsat.int/en/documents-pro/system-documents>); and
- d) ***establish an appropriate nationwide means of disposal for old distress beacons***

*Note 1: Note: Information on beacon registry is in C/S S.007 Handbook of Beacon Regulation. Information on national Beacon Registration Point of Contact is at:*

<http://www.cospas-sarsat.int/en/contacts-pro/contacts-details-all>

Information on IBRD is at:

<http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals>.

*Note 2: Incorrect disposal of distress beacons often causes the deployment of scarce and often expensive SAR resources only to have the beacon located as a non-distress event in a rubbish dump or similar location. This also creates the risk of SAR resources being diverted away from a real emergency should it arise at the time. Beacon batteries are hazardous items which should be disposed of in an environmentally friendly manner.*

7.8 ***Contingency Facilities:*** All States should ensure there are established contingency facilities, or when a SAR service is not able to be provided, procedures in place for the temporary delegation of the SAR responsibility to another appropriate national body or State. All States should test their contingency arrangements periodically, but not less than once every six months.

## **SAR Information**

7.9 ***Provision of Information:*** All States should ensure the:

- a) establishment of a centralised information source publishing all AFI State Aeronautical Information Publication (AIP) information as required by ICAO Annex 15 Appendix 1, page APP 1-8 including:
  - i. The agency responsible for providing SAR services;
  - ii. The area of SAR responsibility where SAR services are provided;
  - iii. The type of SAR services and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft;
  - iv. SAR agreements;
  - v. The conditions of SAR facility and service availability; and

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- vi. SAR procedures and signals used;
  - b) establishment of an Internet-based SAR information sharing system (with security protocols) to share SAR activity with States, National Authorities and key stakeholders participating in a SAR activity (the information sharing system should include a means of handling media and next of kin enquiries, and recognise the need to avoid premature media statements); and
  - c) maximum practicable cooperation between State entities in the provision of accurate and timely information when required, including from military sources except where national security could be adversely affected.

7.10 SAR Facilities and Equipment Lists: All States should maintain informed a current, comprehensive list of State SAR Facilities, SAR Equipment, and SAR Units (SRUs), including joint or shared facilities and equipment, and provide the info via AIP/SAR Section.

7.11 SAR Library: All States should:

- a) establish a web-based SAR Library, or cooperate by contributing to an Internet-based AFI resource; and
- b) ensure that each RCC and SAR Authority has ready access to a current copy (either electronic or hard copy) of the following reference documents at a minimum:
  - i. Annex 12;
  - ii. IAMSAR Manual Volumes I, II and III;
  - iii. International Convention on Maritime SAR (SAR Convention);
  - iv. AFI SAR Plan/electronic Air Navigation Plan; and
  - v. relevant regional, national and agency SAR documents.

## **SAR Improvement**

7.12 Search and Rescue Exercises (SAREX): In order to test and evaluate existing coordination procedures, data and information sharing and aeronautical SAR response arrangements all States should conduct regular SAREX (at least one every two years involving:

- a) both aeronautical and maritime SAR authorities including both civil and military agencies as applicable, and related bodies such as Air Navigation Service Providers (ANSPs) and Airline Operations Centres (AOCs);
- b) where appropriate, cross-aeronautical SRR coordination; and
- c) SAREX effectiveness through a post-SAREX review and written report, completed to ensure that deficient areas or latent problems are identified and remedied.

**Note 1: a SAREX template is in the IAMSAR Manual, Volume I, Appendix O, Sample template for a joint SAREX.**

**Note 2: SAREX should test the SAR system, including unannounced alerts that allow an actual search (whether it is a desktop or a physical operation), to be conducted which will indicate weaknesses in the system. SAREX should not be confused with, or take the form of, simulated crash fire exercises such as for Aerodrome Emergency Procedures that do not have a search component.**

**Note 3: Real SAR incident responses which include an adequate post-response review and evaluation with lessons learned may replace the need for a SAREX.**

7.13 SAR Quality Assurance:

All States should implement SAR System Improvement and Assessment measures, including Safety Management and Quality Assurance systems accordingly with ICAO standards, that:

- a) provide performance and safety indicators, including post-incident/accident lessons

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- learned and management reviews (RCC and SAR System Continuous Improvement process), and feedback from RCC staff, SAR system users or SAR stakeholders;
  - b) identifies risk and corrective and preventive actions that prevent or minimise risk and the possibility of substandard SAR performance;
  - c) establishes an internal quality assurance programme, which includes regular internal audits of the RCC, SAR operations, SAR facilities and procedures that are conducted by trained auditors;
  - d) ensures the person or authority responsible for internal quality assurance within the entity responsible for SAR services has direct access to report to the Head of the entity responsible for SAR services on matters of quality assurance; and
  - e) where appropriate, provides submissions to the ICAO to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system.

