



สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Advisory Circular for MOS-SAR

CAAT-GM-ANS-MOSSR

Revision: 01

Date: 20 December 2021

Approved by

A blue ink signature of Suttipong Kongpool, written in a cursive style.

Suttipong Kongpool

Director General of the Civil Aviation Authority of Thailand

Intentionally Left Blank

Table of Contents

Table of Contents	1
0. Introduction.....	2
0.1 Background.....	2
0.2 Purpose.....	2
0.3 Applicability	2
0.4 Reference.....	3
1. MOS-SAR Chapter 2 Operations Manual.....	4
1.1 MOS-SAR 2.1 General	4
1.2 MOS-SAR 2.2 The Contents of the Operations Manual.....	5
2. MOS-SAR Chapter 3 General Provisions for Search and Rescue Services.....	11
2.1 MOS-SAR 3.2. Organization	11
3. MOS-SAR Chapter 4 Human Resources Management	21
3.1 MOS-SAR 4.1 General	21
3.2 MOS-SAR 4.2 Requirements	21
4. MOS-SAR Chapter 5 Personnel.....	23
4.1 MOS-SAR 5.1 General	23
4.2 MOS-SAR 5.2 SAR personnel Qualification.....	24
5. MOS-SAR Chapter 6 Training and Exercises	25
5.1 MOS-SAR 6.2 Training and Exercises	25
6. MOS-SAR Chapter 8 Management System	27
6.1 MOS-SAR 8.2 Safety Management	27
7. MOS-SAR Chapter 11 Documents and Records	29
7.1 MOS-SAR 11.2 Documents and Records	29
8. MOS-SAR Chapter 12 Cooperation.....	31
8.1 MOS-SAR 12.3 Cooperation with Other Services	31
9. MOS-SAR Chapter 13 Preparatory Measures.....	33
9.1 MOS-SAR 13.2 Preparatory Information	33
9.2 MOS-SAR 13.3 Plans of Operation.....	33
9.3 MOS-SAR 13.6 Distress Beacons.....	36
10. Appendix A – Supply Pictograms.....	37
11. Appendix B – Vessel–aircraft Communications	39

0. Introduction

0.1 Background

In accordance with ICAO Annex 12 Search and Rescue, the Civil Aviation Authority of Thailand (CAAT) has been promulgated “Rule of CAAT on Manual of Standards of Search and Rescue Services” which requires Search and Rescue (SAR) service provider to establish, maintain and operate SAR services within Bangkok Search and Rescue Region (SRR).

Advisory Circular for the Manual of Standards - Search and Rescue Services (MOS-SAR) has been developed to assist SAR service provider to comply with MOS-SAR and meet the SAR obligations under the Convention on International Civil Aviation.

It should be clearly understood that this document has no legal status. It is intended to provide recommendations and guidance to illustrate a mean but not necessarily the only mean of complying with the Regulations, or to explain certain regulatory requirements by providing interpretative and explanatory material.

0.2 Purpose

The purposes of Advisory Circular for MOS-SAR are mentioned in the following:

- 0.2.1 To provide guidelines for developing the SAR organizational standards.
- 0.2.2 To assist the development of SAR management system.
- 0.2.3 Provide a guidance for standardized service provider’s operations manuals establishment.
- 0.2.4 To assist the SAR service provider in the application for Air Navigation Services Certificate – SAR services.

0.3 Applicability

Advisory Circular for MOS-SAR provides the guidance for SAR service provider to establish SAR management system and Rescue Coordination Center (RCC) Operations Manual. In part of plans of operation, it refers to ICAO Doc 9731 the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual.

For MOS-SAR elements that are not covered by this Advisory Circular, the intent is that there is sufficient detail in the original MOS-SAR element itself or further explanation in other guidance materials/manuals.

Additionally, the color shades in this Advisory Circular have been generated for user-friendly purpose. The text in and under the Blue shade demonstrates the content of the original MOS-SAR element, while the text under the Green shade provides the additional information of that MOS-SAR element.

This document is published on the CAAT website (www.caat.or.th) and will be an uncontrolled document when printed out, or when open as an electronic file from other sources than CAAT website.

0.4 Reference

0.4.1 National Regulation

- 1) The Requirement of CAAT No. 25 on the Application for and Issuance of Air Navigation Services Certificate
- 2) Regulation of CAAT No. 22 on Search and Rescue Services Standards
- 3) Rule of CAAT on Manual of Standards of Search and Rescue Services Standards
- 4) Rule of CAAT on Operations Manual of Search and Rescue Services

0.4.2 International Standard and Recommendation

- 1) ICAO Annex 12 Search and Rescue
- 2) ICAO Doc 9731 The International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual

1. MOS-SAR Chapter 2 Operations Manual

1.1 MOS-SAR 2.1 General

The SAR service provider shall develop and maintain SAR operations manual and documents detailed provisions for all SAR related functions in national SAR plan or manual. The documents shall serve to demonstrate how the SAR service provider will comply with the requirements set out in this Manual of Standards – Search and Rescue Services.

Guidance MOS-SAR 2.1 General

Creating an Operations Manual

When creating an Operations Manual, SAR service provider is required to concern about how an operation will be carried out safely and describe the procedures for SAR personnel to be followed. Personnel of SAR Service provider will then use the information and procedures contained within the Operations Manual to comply with the appropriate issued legislation, then, that the Operations Manual should be made available to all operation SAR personnel as required under the Air Navigation Act B.E. 2497 amended by the Air Navigation Act (No.14) B.E. 2562 (the Act), the Civil Aviation Emergency Decree B.E. 2558 (the Decree); the Civil Aviation Authority of Thailand (CAAT) Regulation, Requirement and Rules (CAAT Regulation, Requirement and Rules), Manual of Standards (MOS), and Advisory Circular (AC).

The same information or procedures should not have to be repeated in different sections of the manual. Internal references should be in suffice term. Any items from the subject lists inserted in a different section of the manual should be referenced in the suggested section.

Format of the Operations Manual

The format of operations manual should have the characteristics as the following:

- a) Operations manual in typing format and printed version.
- b) The format is appropriate for revising and updating the information easily.
- c) The page and paragraph numbering system should be designed and kept current, including the specification of created/revised date and page for record of revision.
- d) The classification of operations manual is convenient for preparation, review and consideration for approval.
- e) The volume size should be specified upon the amount of the content. The contents should be succinct, easily useable and understood.
- f) In case of hard copy, the quality of paper and printing reproduction of text and diagrams should be readable under all operating conditions.
- g) Electronic versions of the Operations Manual are acceptable with the appropriated controllable process, provided they meet all the requirements of MOS-SAR.

1.2 MOS-SAR 2.2 The Contents of the Operations Manual

An operations manual shall contain at least the following information:

MOS-SAR 2.2 b) a description of the SAR service provider's organizational structure and a statement setting out the functions that the SAR service provider performs, or proposes to perform;

Guidance MOS-SAR 2.2 b)

The basic organizational structure should separate the function between Administration and Operation. The functions should be proceeded by following categories:

Administrative for management function

- a) Planning and management National SAR Plans;
- b) Manage organization;
- c) Human resource management and training;
- d) Financing;
- e) Quality Assurances;
- f) Conduct and contact neighboring state;
- g) Document management record and keeping;
- h) Promoting the SAR service to the public Operation for conduct SAR mission function;
- i) Preparing the system and facility of Rescue Coordination Center RCC;
- j) Response the SAR in the SRR; and
- k) Shift roster allocation for running the RCC duty 24 hours.

