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MSC.1/Circ.1513
28 July 2015

**AMENDMENTS TO THE INTERNATIONAL AERONAUTICAL
AND MARITIME SEARCH AND RESCUE (IAMSAR) MANUAL**

- 1 The Maritime Safety Committee (MSC), at its ninety-fifth session (3 to 12 June 2015), having been informed that the International Civil Aviation Organization (ICAO) had approved the amendments to the IAMSAR Manual prepared by the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue, and that they had been endorsed by the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) at its second session, approved the annexed amendments in accordance with the procedure laid down in resolution A.894(21).
- 2 This circular revokes COMSAR/Circ.23 and COMSAR.1/Circ.57.
- 3 The Committee decided that the amendments should become applicable on 1 July 2016.

PROPOSED AMENDMENTS TO IAMSAR MANUAL VOLUME III

1 Contents

- Add new Section 5 on Multiple Aircraft SAR Operations as follows:

Section 5 Multiple aircraft SAR operations

- Add new appendix H as follows:

Appendix H

Checklist for multiple aircraft SAR operations	H-1
Example radio communications plan	H-2
ACO Procedure Form – Mass Rescue Operations	H-3
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SAR aircraft entry and exit reports	H-5
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2 Abbreviations and Acronyms

- Delete the following text on page vii and page viii

~~GES.....coast earth station~~

~~GES.....ground earth station~~

Add the following text:

RPA Remotely Piloted Aircraft

RPAS Remotely Piloted Aircraft System

SLDMB self-locating datum marker buoy

3 Glossary

- Delete the following text on page xiii

~~Coast earth station (CES) Maritime name for an Inmarsat shore-based station linking ship earth stations with terrestrial communications networks.~~

- Amend the Glossary as follows:

Cospas-Sarsat System	A satellite system designed to detect and locate activated distress beacons transmitting on in the frequency band of 406.0-406.1 MHz.
Direction Finding (DF)	Homing on signals to pinpoint a position. Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object.
Datum marker buoy (DMB)	Droppable floating beacon used to determine actual total water current, or to serve as a location reference. There are two types, the radio type and the self locating datum marker buoy type.
Emergency	Aeronautical distress beacon for alerting and transmitting homing signals. A generic term (related to aircraft) describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated.
Fetch	The distance the waves have been driven by a wind blowing over which the wind blows in a constant direction, without obstruction.
Maritime Safety Information Service	The internationally and nationally coordinated network of broadcasts containing information which is necessary for safe navigation.
Maritime Safety Information (MSI)	Navigational and meteorological warnings and forecasts and other urgent safety related messages broadcast to ships, as defined in regulation IV/2 of the 1974 SOLAS Convention.
Page NAVAREA	One of 16 areas into which the world's oceans are divided by the International Maritime Organization for dissemination of navigation and meteorological warnings. A geographical sea area established for the purpose of coordinating the broadcast of navigational warnings. The term NAVAREA followed by a roman numeral may be used to identify a particular sea area. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.
Personal locator beacon (PLB)	Personal radio distress beacon for alerting and transmitting homing signals. A portable device, manually activated, which transmits a distress signal on 406 MHz, and may have an additional homing signal on a separate frequency.

Remotely Piloted Aircraft (RPA)

an unmanned aircraft which is piloted from a remote pilot station.

Remotely Piloted Aircraft System (RPAS)

a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design (also known as "un-manned air vehicles (UAV), remotely piloted vehicles (RPV) and un-manned air systems (UAS)".

Rescue co-ordination centre (RCC)

Note: The term RCC will be used within this Manual to apply to either aeronautical, maritime or joint centres; ARCC, MRCC or JRCC will be used as the context warrants.

Rescue sub-centre (RSC)

... Note: The term RSC will be used within this Manual except where it applies only to aeronautical or maritime; then ARSC or MRSC will be used.

Self-locating datum marker buoy (SLDMB)

Droppable floating beacon, equipped with a global navigation satellite system (GNSS) sensor that transmits its location periodically, used to determine actual total water current, or to serve as a location reference.

Swell direction

The direction from which a swell is moving. The direction toward which the swell is moving is called the down swell direction.