*Note 1: Resourcing of SAR system audit arrangements could be mitigated by States entering cooperative arrangements, including sub-regional regulation, between States for auditing of each other's SAR systems to share expertise and costs.*

*Note 2: Provisions of Annex 19 for a Safety Management System (SMS) may apply where a SAR service is provided under the authority of an ATS provider (Annex 19, Chapter 3, 3.1.3 e refers).*

*Note 3: Peer review, either external or internal, may provide a useful internal quality assurance tool.*

7.14 SAR Management Review: All States should conduct an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability against the minimum requirements of Annex 12 to:

- a) enable the AFI SAR data to be updated to accurately reflect the State's capability;
- b) identify SAR research and development programmes, especially those which could be conducted if possible in cooperation with other States;
- c) establish a common set of basic SAR system statistics, which include:
  - i. number of aeronautical SAR incidents per year;
  - ii. number of lives at risk versus number of lives saved;
  - iii. type of aircraft in distress (light, heavy, glide, etc.);
  - iv. number of electronic alert (ELT, PLB) have received / TRUE-FALSE;
  - v. Number versus Distribution in SRR;
  - vi. time from first alert to tasking the SRU;
  - vii. time from first alert to arrival on scene of first SRU; and
  - viii. time from first alert to rescue.
- d) plan for any necessary improvements to gradually build and improve capability over time, which would be detailed in the State SAR Plan; and
- e) regularly review and update SAR agreements as appropriate.

*Note 1: The National Self-Assessment found in IAMSAR Manual Vol I Appendix H and the ICAO USOAP-CMA Protocol Questions for SAR may assist States with their reviews.*

*Note 2: The number of incidents should identify the type (e.g.: COSPAS-SARSAT alert, ATS alerts, etc.) and outcome of SAR incidents.*

7.15 SAR Promotion: All States should conduct SAR promotional programs (e.g. Seminars, Workshops and public safety campaigns) to:

- a) encourage higher SAR preparedness by persons that may require SAR services through public safety campaigns aimed at preventing persons getting into distress situations (i.e.:

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- ‘preventative SAR’);
- b) ensure the support of government decision-makers for SAR facilities and improvements, in particular adequate funding availability;
  - c) assist media to understand SAR operations in order to minimise the need for explanations during SAR responses;
  - d) recognise improvement in State SAR systems;
  - e) enhance cooperation between SAR services and:
    - i. civil, military, police and other agencies;
    - ii. ANSPs;
    - iii. aerodrome and port operators (hydroplanes);
    - iv. aircraft operators;
    - v. meteorological agencies;
    - vi. accident investigation agencies;
    - vii. government and non-government agencies affected by SAR operations, in particular large scale national and international responses involving whole of government agencies; and
    - viii. other States.

*Note: Social media may be an effective means of SAR promotion that reduces the workload of SAR staff during major SAR responses States should however, implement measures to prohibit and control the immediate spreading of Aviation accident on-scene footage by all media and should find a way to integrate the permission for such with the Annex 13 and Annex 19 requirements. (Protection of Safety Information.*

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## EMERGING ISSUES AND FUTURE DEVELOPMENTS

8.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake planning and co-operation on SAR matters. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future SAR challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialised technical agencies. This concept may manifest itself in joint projects such as:

- ICAO and/or IMO Regional SAR training opportunities where provided to assist States that are unable to provide their own SAR training;
- Joint Sub-regional RCCs;
- Development of Training Centre of excellence that brings together civil and military SAR experts and provides a single SAR facility, cost-effective and has a level of resources and facilities that would be difficult for all States to maintain by themselves; and
- Regional online eLearning packages.