Operation function

- a) SAR system;
- b) Communication system;
- c) Awareness and initial action;
- d) Search planning and evaluation concepts;
- e) Search techniques and operations;
- f) Rescue planning and operations;
- g) Multiple aircraft SAR operations;
- h) Emergency assistance other than SAR; and
- i) Conclusion of SAR operation;

Suggested requirements of SAR organization structure

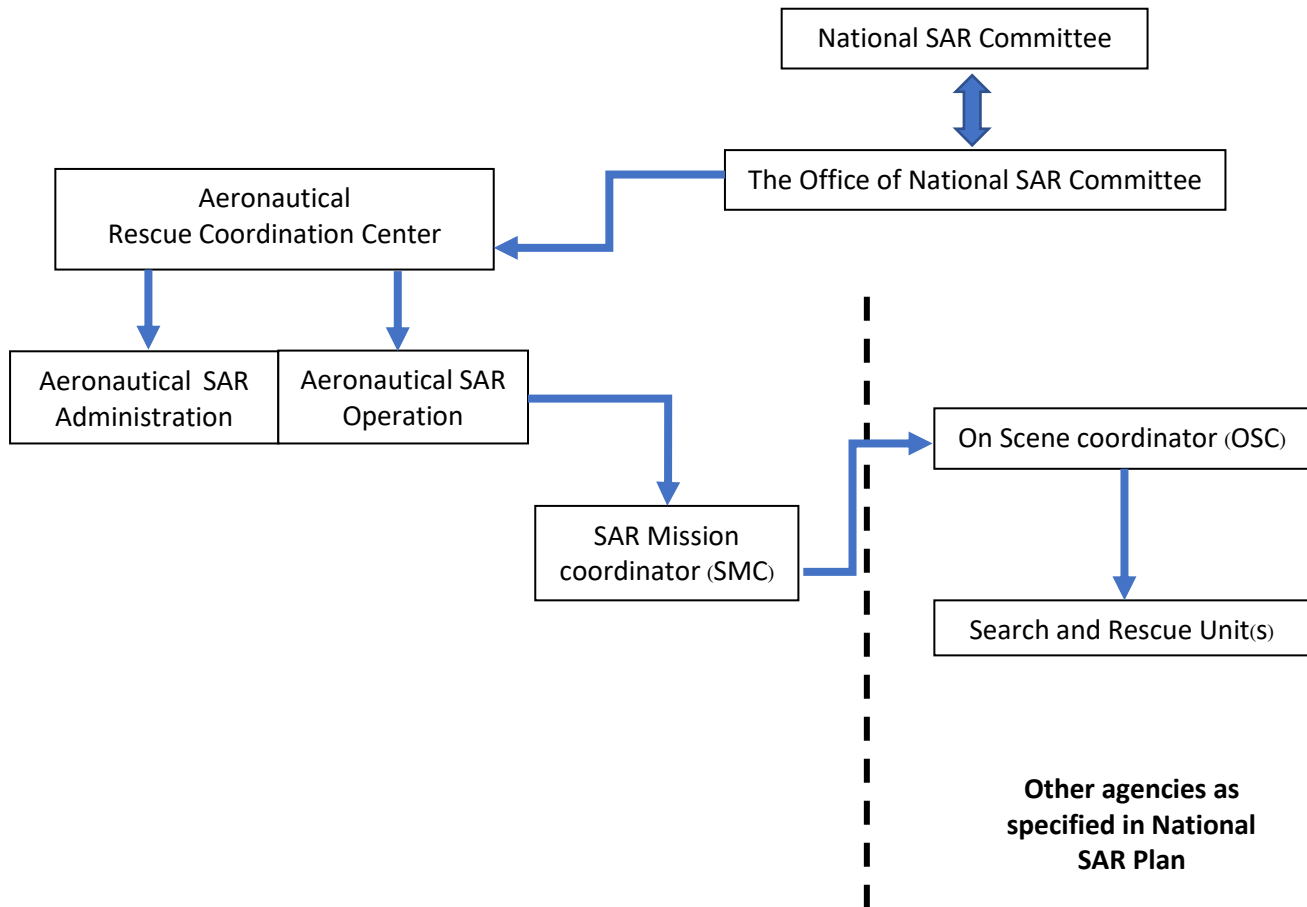


Figure 1-1: Suggested requirements of SAR organization structure

MOS-SAR 2.2 c) a description of the chain of command established, or proposed to be established, by the SAR service provider, and a statement of the duties and responsibilities of any supervisory positions within the SAR service provider; organizational structure;

Guidance MOS-SAR 2.2 c)

The SAR service provider should specify chain of command in their organization by identify RCC staff positions, job description to cover RCC duties and responsibilities for the efficient operation as suggestion below;

Scopes of RCC staff duties and responsibilities

The RCC staff perform administrative and operational duties. Administrative duties, including planning, cooperation with providers of facilities, exercises and case studies, are concerned with maintaining the RCC in a continuous state of preparedness. The administrative duties should be shared so that more than one person is capable of performing these duties. Effective administrative actions help to ensure proficient SAR operations. SAR operations are the responsibility of the SAR Mission Coordinator (SMC) and this responsibility may be met by the RCC chief or by other properly trained staff of the RCC. The RCC should be prepared to

undertake and continue operational duties 24 hours per day. This level of readiness requires that multiple persons be trained and qualified to assume SMC duties.

RCC Duties and Responsibilities

- a) Manage and improve of the aeronautical SAR service in accordance with CAAT Regulations.
- b) Develop and maintain the continuous improvement of the National SAR Plan, in close collaboration and cooperation with CAAT, other relevant civil and military Government Authorities and relevant supporting industry organizations.
- c) Manage the ongoing provision, implementation, establishment, continuous development and improvement of the Aeronautical Rescue Coordination Center (ARCC) of Thailand.
- d) When necessary, perform the role of SMC responsible for the coordination of aeronautical SAR response by the Bangkok RCC within the Thailand SRR, or cooperatively with neighboring International RCCs across SRR boundaries where appropriate. Supervise the Bangkok RCC for SAR responses, operations and coordination in accordance with published SAR procedures and arrangements.
- e) Manage/supervise and lead a team of staff to ensure the Bangkok RCC's ongoing readiness for SAR operations, including;
 - i. Development of Bangkok RCC qualified staff to enable availability of a sufficient number of SMC's and SAR coordination support staff to be deployed at the Thailand ARCC when coordinating SAR operations.
 - ii. Arrangement of SAR coordination training and assessment for staff in SAR team deployed at the Bangkok RCC. Set appropriate proficiency standards and provide appropriate remedial training where necessary.
 - iii. Oversight the maintenance of overall Search and Rescue Units (SRUs) performance and arrange Crew Resource Management (CRM) training for competency enhancement when required.
 - iv. Ensure the physical readiness of the Bangkok RCC, inclusive of its equipment, documentation, systems and communication capability.
 - v. Facilitate the personal development of RCC staff under supervision.
 - vi. Plan and establish an operational liaison mechanism with neighboring SAR agencies including relevant Marine SAR system and military SAR support.
 - vii. Develop and implement a Bangkok RCC contingency plan to ensure the aeronautical SAR services can be maintained uninterruptedly should the primary Bangkok RCC facility unavailable.
 - viii. Manage or conduct other activities and projects in support of operational readiness of the Bangkok RCC facility or as assigned.
- f) Plan design and conduct Bangkok aeronautical Search and Rescue Exercises (SAREX) program in collaboration with relevant aeronautical. Participate in overseas and local SAREX regularly, to familiarize with newest SAR developments (SAR techniques/procedures, advanced SAR tools and equipment introduced in to ARCC facilities, competency enhancement, sharing of expertise, greater harmonization

between respective SAR agencies etc.) and consequently to develop/improve Thailand local aeronautical SAR infrastructure and SAREX programs.

- g) Develop and maintain close corporative and collaborative relationships with neighboring RCC's including the establishment and/or ongoing maintenance of SAR working agreements.

MOS-SAR 2.2 f) a list of the facilities, equipment, location and contact details of Search and Rescue unit (SRU);

Guidance MOS-SAR 2.2 f)

The list of the SAR facility, especially SRU in Thailand should identify the operation unit as shown in table below. It should be in detailed name, location, facility and equipment for SAR services, information and limitation of their equipment or services, service times, times ready to service (how long they need to prepare themselves and launch their services) and updated/available contact details etc., to identify a capability of the SRUs.