Vessel Monitoring System (VMS)

~~A tracking system which provides for environmental and fisheries regulatory organizations to monitor position, time at a position, course and speed of commercial fishing vessels~~

Systems primarily used by environmental, fisheries and regulatory organizations, but also used by other organizations, to monitor the position, time of the position provided, course and speed of vessels

4 Section 1

- Amend page 1-2 last sub bullet as follows:
 - evaluate all reports and modify ~~search~~ action plans as necessary

5 Section 2, page 2-i

- Add new subsection at bottom of page after "**Aircraft assisting**"

Vessel and aircraft actions on observing AIS-SART or AIS MOB device signals

- Amend page 2-1 first four bullets as follows:
 - A distress call or signal or other emergency information from another vessel at sea, either directly or by relay.
 - A distress call or message from aircraft. This will normally occur by relay from an aircraft, RCC or CRS.
 - ~~Alert from a vessel.~~
 - ~~Visual signals or sound signals from a nearby distressed craft.~~
- Amend page 2-1, second sub-bullet under *Immediate action*, 3 element as follows:
 - Number of ~~POBs~~ persons on board
- Amend page 2-2, first bullet as follows:
 - Vessels should maintain communications with the distressed craft while ~~attempting to advise the SAR system~~ advising an RCC or CRS of the situation.
- Amend page 2-2, fifth bullet as follows:
 - The ship or a CRS coordinating distress traffic should establish contact with ~~the SMC~~ an RCC and pass on all available information, updating as necessary
- Amend text on page 2-5, third bullet as follows:
 - A vessel en route to assist a distressed craft should have the following equipment ready for ~~possible~~ use if possible:
- Add on page 2-5 new 1st bullet under *Life-saving and rescue equipment* as follows:
 - Specialized recovery equipment
- Amend page 2-5 existing 4th bullet under *Life-saving and rescue equipment* as follows:
 - Survival suits ~~for the crew~~
- Amend page 2-6 1st bullet under *Miscellaneous equipment* as follows:
 - ~~If fitted, a gantry~~ A crane for hoisting or other lifting equipment on each ~~either side of the ship,~~ fitted with a ~~cargo net for recovery device~~ of survivors
- Amend page 2-7 second sentence of second bullet under **Aircraft assisting Distress call and message received** as follows:
 - This usually occurs by relay from ~~a CRS~~ an RCC

- Add new subsection on page 2-9 before **Search function**:

Vessel and aircraft actions on observing AIS-SART or AIS MOB device signals

- Vessels at sea may observe AIS-SART or AIS MOB signals on navigation displays. Although AIS-SARTs and AIS MOB are locating signals, these signals may be related to a vessel or craft that has activated a device to draw attention to its location due to a distress situation and this should be investigated by RCCs. Therefore, AIS-SART and AIS MOB transmissions should not normally be ignored unless information is available that confirms that no response is necessary e.g. it is known to be a false alarm.
 - The majority of vessels will have AIS directly linked to the electronic charting system which means that the SART should automatically be displayed on the navigation display.
 - The AIS-SART and AIS MOB also display on any X band radar as a series of 12 dots for identification.
 - It is recommended that any vessel at sea or aircraft that observes AIS-SART or AIS MOB signals should report this to the nearest RCC immediately. The RCC will then take appropriate actions.
 - Vessels or aircraft should also be prepared to proceed to the location of the AIS-SART or AIS MOB signal, if it is safe to do so, to assist the RCC in investigating the transmission. Because AIS-SART and AIS MOB signals are likely to transmit over relatively short distances e.g. up to 10NM, a vessel should not be significantly delayed by doing this.
- Amend page 2-9 second bullet under *Search action plan and message*, as follows:
 - The OSC and ACO (if designated) and facilities on-scene...
 - Amend page 2-9 first square bullet under *Coordination required* as follows:
 - designates the SMC, ~~and~~ OSC and ACO
 - Amend page 2-9 fourth square bullet under *Coordination required* as follows:
 - OSC and ACO instructions..."
 - Amend page 2-10 third square bullet under *Coordination required* as follows:
 - ...follows coordinating guidance of SMC, ~~or~~ OSC and/or ACO)
 - Amend page 2-10 fourth square bullet under *Communications* as follows:
 - method for OSC and/or ACO to be identified by SAR facilities