8.2 With the end goal of a globally interoperable SAR system in mind, the region will have to consider planning for a long term supporting concept and infrastructure. The following are possible areas that should be considered for future SAR research and development, in order to promote the maximum possible harmonisation and interoperability of SAR systems:

- a) data sharing such as aircraft and ship tracking information;
- b) automated data link communication to RCCs when an aircraft exceeds a Variable Set Parameter (VSP) in terms of its operating envelope, or activation of an emergency status (could be displayed as a symbol, and the data could include certain operating parameters such as acceleration and altitude for an aircraft) – note the ICAO GADSS includes this concept;
- c) regional Remotely Piloted Aircraft Systems (RPAS) SAR capability;
- d) inclusion of the SAR system and RCC access as a component of the new ICAO SWIM concept of operation and implementation;
- e) on-going development of standardised SAR training objectives and advanced training systems, including the use of high fidelity simulators; and
- f) enhanced technology oriented systems to improve SAR system effectiveness.

## PLANNING FOR THE FUTURE

8.3 States should monitor developments such as improvements to existing and new technologies and other emerging matters which may impact on the SAR system of the future as part of State, regional and global aviation strategic direction and planning. This may include matters such as:

- the need to cater for increased growth or changes in air and maritime traffic through SAR regions which may increase the demand, or present changed capability requirements, for SAR services. This may include, for example, new air routes using longer range aircraft into more remote areas or increased numbers of, and/or larger, cruise ships; and
- new technology such as UAS, autonomous vessels, new distress alerting devices and systems.

## RESEARCH AND DEVELOPMENT

8.2 States should monitor developments such as improvements to existing and new technologies and other emerging matters which may impact on the SAR system of the future as part of State, regional and global aviation strategic direction and planning. This may include matters such as:

- the need to cater for increased growth or changes in air and maritime traffic through SAR regions which may increase the demand, or present changed capability requirements, for SAR services. This may include,

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for example, new air routes using longer range aircraft into more remote areas or increased numbers of, and/or larger, cruise ships; and

- new technology such as UAS, autonomous vessels, new distress alerting devices and systems.

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## 9. MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

### MILESTONES

#### Priorities

9.1 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

#### Actions

9.2 This Plan necessitates several implementation actions. It is expected that each AFI State report progress on each applicable element to the APIRG. All States should note the importance of SAR status monitoring, which is expected to be conducted. Reporting of implementation progress of SAR elements from this Plan is expected to be conducted by the AFI SAR TET through the Regional Offices or an Activity Follow-up Manager, a reporting and monitoring tool available in the ICAO Office, using the following categories:

- SAR Regulatory and Coordination Mechanisms ;
- SAR Facilities and Assets;
- SAR Information; and
- SAR Improvement.

9.3 Section 6 (*Current Situation*) provides analysis and major concerns in the region, which should be considered in the formulation of specific State plans.

9.4 SAR Coordination Forums, which are likely to be based on sub-regional development, as the Regional Advisory SAR Committee, need to be promoted, established, and supported to ensure the on-going implementation work and future review of SAR expectations linked to this Plan are conducted.

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## **SAREX**

9.5 A SAR exercise (SAREX) provides unique search and rescue training experience regarding the operational, technical, and planning aspects. In this regard, every State is encouraged to establish an annual SAREX program with other States in the AFI Region, with every second year being a desktop communications exercise, and alternate years being a full exercise, taking into consideration the operational benefits and financial aspects. The SAREX outcomes and lessons identified should be reported to the APIRG.

9.6 The ICAO ESAF and WACAF Regional Offices were responsible for taking actions that assist the implementation of SAR within its accredited States and coordinating with adjacent ICAO regional offices on an ad hoc basis or at relevant trans-regional meetings. .

APPENDIX A – *AUTONOMOUS DISTRESS TRACKING OF AIRCRAFT IN FLIGHT*

APPENDIX B - SAREX

APPENDIX C - SAR CAPABILITY MATRIX.

APPENDIX D - SAR AGREEMENTS

APPENDIX E - RCC PROCEDURES FOR ADT SIGNALS (UNDER CONSTRUCTION)

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