Table 1-1: Example List of SAR facilities

Name	Location	Facility	Equipment	Remarks
Royal Thai Airforce Wing 20	Don Muang airport	EC 725 1 Unit Bell 412 1 Unit	Rescue Team Meal Ready to Eat (MRE)	Speed 150 KT Speed 120 KT
Royal Thai Navy Navy 01	12°39'47"N 100°54'20"E	Speed boat 2 Unit Patrol Boat 2 Unit	Survival Kit	Speed 12 KT Speed 20 KT

MOS-SAR 2.2 i) a description of the arrangements made or proposed to be made by the SAR service provider to ensure that it has and will continue to receive, on a daily basis, the information necessary for providing the service;

Guidance MOS-SAR 2.2 i)

Fundamentally, the information used in SAR service comes from different sources. When necessary, such information has to be received immediately with correctness and reliability. It is important to identify those sources according to the list of agreements and a person in charge of organizations. The information management should be proceeded by following categories:

- a) The list of agreement organization information resources;
- b) The suitable system of collection the information;
- c) The person of the authority who has responsibility to be informed and received information; and
- d) Used information record and recall system.

MOS-SAR 2.2 j) a description of the arrangements made or proposed to be made by the SAR service provider to ensure that it is able to provide, information in connection with its SAR services to other entities whose functions reasonably require that information;

Guidance MOS-SAR 2.2 j)

The SAR service provider should group and prioritize information that to be used, in order to maintain continuous communication, and provide that information to other entities whose require that information in timely manner. The SAR service provider also establishes the communication reliable network by providing a variety sources of the system such as telephone, Aeronautical Fixed Telecommunications Network (AFTN), radio, and internet. The most important thing that the provider need to consider is to organize the main and backup system effectively.

MOS-SAR 2.2 k) a description of the SAR service provider's documents and record keeping system;

Guidance MOS-SAR 2.2 k)

The documents and record keeping system, both should record in hard copy and soft copy formats. Moreover, formats need to be able to recall easily, these are the evidence that might be used to improve the SAR service in the future. The records should be stored at least five years. Normally, the logs, diaries and documents should be stored in electronic format. In case the log, diaries or documents contain SAR accident/incident information, they shall be permanently stored electronically or in a case folder.

MOS-SAR 2.2 q) a description of the processes and documentation used to inform and update staff in the relevant Standards, rules and procedures contained in ICAO Annexes 1, 10 Vol. II, 11, 12, 13, 14 and 19, ICAO IAMSAR Manual, ICAO Regional Supplementary Procedures and any of the SAR service provider's specific instructions for the provision of SAR services;

Guidance MOS-SAR 2.2 q)

The purpose of this requirement is to ensure the operational staff in SAR service recognize all the update information concerning their operation function. The processes and documentation, used to present to staff the relevant standards should be proceeded by following categories.

- a) Documents used in the system should be considered as the legality in order to be used as evidence in operations.
- b) Documents should be prepared and authorized for using by the organization's authority.
- c) There should be documents management process indicating the priorities of the system, certification of use, revision notification, storage index, document status (used, return, distributed, etc.) by the authorized agency.

MOS-SAR 2.2 t) a description of the SAR service provider's training and exercise schedule;

Guidance MOS-SAR 2.2 t)

To achieve and maintain maximum efficiency in SAR, the SAR service provider should perform regular training of their SAR personnel and arrange appropriate SAREX. The training and exercises conducted by SAR personnel should be recorded in accordance with MOS 6.2.6.

In conducting SAR training exercises, exercises with neighboring States should also be conducted to ensure the efficient cooperation between States.

When practicable, according to the SAR service provider requirements, the SAR inspectors of the CAAT Air Navigation Services Standards Department should be allowed to observe SAR training exercises to ensure overall performance and compliance with MOS 6.2.

MOS-SAR 2.2 u) a description of the procedures to be used in commissioning new facilities, equipment and services including decommissioning obsolete facilities, equipment and services;

Guidance MOS-SAR 2.2 u)

When commissioning new facilities, it affects to the safety of SAR service system. Service provider should have backup plans by using Change Management principle. Change Management is an essential component of the Safety Management System (SMS) and Aviation Stakeholders are encouraged to manage Change through the PDCA - Plan-Do-Check-Adjust cycle allowing a continuous improvement and facilitating the implementation of a sustainable change.

2. MOS-SAR Chapter 3 General Provisions for Search and Rescue Services

2.1 MOS-SAR 3.2. Organization

MOS-SAR 3.2.2 Search and rescue regions

MOS-SAR 3.2.2.1 The SAR service provider shall delineate the SRRs within which they will provide SAR services. Such regions shall not overlap and neighboring regions shall be contiguous.

Guidance MOS-SAR 3.2.2.1

The SAR service provider should define the SRR according to its SAR service capability, e.g. SAR facility, SAR equipment and the number of SAR personnel, and ensure that the ability to provide SAR service cover all defined SRR. The SRR and neighboring SRRs are not overlap for clear responsibility. In case of ambiguous SRR between two or more neighboring states, The SAR service provider should establish clear and concise procedures for the SAR actions initiative in that area.

MOS-SAR 3.2.5 Search and rescue units

MOS-SAR 3.2.5.1 Elements of public or private services suitably located and equipped for SAR operations shall be designated as SRUs.

Guidance MOS-SAR 3.2.5.1

SRU is a unit composed of trained personnel and provided with equipment suitable for the expeditious and efficient conduct of SAR. SRU can be an air, maritime, or land-based facility. Facilities selected as SRUs should be able to reach the scene of distress quickly and, in particular, be suitable for one or more of the following operations:

- a) providing assistances to prevent or reduce the severity of accidents and the hardship of survivors, e.g. escorting an aircraft;
- b) conducting a search;
- c) delivering supplies and survival equipment to the scene;
- d) rescuing survivors;
- e) providing food, medical or other initial needs of survivors; and
- f) delivering the survivors to a place of safety.

The equipment needed by SRUs may be grouped as:

- a) Communications. An SRU should have rapid and reliable means to communicate by voice or message with the SMC, the On Scene Coordinator (OSC) if assigned, to other SRUs and the distressed persons;
- b) Mobility. The effectiveness of a SAR service depends on the number, speed, location, and efficiency of the aircraft, vessels and land vehicles available;
- c) Supplies and survival equipment. Supplies and survival equipment are carried by land, air or maritime SAR facilities to give aid to survivors and to facilitate their rescue. The type and number to be carried depend on the circumstances on scene. Maritime facilities and helicopters generally can deliver this equipment directly to survivors.

Fixed-wing aircraft can deliver supplies to survivors if suitable landing areas exist nearby or if the supplies can be dropped at the scene. The packing of supplies and survival equipment should be adapted to the manner of delivery. Containers and packages of supplies and survival equipment should be strong, of a highly visible color, waterproof and buoyant. The general nature of their contents should be clearly indicated in print in English and additional languages appropriate to the intended area of operation or using self-explanatory symbols and pictograms as discussed in appendix A. Supplies and survival equipment requirements should be adapted to the circumstances of the SRR in which they are used; and

- d) Other equipment. Every SRU should have at its disposable maps, charts, plotting equipment, and information relevant to the SRR in which it is likely to operate designated SRUs.

Selection of SAR facilities

General

There are three broad categories of SAR facilities: aeronautical, maritime, and land. All three will be needed in most parts of the world, but local conditions determine their selection. Facilities selected by a SAR service need to be able to reach the scene of distress quickly and be suitable for the following types of operations:

- a) providing assistance, e. g. , escorting an aircraft or providing guidance on ditching, standing by a ship sinking or on fire, Visual Meteorological Conditions (VMC) or Instrument Meteorological Conditions (IMC).
- b) conducting a search;
- c) delivering supplies and survival equipment; and
- d) rescuing survivors and delivering them to a place of safety and proper medical care.

The range and speed of available search facilities should be considered when the search area is far from their home bases. They should be redeployed to an advance base closer to the scene so that more time will be available for the search and less time will be spent on transits to and from the search area.

The number, placement, and training level of look-outs, their height above the ground or sea, fatigue, and the speed of the search craft are important factors affecting the probability of detection (POD) and probability of success (POS). Altitude is factored into sweep width determinations but the other factors, though important, usually are not included in order to keep the sweep width tables from becoming much larger and more complicated. Search aircraft speed is especially important; slow aircraft flying at low altitudes generally have a significantly better chance of locating search objects visually. Look-out fatigue also can be an important factor, especially for long searches in rough weather.