- Amend page 2-16 first bullet under **Rescue action plan and message** as follows:
 - ...implementation by the OSC and ACO (if designated) and facilities on-scene..."
- Amend page 2-17 first square bullet under *Coordination* as follows:
 - designates the SMC, and OSC and ACO
- Amend page 2-17 third square bullet under *Coordination* as follows:
 - ...follows coordinating guidance of SMC, or OSC and/or ACO)
- Amend page 2-33 by adding new first bullet under *General maritime considerations* as follows:
 - See also "Recovery of survivors by assisting vessels", below, and the action card "Master's checklist – Recovery of people in the water". The IMO publication Pocket Guide to Recovery Techniques provides additional guidance.
- Amend page 2-33, third bullet under *General maritime considerations* as follows:
 - In heavy weather, an area of sea may be calmed significantly ~~calmed~~ by a large vessel circling at reduced speed
 - oil may also be used for quelling waves: vegetable oils and animal oils, including fish oils, are most suitable for quelling waves..."
- Delete footnote on page 2-35
- Amend page 2-35 by adding new first bullet under *Recovery of survivors by assisting vessels* as follows:
 - Vessels to which Chapter III of the SOLAS Convention applies shall, and other vessels are recommended to, have ship-specific plans and procedures for recovery of people from the water. The action card 'Master's checklist – Recovery of people in the water' and the IMO publication Pocket Guide to Recovery Techniques provide additional guidance.
- Amend page 2-35 by adding new third sub- bullet under *Recovery of survivors by assisting vessels* as follows:
 - utilizing specialized recovery equipment
- Amend page 2-39 sub-bullets under bullet Questions to ask include the following as follows:
 - What was the time and date of the incident?

- What was the last known position?
- What was the total number of persons on board ~~the aircraft~~ prior to the accident?
- ~~What was the total number of persons on board the vessel?~~
- What caused the emergency?
- Were any of the persons able to leave by lifeboat or raft?
- How many survivors did you see in the water?
- What flotation gear ~~had~~ did they have?
- ~~How long was the survivor in the water?~~ If you were in the water, how long for?
- Were search craft seen before the survivors were located and, if so, what were the dates and times of the sightings?
- Were any signals or devices used to try to attract the attention of search craft? If so, what were they and when were they used?

In addition, for aircraft incidents:

- Did you bail out or was the aircraft ditched?
 - If you bailed out, at what altitude?
 - How many others did you see leave the aircraft by parachute?
 - How many ditched with the aircraft?
 - How many did you see leave the aircraft after ditching?
- Amend page 2-52 fifth and sixth sub-bullets under *Radio* by combining them in one sub-bullet as follows:

Merchant ships are ordinarily informed of aircraft distress situations by broadcast messages from a CRS or RCC on the international maritime distress frequencies of 2,182 kHz or 156.8 MHz (VHF channel 16). Few aircraft can operate on these frequencies.

6 Section 3

- On page 3-2 delete text of 3rd bullet as follows:
 - ~~LESs may also be referred to as aeronautical ground earth stations (GESs) or maritime coast earth stations (CESs).~~
- Amend page 3-3 first bullet under **OSC duties** as follows:

- Coordinate operations of all SAR facilities on-scene. An ACO may be designated to coordinate aircraft operations
- Amend page 3-3 second bullet under **OSC duties** as follows:
 - Carry out the ~~received~~ search action plan or rescue ~~action~~ plan ~~received~~ from the SMC...
- Amend page 3-3 third bullet under **OSC duties** as follows:
 - Modify the ~~search action or rescue action~~ plan as the situation on-scene dictates, keeping the SMC advised (~~do in consultation~~ discuss proposed modifications with the SMC when practicable).
- Amend page 3-3 second square bullet, eight bullet under **OSC duties** as follows:
 - the results of search and/or rescue action to date
- Amend page 3-3 third square bullet, eight bullet under **OSC duties** as follows:
 - any ~~actions taken~~ modifications made or suggested to the action plan
- Amend page 3-6 first square bullet, eight bullet under bullet Search and rescue... as follows:
 - the OSC may adjust the plans, based on the situation, and inform the SMC (~~do in consultation~~ discuss proposed modifications with the SMC when practicable)
- Amend page 3-7 first bullet as follows:
 - ... should be appointed to assist in maintaining flight safety and to handle communications with the aircraft on scene.
- Amend page 3-8 second square bullet, under first bullet of *Situation reports* as follows:
 - ... an information addressee on all SITREPs from the SMC
- Amend page 3-16 third bullet as follows:
 - On assuming the duty, the OSC should inform the appropriate RCC, via a CRS or ATS unit as necessary, and keep it informed of developments at regular intervals.
- Delete page 3-16 fourth bullet
- Amend page 3-35 first bullet, under **SAR briefing, debriefing and tasking** as follows:
 - The SMC, ~~or~~ OSC and/or ACO should provide information to SAR facilities..."
- Amend page 3-36 first bullet, as follows:

- ...units should also be contacted by the SMC, or OSC and or ACO for debriefing
- Amend page 3-36 first and second bullets, under **Further action on ...** as follows:
 - The ~~OSC will normally consider the~~ initial phase is normally considered to have been completed when, in the absence of further information, searching ships have completed one search of the most probable area.
 - If at that stage nothing has been located, it will be necessary for the SMC, in consultation with the OSC, to consider the most effective method of continuing the search."
- Amend page 3-37 third bullet as follows:
 - The SMC and OSC should, therefore, consider using surface craft at night to ~~research~~ search again areas covered by day."
- Amend page 3-41 second bullet, under **Search unsuccessful** as follows:
 - The OSC may need to decide whether to terminate an unsuccessful search. ~~(do in consultation with the SMC when practicable)~~ This should be discussed with an RCC whenever practicable. For this determination...
- Amend page 3-42 text under the first bullet:

~~Ocean incident~~

- terminate active search and inform the RCC
- advise assisting craft to proceed on passage and inform the land-based authority
- send a message to all ships in the area asking them to continue to keep a look-out

~~Coastal incident~~

~~F consult with land-based authorities about the termination of search~~

- Amend page 3-42, fourth bullet under **Search successful** as follows:
 - When all ~~rescuing action has been effected~~ persons in distress have been accounted for, the OSC should immediately inform all search facilities that the search has been terminated.

7 Section 4

- Amend page 4-i as follows:

Add new subsection called "Guidance for Vessels" after section Evacuation by helicopter

- Amend page 4-4 as follows:

EPIRBs, ELTs and personal locator beacons (PLBs) distress beacons

- Some ELTs and EPIRBs may also have integral GPS capabilities.

- ~~• It is recommended that an activated distress beacon, even if inadvertently activated (false alarm), be kept on until the RCC is informed.~~
- ~~▪ this enables the RCC to work with a more accurate position and identification, allowing resolution of the alert without dispatching SAR facilities needlessly~~
- ~~▪ immediately attempt to notify the RCC by other means that the alert is false.~~
- The followings steps should be followed when a distress beacon is inadvertently activated:
 - Switch the distress beacon OFF; and
 - immediately attempt to notify the RCC that the alert is false.

In cases were the beacon cannot be turned OFF, take measures to prevent or inhibit transmission of signal (e.g. shielding of transmission, battery removal, etc.) Such actions may prevent future use of the distress beacon.

Note: There is no penalty for inadvertent activation of a distress beacon.

- Amend page 4-10 as follows:

Add new subsection called "Guidance for Surface Vessels" after section Evacuation by helicopter

Guidance for Vessels

SRUs

Vessels taking part in a SAR mission in the vicinity of aircraft operations, should consider the following:

- keep clear of aircraft approach path (area between Final Point and distress vessel)
- keep clear of missed approach flight path
- inform ACO/OSC/SMC of any activity observed in above-mentioned areas
- ask ACO for guidance concerning the placement of the areas mentioned above in case they are unclear
- the ACO/OSC/SMC may also ask a surface SRU to remain in certain position relative to a distressed vessel to accommodate operational needs, for example act as an approach fix for aircraft airborne radar approaches
- in search missions including both airborne and surface units, keep the ACO/OSC/SMC aware of own position as advised

Distress vessel

In addition to other guidance given to vessels, in multiple aircraft SAR operations or mass evacuation situations, the Master of the vessel in distress should consider the following:

- agree on cooperation with airborne units with ACO/OSC/SMC including:
 - determine landing/hoist positions
 - determine working channels
 - inform when ready to receive helicopters
 - be prepared to provide ship manifest to RCC or SRU
 - be prepared to guide rescue personnel arriving on ship
 - be prepared to gather passengers to landing/hoist positions and to guide them
 - determine medical triage status and number of casualties
 - plan order of evacuation and relay to RCC/OSC/ACO
 - update vessel position, speed and course at regular intervals; 1NM can be considered a significant difference in position for aircraft especially in poor weather conditions

- Amend page 4-14 11th bullet under Initial actions as follows:
 - Prepare lifeboat for possible launching recovery equipment – see Section 2, Recovery of survivors by assisting vessels

- Delete page 4-14 last bullet under Initial action
 - ~~Rig pilot ladder to assist in recovery~~

- Amend page 4-14 title of last section as follows:

Standard methods of recovery manoeuvres

- Delete page 4-17, fourth square bullet under *Collision*
 - ~~POB control (vessels involved)~~

8 Section 5

- Add new Section on Multiple Aircraft SAR Operations as follows:

Section 5

Multiple aircraft SAR operations

Contents

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General guidance

The information in this section provides guidance for the management and conduct of multiple aircraft SAR operations. Any of the described principles and procedures might have to be modified by SMCs, ACOs and SRUs, in order to deal with specific situations. Further information on multiple aircraft SAR operations is available in IAMSAR Volume II, chapter 6.