Air facilities

- a) Sources of aircraft suitable for SAR include:
 - i. Government department responsible for civil aviation;
 - ii. other Government or semi-government departments (e.g., police, fire services);
 - iii. military services; and
 - iv. commercial or private aircraft operators.
- b) Search Aircraft Category

- i. SRG, Short-range (radius of action of 280 km (150 NM) plus ½ hour search remaining)
 - ii. MRG, Medium-range (radius of action of 740 km (400 NM) plus 2 ½ hour search remaining)
 - iii. LRG, Long-range (radius of action of 1,390 km (750 NM) plus 2 ½ hour search remaining)
 - iv. VLR, Very-long-range (radius of action of more than 1,850 km (1,000 NM) plus 2 ½ hour search remaining)
 - v. ELR, Extra-long-range (radius of action of 2,780 km (1,500 NM) or more, plus 2 ½ hour search remaining)
- c) Helicopters
- i. HEL-L, Light helicopter (radius of action, for rescue purposes, up to 185 km (100 NM) and capacity for evacuating one to five persons)
 - ii. HEL-M, Medium helicopter (radius of action, for rescue purposes, 185 to 370 km (100 to 200 NM) and capacity for evacuating six to 15 persons)
 - iii. HEL-H, Heavy helicopter (radius of action, for rescue purposes, more than 370 km (200 NM) and capacity for evacuating more than 15 persons)

Note: The categories light, medium, and heavy refer to the load-carrying capabilities. Some military helicopters may have an air refueling capability which extends their range. Hoist capability may also be included.

- a) Equipment for aircraft participating in SAR operations includes
 - i. Navigation equipment

Accurate navigation is essential for maximizing the probability of success in search operations and for determining the exact position of survivors or wreckage. Since long and medium-range aircraft may need to search far from their bases over isolated or ocean areas, Extensive navigation equipment is essential. Precise navigation equipment such as the Global Positioning System (GPS) or Global Orbiting Navigation Satellite System (GLONASS) can be helpful in covering a search area carefully or locating a datum, especially when operating over terrain or water with few navigation references. Short-range aircraft normally will not require extensive navigation equipment if used to search areas familiar to the pilot close to their bases. Aircraft tasked for SAR operations should be equipped to receive and home on radio signals, emergency locator transmitters (ELTs), emergency position-indicating radio beacons (EPIRBs), and if practical, SAR radar transponders (SARTs).

- ii. Communications equipment

All aircraft should be equipped to maintain good communications with their RCC and Rescue Sub-center (RSC) (either directly or indirectly) and other SAR facilities. SAR aircraft, particularly those engaged in oceanic searches, should be equipped to communicate with vessels or survival craft. They also should be able to communicate with survivors on VHF-FM channel 16 (156.8 MHz) and VHF-AM on 121.5 MHz and 123.1 MHz. SAR coordinators should consider the possible need for communications between aircraft and surface units within their SAR Regions, and ensure that this need can be met even for aircraft that cannot communicate directly on maritime frequencies. Typically, the RCC should be able to provide a communication link between the aircraft and surface units directly or by making other arrangements.

SAR and government vessels should be encouraged to fit equipment to be able to communicate directly on aeronautical frequencies. Passenger ships subject to the International Convention for the Safety of Life at Sea (SOLAS) are required to have this capability.

iii. Auxiliary fuel tanks

Where practicable, auxiliary fuel tanks should be available for SAR aircraft, to be readily fitted when increased range or endurance would benefit operations.

iv. Miscellaneous

The following equipment, not normally carried by aircraft, should be readily available for SAR operations:

- binoculars;
- a copy of the International Code of Signals;
- signaling equipment, e.g., lamps, mounted loudspeakers, pyrotechnics;
- buoyant VHF/UHF marker beacons, floating lights, smoke floats, dye markers, etc., to mark position of survivors;
- air-deployable supplies and equipment for survivors;
- fire-fighting equipment;
- cameras for photographing wreckage and the location of survivors;
- first-aid supplies, including resuscitation equipment for immediate use;
- loudhailers and containers for dropping written messages;
- portable dewatering pumps and bailers;
- inflatable life rafts; and
- lifejackets and lifebuoys.

Maritime facilities

- a) Vessels suitable for oceanic SAR operations can be provided by:
- i. Government departments responsible for merchant and fishing vessel safety;
 - ii. military services;
 - iii. lifesaving institutions;
 - iv. commercial shipping companies, and
 - v. other public and private authorities, operators and owners of small vessels, e.g., police, customs and port authorities, fishing fleet and tugboat operators, pleasure boat owners, and oil companies with off-shore installations.

Knowing the positions of merchant ships is often of considerable value in SAR operations. They are frequently the closest available means of search or rescue in a SAR incident on or over the high seas.

It is very important that RCCs fully use Inmarsat, Global Maritime Distress and Safety System (GMDSS), Coast Radio Station (CRS), Vessel Traffic Services (VTS),

and other means of communication described in chapter 2 of IAMSAR Manual Volume II to contact vessels in or near the search area to determine their locations and capabilities. Another, often faster and more efficient,

means to obtain this information is via merchant vessel ship reporting systems. One such system is the Automated Mutual-assistance.

- b) The following abbreviations may be used for maritime SAR facilities.
 - i. Category Abbreviation
 - ii. Rescue boat – short-range coastal and/or river craft Rescue Boat (RB)
 - iii. Rescue vessel – long-range seagoing craft Rescue Vessel (RV)

Note: The boat and vessel speed in knots should be inserted, e.g., RB(14) or RV(10).

Vessels are usually suitable for both SAR operations at sea, particularly those which have adequate speed, range, and seagoing qualities. The type of vessel assigned to an incident will depend upon the location of the distress scene, the number of survivors, the weather conditions, the speed, range and seagoing qualities required, and availability. Rescue vessels can sustain operations far from base. Warships, offshore lifeboats, seagoing tugs, customs and pilot launches, and patrol boats, are most suitable on account of their special equipment and trained personnel. Agreements to secure the services of these vessels should be a priority.

- a) Other potential SAR vessels include:
 - i. merchant vessels; their importance as a SAR facility is improved if they participate in a vessel reporting system; and
 - ii. offshore oil rig supply vessels, fishing vessels, private yachts, and launches. Rescue boats are short-range vessels, e.g., lifeboats, patrol boats and crash boats, which are capable of operating to a limited distance offshore. Pleasure craft, yachts, and inflatable boats fitted with an outboard engine also can be used for SAR, provided they carry appropriate equipment (equipment for vessels participating in SAR operations includes:). Enough rescue boats should be available in areas with large numbers of pleasure craft and at aerodromes where the take-off or approach paths are over water so that they may go immediately to the scene of an accident. If boats of the type mentioned above are not available for rescue work from local owners or operators and owners, or if the area is distant from harbor or lifeboat station, special rescue boats may have to be provided. Other vessels which could serve as rescue boats include:
 - iii. hydrofoils, capable of speeds in the range of 55 to 150 km/h (30 to 80 kts). They are best used in coastal or semi-sheltered water when fast response is desired; and
 - iv. hovercraft, which have a similar speed range to hydrofoils. Their amphibious capability and high speed make them ideal for rescue in ice-covered areas, swamps, and shallow or flat coastal areas. Most can maintain a hover one to two meters off the surface and are unaffected by moderate seas, floating debris, or small obstructions.
- b) Equipment for vessels participating in SAR operations includes:
 - i. Navigation equipment. Although larger vessels generally carry adequate navigation equipment, small craft may not. Owners of such craft assigned to SAR should be encouraged to install lightweight, easy-to-operate navigation equipment to enable them to reach a rendezvous or to carry out a given search pattern accurately, without visual reference points.

- ii. Communications. The communications requirements for SAR vessels are generally the same as those for SAR aircraft. Many vessels can communicate with aircraft on 2182, 4125 kHz and 121.5 MHz. However, these frequencies, and in particular 121.5 MHz, may not be routinely monitored by vessels. Good direct or indirect communications with the RCC, RSC, and other SRUs are essential. All SRUs must have radio communications to guard and communicate on the international distress frequency being used by the ship or other craft in distress. Radio equipment should be capable of operating on Medium Frequency (MF)/ High Frequency (HF) and Very-High Frequency (VHF)/ Ultra-High Frequency (UHF) to communicate with the RCC and rescue units. SAR coordinators should consider the possible need for communications between aircraft and surface units within their SRRs, and ensure that this need can be met even for aircraft that cannot communicate directly on maritime frequencies. Typically, the RCC should be able to provide a communication link between the aircraft and surface units with their own equipment or by making other arrangements. SAR and government vessels should be encouraged to fit equipment to be able to communicate directly on aeronautical frequencies. Passenger ships subject to the SOLAS Convention are required to have this capability. Chapter 2 of IAMSAR Manual Volume II discusses selection of radio frequencies.

c) Miscellaneous equipment.

The following equipment should be carried aboard maritime SRUs. For smaller vessels or those which only operate inshore this may not be practical, in which case the equipment should be readily available ashore. This equipment includes:

- i. Lifesaving and rescue equipment:
 - lifeboat with oars;
 - line-throwing apparatus, buoyant lifelines, and hauling lines;
 - non-sparking boat-hooks or grappling hooks and hatchets; and
 - rescue baskets, litters, boarding ladders, and/or scrambling nets;
 - signaling equipment;
 - lamps, searchlights, and torches (flashlights); buoyant VHF/UHF marker beacons, floating lights, smoke generators, flame and smoke floats, dye markers; and
 - exposure suits for the crew.

Coastal facilities

- a) Personnel and equipment for coastal SAR operations can be drawn from several sources:
 - i. military and coastguard services;
 - ii. lifesaving institutions; and
 - iii. police, fire departments, and other local authorities.
- b) Facilities provided vary according to local prevailing conditions. They include:
 - i. shelter huts equipped with emergency rations, means of communication, etc.;

- ii. SAR teams provided with cliff rescue, breeches buoys, and similar equipment;
- iii. first aid and medical teams; and
- iv. accommodations for survivors.

Land facilities

- a) Sources of personnel and equipment for land SAR operations include:
 - i. military services (trained personnel, equipped and mobile);
 - ii. police or fire departments (trained and equipped to search for, rescue, and transport missing and injured persons);
 - iii. public or commercial enterprises operating in the field or in remote areas and employing people and equipment capable of providing SAR assistance.
 - iv. forestry departments;
 - v. transportation departments;
 - vi. railway, telephone, telegraph, and hydro-electric companies;
 - vii. disaster-response organizations;
 - viii. engineering and road-building enterprises; and
 - ix. health departments (medical stations);
 - x. sports clubs and similar organizations specializing in activities useful to SAR, e.g., parachute jumping, diving, scouting, hiking, mountain climbing, cave spelunking, skiing, or potholing; and
 - xi. specialized international teams, e.g., search dogs and collapsed structure task forces.

Land facilities, unlike air and marine facilities, are difficult to classify. However, abbreviations for five specialist facilities, parachute rescue unit (PRU), mountain rescue unit (MRU), urban search and rescue (USAR), cave rescue unit (CRU), and desert rescue unit (DRU), may be used. USAR teams specialize in rescue of survivors from collapsed structures.

Search by land facilities alone is usually impractical for large areas but they can be used in most weather conditions and can provide complete coverage of the area searched. They are mainly used when a confined area cannot be thoroughly searched from the air, and in operations where the search is carried out by aircraft and the rescue is performed by land facilities.

Land rescue facilities need highly mobile vehicles in order to reach an accident site quickly and initiate rescue action. For road transport, the land facility will normally use vehicles at its disposal, such as ambulances, four-wheel-drive vehicles, trucks, buses, or cars belonging to its members. Military units can usually provide rough-terrain vehicles, such as high traction vehicles and troop-carriers. In areas where motor transport is unsuitable, transport by horses, mules, dog-sleds, canoe, boats, or on foot may be required.

- b) Equipment for land facilities includes:
 - i. Navigation equipment. The navigation equipment needed by land facilities need not be elaborate, but at least the following should be carried by each member or team:
 - ii. large-scale maps (1:50000 or 1:100000);
 - iii. reliable magnetic compass and watch; and

- iv. a protractor and a pair of dividers.
- v. Direction Finder (DF) equipment for radio signals, listening devices for collapsed structures, and GPS equipment for three-dimensional positioning can be useful.
- vi. Communications. Each land facility should be able to communicate with the RCC, either directly or through its base camp. In combined air/surface operations the land facility must be able to communicate with the SAR aircraft. Portable lightweight radio equipment is available for this purpose. The selection of appropriate radio frequencies for the different communications functions is dealt with in chapter 2. IAMSAR Manual Volume II.
- vii. Personal equipment. Each member of a land SAR facility should be properly clothed and equipped for the mission. This may include rations for two or three days to reduce the need for air-drops, and sufficient personal medical supplies. If not part of the permanent equipment carried by the land facility, the following should be readily available:
 - binoculars;
 - signaling equipment, e.g., loudhailers, pyrotechnics, whistles;
 - non-sparking tools;
 - cameras;
 - supplies and survival equipment as required;
 - portable lights operated from vehicle batteries and flashlights and spare batteries to be carried by each team member; and
 - fire-fighting equipment.
- viii. Proper equipment is particularly important for those facilities which require additional gear for specialist work, such as:
 - special equipment for a PRU, in addition to parachutes, will vary according to the nature of the terrain in which it will operate.
 - crash helmets fitted with protective visor;
 - protective suits of tough material;
 - stout boots;
 - ropes or other devices for climbing down from trees;
 - special equipment for an MRU will include mountain-climbing gear such as ropes, slings, ice axes, and crampons;
 - special equipment for USAR teams will include dogs and electronic locating equipment, equipment suitable for cutting and removing various types of structural material and debris;
 - special equipment for CRUs includes climbing equipment, lights, litters, and helmets; and
 - special equipment for a DRU will include:

- sunshades and extra drinking water;
- four-wheel-drive winch-fitted vehicle;
- sand shovel, mats, boards, and other material to ensure that the vehicle does not get stuck.

c) Supplies and survival equipment guide

i. Packs of supplies and survival equipment

The word “pack” is used here as a collective term. A pack may consist of several parcels. The lists of supplies and survival equipment which follow are not all-inclusive but are intended to serve as a guide. The lists indicate which items should be considered for inclusion in a basic pack.

- Rations: subsistence pack of concentrated food or assorted containers of food, water in sealed containers or screw-top polythene containers, condensed milk, coffee, sugar, and salt. In general, provision of water to survivors should take priority over food.
- Signaling: portable radio transmitter/ receiver, pyrotechnic signals (smoke candles and red flares), flare pistol and color-coded signal flares, flashlight, whistle, signaling mirror, and signal code card.
- Medical: first-aid kit, insect repellent and head net, aspirin, sunburn lotion, and sunglasses or glare goggles.
- Covering: tent, sleeping bag, blanket, waterproof clothing, socks, gloves, protective foot covering, wool hat, and compact foil emergency (“space”) blanket.
- Fire and lighting: water- and wind-proof matches, burning lens, fire kindling tablets, emergency stove, candles, and flashlight with spare batteries and bulbs.
- Sundry: can opener, cooking and eating utensils, fishing kit, lock-blade knife, axe, rope, compass, writing pad, pencil, soap, toweling and toilet tissues, and booklet with survival hints.

A sufficient number of packs should be held in stock for immediate delivery to SRUs setting out on a SAR operation. There should be enough of each item to enable survivors to subsist until rescue may be effected.

In areas with more severe climates the basic items will have to be supplemented. The areas for which these items are listed below do not cover the entire world, but the items may be needed in maritime areas from the polar regions to the tropics.

i. Maritime areas:

- Rations: extra fluids, desalination and water purification kits;
- Signaling: dye markers, smoke floats;
- Medical: sea-sickness medication; and Sundry: fishing kit, additional life rafts, life raft repair kit, shark repellent and lifejackets.

ii. Forest and jungle areas:

- Rations: water purification tablets;
- Medical: anti-malaria tablets, antiseptic ointment, snakebite kit, adhesive plaster, insect repellent; and Sundry: fishing kit, bush axe, and bush saw.

- iii. Mountainous areas:
 - Sundry: rope and mountain-climbing equipment.
- iv. Additional items that may be required include:
 - Hunting and self-protection: firearms and ammunition, knives.
 - Care of injured: extra dressings and bandages, air mattresses, stretchers, splints, morphine, antibiotic drugs.
 - Leaving scene of accident for recovery point: litters (for the injured), rucksacks, walking boots, additional signaling equipment.
 - Necessary equipment for survival in polar and subpolar areas.

3. MOS-SAR Chapter 4 Human Resources Management

3.1 MOS-SAR 4.1 General

This Chapter sets out standards for proper management of human resources throughout for the provision of SAR services.

Guidance MOS-SAR 4.1 General

The RCC staff performs both administrative and operational duties. The administrative duties are concerned with maintaining the SAR service in a continuous of preparedness, and are mainly of a routine character. The operational duties, on the other hand, are concerned with the efficient coordination of all SAR occurring within the SAR area. The normal duty shift of RCC usually consists of an administration office and an RCC staff. When a period of heavy activity is anticipated, or during major SAR operation, the administration staff may be supplemented with a plotter and additional assistants as required.

3.2 MOS-SAR 4.2 Requirements

MOS-SAR 4.2.1 The SAR service provider shall systematically address the following needs for effective human resources management:

- a) management of responsibilities and accountabilities;
- b) staff deployment;
- c) operational watch rostering; and
- d) operational support arrangements.

Guidance MOS-SAR 4.2.1

In aeronautical SAR, there is no exact standard established for duty period of RCC staff. It could be compared to ATC duty period. The considering information should at least base on the Thailand Labour Protection Act, workload management and rest period.

This section is referring to CAAT Manual of Standards Air Traffic Management Services: Air Traffic Services (CAAT-ANS-MOSATS) Issue: 03, Revision: 00, Date: 18 Sep 2020 Chapter 4 Human Resources Management on 4.2.2 Air Traffic Controllers' rostering system(s).

MOS-SAR 4.2.5 The SAR service provider shall deploy a sufficient number of trained and qualified staff, skilled in coordination and operational function to provide SAR services throughout each 24 hour cycle.

Guidance MOS-SAR 4.2.5

For setting up the number of sufficient staffs. RCC should consider in their context as area of service, cooperate marine SAR and statistic of distress aircraft. The service provider should consider the number of staffs required which are vary with local requirements, traffic density, seasonal conditions, meteorological conditions and other SRR conditions.

Intentionally Left Blank

4. MOS-SAR Chapter 5 Personnel

4.1 MOS-SAR 5.1 General

The SAR service provider shall assign appropriately trained, qualified and experienced personnel to perform their respective duties in a safe, effective, efficient, and sustainable manner.

Guidance MOS-SAR 5.1 General

The fundamental of maintaining SAR personnel proficiency as Flow chart and consideration duration of training course.

The process of keeping personnel capability, begins at the recruitment process, based on RCC's qualifications, then basic training process. Before on duty, personnel should be passed On-the Job Training (OJT) process.

The recurrent process should be conducted within 6 months to keep the currency of the personnel knowledge, skills and attitude. In case of personnel has not been on duty exceed 12 months, the refresher course is required before return to duty.

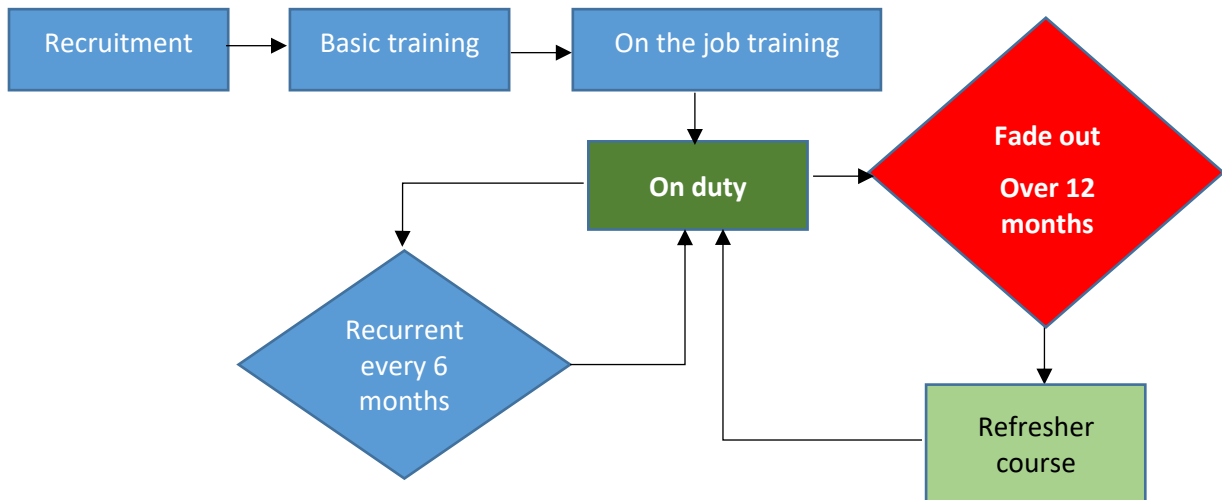


Figure 5-1: Example of Recurrent and Refresher flow chart

Example of training course duration

SAR Administrators Course SAR	Initial course 8 Days/Recurrent 2 day every 6 months
SAR Mission Coordinator (SMC)	Initial course 5 Days/Recurrent 2 day every 6 months
Chartwork & Navigation	Initial course 10 Days/Recurrent 5 day every 6 months
On Scene Coordinator	Initial course 5 Days/Recurrent 2 day every 6 months
Refresher Course	10 days

4.2 MOS-SAR 5.2 SAR personnel Qualification

MOS-SAR 5.2.1 The SAR service provider shall establish appropriate minimum qualifications and experience requirements for SAR personnel.

Guidance MOS-SAR 5.2.1

The purpose of qualification is to validate an individual's ability to perform certain duties. It is a minimum level of knowledge and skills which are required to demonstrate correctly. This validation activity may take place at a specific position, while perform as a team member within RCC. Qualification is not designed as a training program but can result in training. Qualification procedures demonstrate the capability to perform specific tasks.

5. MOS-SAR Chapter 6 Training and Exercises

5.1 MOS-SAR 6.2 Training and Exercises

MOS-SAR 6.2.1 The SAR service provider shall arrange for training and exercises for RCC and, as appropriate, RSC staff to develop and maintain their skills, knowledge and attitudes at a level necessary for safe and effective provision of civil aviation SAR services to domestic and international civil aviation operations. The training program, types of exercises and scheduled intervals shall be acceptable to CAAT.

Guidance MOS-SAR 6.2.1

The concept of acceptable training and exercises by CAAT:

The SAR training

- a) Training based on performance helps SAR experts and teams to perform their duties effectively. Ensure that all SAR service personnel reach and maintain the required level of competence.
- b) Training based on knowledge provides information necessary for the SAR experts and students to perform their duties. One method is to provide knowledge to enable them to review SAR cases. Resulting recommendations can be used to review the policy, update standard procedures, and improve training and other processes.

SAREX

- a) Exercises are tools for testing and improving operational plans, provide learning experience and improve liaison and coordination skills. Exercises should be conducted base on a realistic basis to help demonstrate and assess the true effectiveness of training and the operational efficiency and competence of the SAR service. Exercises will reveal deficiencies that may exist in SAR plans and enable them to be improved. It is a safer way to have shortcomings revealed by exercises rather than during actual operations.
- b) Each SAR service provider should periodically take part in coordinated SAREX. These SAREXs should be designed to exercise the SAR system, in whole or part, and test such things as operational plans, communication procedures and facilities, individual staff performance, SRU performance and inter-organization and/or international operations.
- c) It is equally important that personnel have a good knowledge of the duties and procedures of other units and person who may be involved in a SAR operation, particularly those with whom they will have direct contact. It is especially important that SMCs be aware of the time, effort, and risk involved when requests are made to other units or organizations.
- d) The regular conduct of joint SAREXs between SAR organizations should form a part of any training program.
- e) Exercises should be conducted on three levels.
 - i. The simplest type of exercise, a *communications exercise*, requires the least planning. It consists of periodic use of all means of communications between all potential users to ensure capability for actual emergencies.
 - ii. A *coordination exercise* involves simulated response to a crisis based on a series of scenarios. All levels of the SAR service are involved but do not deploy. This

type of exercise requires considerable planning, and usually one to three days to execute.

- iii. The third type, a *full-scale exercise or a field exercise*, differs from the previous types in that actual SAR facilities are deployed. This increases the scope of SAR system-testing and adds realistic constraints due to times involved in launching, transit and activities of the SRUs.

6. MOS-SAR Chapter 8 Management System

6.1 MOS-SAR 8.2 Safety Management

The SAR service provider shall implement a safety management acceptable to CAAT and which, as a minimum:

- a) sets out safety policy, objective, safety accountabilities including the appointment of a safety manager within the organization;
- b) provides safety performance indicators including post incident/accident lessons learned, management reviews (through an RCC and SAR System continuous improvement process), and feedback from RCC staff, SAR system users and SAR stakeholders;
- c) identifies safety hazards;
- d) promotes the implementation of remedial action necessary to maintain agreed safety performance;
- e) provides for continuous monitoring and regular assessment of the safety performance; and
- f) is subject to regular review which has as its objective the improvement in the overall performance of safety management.

Note: Reference may be made to ICAO Safety Management Manual Doc 9859 for additional guidance where appropriate.

Guidance MOS-SAR 8.2 Safety Management

The fundamental of Safety management is based on Thailand State Safety Programme (SSP), RCC are able to conduct the activities by safety committee of their organization, and the safety manager is a person who takes the responsibility. To make this activity explicitly, SMS manual is an important document which is used to ensure the performance. The SMS manual should provide the contents at least following topics.

SMS manual content

- a) Table of contents.
- b) List of effective pages.
- c) Distribution list.
- d) Safety policy and objectives (this section should include the safety policy signed by the Accountable Manager).
- e) Safety organization (this section should detail the management structure of the organization).
 - i. Scope of SMS and contracted activities (this section should detail what the SMS covers and how it interfaces with other safety related parties).
 - ii. Safety accountabilities and responsibilities (this section should detail the key safety staff members and the safety committee and safety accountabilities and responsibilities of all key staff members).
 - iii. Documentation of SMS (this section should describe how the SMS is documented and recorded).

- f) Hazard identification and risk management process (this section should include the safety reporting and hazard identification process and how hazards and their risks are assessed and then managed and controlled).
- g) Safety assurance (this section should include how the SMS and its outputs are audited. It should also include the safety performance monitoring and measurement process).
- h) Change management (this section should detail how the organization uses the SMS to manage the change).
- i) Emergency Response Plan (this section should detail how the organization would deal with an emergency situation and provide a quick reference guide for key staff members).

7. MOS-SAR Chapter 11 Documents and Records

7.1 MOS-SAR 11.2 Documents and Records

MOS-SAR 11.2.1 The SAR service provider shall establish and maintain a library that contains up-to-date editions of relevant records, documents, directives, manuals and periodicals. All such documents, publications and records shall be made immediately accessible to operational and management staff at all times. The library shall include but not be limited to:

MOS-SAR 11.2.1 n) all legible records made during SAR actions and all documents of a permanent nature;

Guidance MOS-SAR 11.2.1 n)

SAR Operation Report and Lesson Learn Report have been defined as a permanent nature document to be recorded which are made during SAR actions. Where appropriate, provides submissions to the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime SAR (JWG) to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system MOS-SAR.

Intentionally Left Blank

8. MOS-SAR Chapter 12 Cooperation

8.1 MOS-SAR 12.3 Cooperation with Other Services

MOS-SAR 12.3.5 The SAR service provider shall establish an ASPOCS for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office.

Guidance MOS-SAR 12.3.5

Such details of Administrative SAR Point of Contact (ASPOCS) list must be updated and informed to CAAT, for further submission to the ICAO Regional Office.

Intentionally Left Blank

9. MOS-SAR Chapter 13 Preparatory Measures

9.1 MOS-SAR 13.2 Preparatory Information

MOS-SAR 13.2.5 The SAR service provider shall establish SAR Alerting procedures which:

MOS-SAR 13.2.5 b) 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; and

Guidance MOS-SAR 13.2.5 b)

SAR alerting procedures for joint aeronautical and maritime distress alert notification, including Cospas-Sarsat message alert testing and SPOC responsive performance testing.

9.2 MOS-SAR 13.3 Plans of Operation

MOS-SAR 13.3.4 The SAR plans of operation shall contain details regarding actions to be taken by those persons engaged in SAR, including:

MOS-SAR 13.3.4 i) the methods for assisting distressed aircraft being compelled to ditch to rendezvous with surface craft;

Guidance MOS-SAR 13.3.4 i)

Ditching assistance

- a) RCC assistance for ditching should include:
 - i. obtaining the latest position of the aircraft by any means available, e.g., from the aircraft, from its escort (if applicable), by direction finding, or by radar;
 - ii. requesting the maritime RCC to alert vessels in the vicinity of the distressed aircraft, asking them to keep a listening watch on frequency 4125 kHz if possible, or on 3023 kHz otherwise;
 - iii. providing the aircraft with the position of the nearest ship (hence, the importance of ship reporting systems to ARCCs), the course to steer, and information on sea condition and ditching heading;
 - iv. requesting the distressed aircraft to communicate with the selected vessel on 4125 kHz or any other suitable frequency (if applicable — if this is not possible, act as a relay station); and
 - v. if time permits, informing the ship of how it can assist the aircraft.
- b) Assistance provided by ships for ditching depends on the capabilities of the ship. Communications between ships and aircraft are discussed in appendix B. The nearest vessel to the ditching aircraft will often be a merchant ship. The ship may be limited to the assistance arranged by the RCC, but it can also rescue survivors. The most suitable vessels are SRUs equipped for two-way radio communications with the aircraft, and

with crews trained and equipped for SAR incidents including ditching. Assistance from vessels includes:

- i. locating the aircraft by radar;
 - ii. providing navigation and homing aids;
 - iii. furnishing weather and sea information;
 - iv. directing the aircraft to the vessel;
 - v. assisting the aircraft by marking a sea-lane and providing illumination; and
 - vi. effecting rescue after the ditching.
- c) Ditching assistance provided by escort aircraft to distressed aircraft may include:
- i. guiding it to the vessel alongside which it plans to ditch;
 - ii. giving advice on ditching procedures;
 - iii. evaluating the sea conditions and recommending a ditching heading;
 - iv. informing the vessel on how it can assist the ditching aircraft;
 - v. dropping survival and emergency equipment;
 - vi. informing the SMC of the location of the ditching;
 - vii. directing other vessels to the scene; and
 - viii. providing illumination for a night ditching if this cannot be done by the vessel or if the ditching is taking place away from vessels.

MOS-SAR 13.3.4 j) the methods for assisting SAR or other aircraft to proceed to aircraft in distress; and

Guidance MOS-SAR 13.3.4 j)

The methods for assisting SAR or other aircraft to proceed to aircraft in distress, the RCC should consider on the intercept and escort services. The main purpose of intercept and escort services is to minimize delay in reaching the scene of distress and to eliminate a search for survivors. Escort service for both aircraft will normally be provided to the nearest adequate aerodrome. Escorts can also often provide various types of assistance should the escorted craft be unable to arrive at a safe place under its own power. The procedures to develop intercepts can be seen in ICAO Doc 9731 IAMSAR Manual Volume II, Appendix J - Intercepts.

- a) The following assistance can be provided by an escort:
- i. moral support to the persons on board the distressed craft, assuring them that assistance is immediately available;
 - ii. navigation and communication functions for the distressed craft, permitting its crew to concentrate on coping with the emergency;
 - iii. inspection of the exterior of the distressed craft;
 - iv. advice on procedures for aircraft ditching, including ditching heading, or for abandoning or beaching a vessel;

- v. illumination during aircraft ditching or vessel abandonment, or assistance in the approach procedure at the destination;
 - vi. immediate provision of emergency and survival equipment, if any, carried by the escort facility; and
 - vii. direction of rescue facilities to the distress scene.
- b) In an uncertainty phase, the SMC may alert SAR facilities capable of providing an escort facility. If the incident progresses to an alert or distress phase, the SMC may then dispatch the escort facility immediately. Even when it appears too late for the intercepting facility to affect the intercept, it should be dispatched to begin the search.
- c) An aircraft may be considered to need an escort when:
- i. navigation or radio equipment is suspect;
 - ii. it is unable to maintain altitude;
 - iii. it has suffered structural damage;
 - iv. it is on fire or fire is suspected;
 - v. the pilot's control of the aircraft is impaired;
 - vi. remaining fuel is suspected to be insufficient;
 - vii. fewer than three out of four, or fewer than two out of three engines are operating normally; or
 - viii. it is threatened by any other grave and imminent danger.
- d) The following information regarding the distressed craft should be given to the intercepting facility:
- i. description, including call sign and other identification marks;
 - ii. position at a specified time and type of navigation aids used;
 - iii. heading and drift (or track);
 - iv. speed over the ground or water;
 - v. if an aircraft, whether maintaining altitude, climbing, or descending;
 - vi. number of persons at risk; and
 - vii. brief description of the emergency.
- e) Accurate navigation by both the distressed craft and the intercepting facility is the most important factor when effecting an intercept.
- f) When visual contact has been made, the intercepting aircraft will normally take up a position slightly above, behind and to the left of the distressed craft. Aircraft can escort ships.

9.3 MOS-SAR 13.6 Distress Beacons

MOS-SAR 13.6.1 The SAR service provider should:

MOS-SAR 13.6.1 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 Emergency Locator Transmitter (ELTs), Emergency Position-Indicating Radio Beacons (EPIRBs) and Personal Locator Beacons (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;

Guidance MOS-SAR 13.6.1 b)

The information on distress beacon registration system can be reached at Cospas-Sarsats website. (<http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals>)

MOS-SAR 13.6.1 d) establish an appropriate nationwide means of disposal for old distress beacons; and

Guidance MOS-SAR 13.6.1 d)

The 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.

10. Appendix A – Supply Pictograms

10.1 Containers or packages containing survival equipment for dropping to survivors should have the general nature of their contents indicated both in print and self-explanatory symbols.

10.2 Bands of suitable pictograms in retroreflective material should be used. Pictograms are shown in figure A-1.

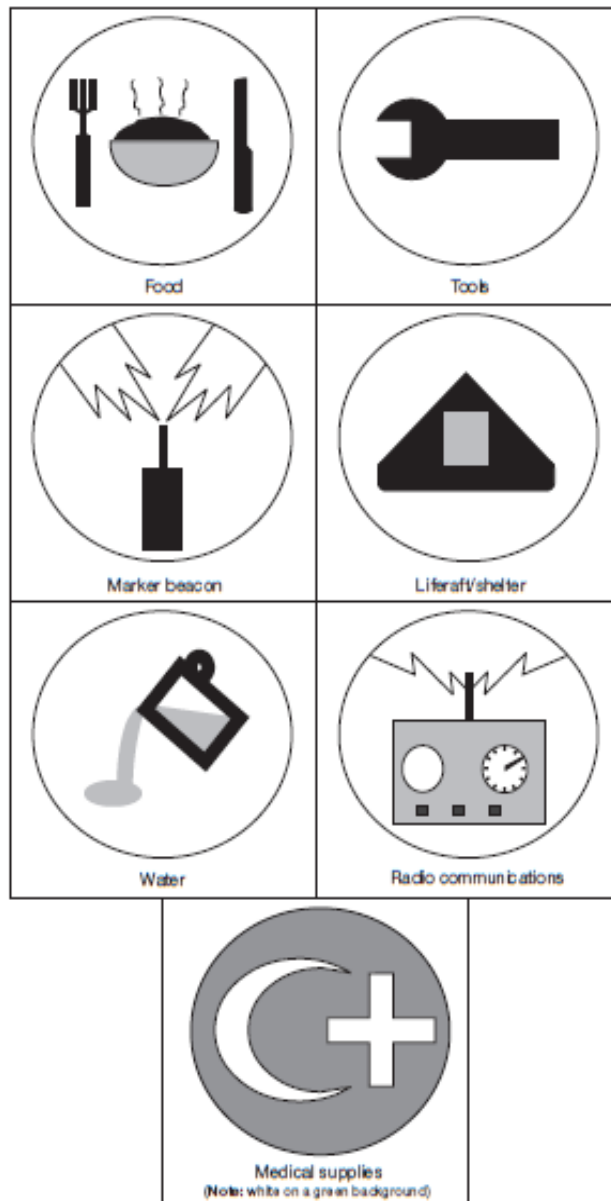


Figure A-1

Intentionally Left Blank

11. Appendix B – Vessel–aircraft Communications

- 11.1 Civil vessels and aircraft may need to communicate with each other if either is in an emergency situation or performing SAR services. Since these occasions are infrequent, civil aircraft may be reluctant to carry additional equipment for these purposes; incompatible equipment makes communications difficult.
- 11.2 The aeronautical mobile service uses amplitude modulation (AM) for VHF telephony while the maritime mobile service uses frequency modulation (FM). Except for SRUs, most small vessels normally cannot communicate on 3,023 and 5,680 kHz, or on 121.5 and 123.1 MHz.
- 11.3 The following frequencies may be used between vessels and aircraft when compatible equipment is available.
- a) 2182 kHz. Many vessels, especially fishing vessels, and nearly all ships, are equipped to use 2182 kHz. Some transport aircraft can transmit on 2182 kHz, and aircraft designated for maritime SAR operations are required to carry this frequency. Aircraft may have difficulty calling up vessels on 2182 kHz, as vessels normally guard this frequency through automatic means and are alerted when the MF and Digital Selective Calling (DSC) alarm signal is transmitted.
 - b) 4125 kHz. This frequency may be used by aircraft to communicate with ships for distress and safety purposes. All ships may not carry this frequency (most SOLAS ships and many other vessels do). If an aircraft needs help from a ship, SAR authorities can notify ships in the vicinity of the situation and ask them, if practicable, to set up watch on frequency 4125 kHz.
 - c) 3023 and 5680 kHz. These are HF on-scene radiotelephony frequencies for SAR. Designated SAR aircraft and most civil aircraft carrying HF equipment can operate on these frequencies; they may also be used by vessels (nearly all SOLAS ships) and coast radio stations engaged in co-ordinated SAR operations.
 - d) 121.5 MHz AM. This is the international aeronautical distress frequency. All designated SAR aircraft and civil aircraft carry equipment operating on 121.5 MHz; it may also be used by maritime craft. Passenger ships must be able to communicate for SAR purposes on this frequency. All aircraft are required to guard this frequency, flight-deck duties and equipment limitations permitting.
 - e) 123.1 MHz AM. This aeronautical on-scene frequency may be jointly used by aircraft and vessels engaged in SAR operations. Passenger ships must be able to communicate for SAR purposes on this frequency.
 - f) 156.8 MHz FM. This is the VHF maritime distress and calling frequency (channel 16) carried by most ships; civil aircraft do not normally carry radios that can use this frequency, but some aircraft that regularly fly over water do, usually in portable equipment. Designated SAR aircraft should be able to use this frequency to communicate with vessels in distress and assisting vessels.

- 11.4 Once alerted, RCCs can often help aircraft make arrangements for direct communications with vessels, or provide a message relay. An aircraft in distress over an ocean area can be expected to contact an Air traffic service (ATS) unit about the situation on the frequency being used for air traffic control purposes. If ditching at sea is likely, the ATS unit will immediately advise the responsible RCC, which can alert ships in a position to assist and arrange an escort aircraft or other appropriate measures.
- 11.5 Regardless of whether the ship or the aircraft needs help, RCCs can sometimes enable communications between them by asking the ship(s) to establish a listening watch on 4125 kHz if possible, or on 3023 kHz otherwise. The aircraft will attempt to establish communications on 4125 kHz, and if unsuccessful will try on 3023 kHz.
- 11.6 If the threat of ditching subsides, or the vessel no longer needs aid, all alerts must be cancelled immediately.