Number of SAR Aircraft Required and Aircraft Capabilities

The RCC/OSC/ACO responsible for the SAR operation should aim to achieve the most effective blend of aircraft and surface unit capabilities for the situations that are anticipated. The operation should aim to achieve continuous or efficient use of aircraft on scene when needed, while minimising the situations in which aircraft are airborne without a mission. Where more aircraft than needed are available for a SAR operation, some can be held in reserve. These aircraft can provide additional resources if needed, or relieve other aircraft involved in the operation for reasons related to aircrew fatigue or maintenance requirements.

The RCC/OSC/ACO should define the number of aircraft to be used in a mission taking into account weather, distance from scene, nature of distress, available facilities and other operational issues. The SMC ideally has the best overall picture of ongoing SAR operations. Therefore tasks given to aircraft may not necessarily always utilise all the capabilities available.

Given tasks should not rely on aircraft and aircrew conducting flying activities beyond their abilities, or their approved types of operations. In case such a task is given, the pilot-in-command shall inform the RCC/OSC/ACO immediately.

Participation by Other Aircraft

In some situations, such as mass evacuations from offshore drilling platforms, large scale incidents over land areas etc., aircraft belonging to commercial companies or other organizations might be able to respond to incidents as part of existing emergency plans.

Refuelling Facilities

The RCC/ACO/OSC is responsible for arranging refuelling facilities in a SAR operation. The pilot-in-command is responsible for ensuring that the facilities available are suitable, taking into account endurance and all operational needs. The pilot-in-command should take appropriate actions to ensure required refuelling and keep the RCC/ACO/OSC continuously informed of changes to on-scene and overall endurance.

Area of SAR action

Definition

For IAMSAR Manual purposes, an area of SAR action is an area of defined dimensions that is established, notified or agreed for the purposes of protecting aircraft during SAR operations and within which SAR operations take place.

Entering Areas of SAR Action

SAR aircraft intending to enter an area of SAR action should normally first contact the ACO. They should not enter the area until the ACO gives them permission and provides them with sufficient information to safely join the flow of SAR aircraft involved in the operation (see also Communications). Aircraft should call an ACO as early as possible before entering an area of

SAR action, in order to allow time for information to be exchanged and in case they are required to remain clear of it. As a general guide, aircraft should aim to get in touch with an ACO when at least ten minutes' flying time from the edge of an area of SAR action and pass entry information using the format described in appendix H - 5. In the event that an area of SAR action has been established but an ACO is not yet available, SAR aircraft should receive information that they require from the coordinating RCC.

Leaving Areas of SAR Action

Aircraft leaving areas of SAR action should contact the ACO before the area boundary and before changing to another frequency. Aircraft leaving should use the format described in appendix H - 5.

Flights in Areas of SAR Action by Other Aircraft

Aircraft that are not involved in a SAR operation should normally not fly within areas of SAR action. However, if such aircraft need to enter an area of SAR action, they should do so only with the approval of a SMC, ACO or coordinating ATS unit and are subject to the rules of the area or the relevant class of airspace. If a SMC or coordinating ATS unit is giving approval, the ACO should first be consulted.

Aircraft coordinator

Purpose of an ACO

The primary purpose of an ACO is to contribute to flight safety of aircraft involved in a SAR operation. The ACO should have a clear understanding of the aim of a SAR operation. The ACO organizes and coordinates the operations of aircraft involved in the SAR mission to carry out the mission effectively, paying particular attention to aircraft that are likely to operate close to each other.

Responsibility for Safety

Information from ACOs to other aircraft on scene is advisory, but should nevertheless be followed as closely as practicable. If necessary to ensure flight safety, aircraft pilots-in-command should take whatever measures they assess are needed. If aircraft pilots-in-command deviate from advice passed by an ACO, then they should inform the ACO as soon as possible. The final decision concerning the safety of an aircraft, its crew and passengers rests with the pilots-in-command of the aircraft involved.

ACO Duties

Procedures, duties and tasks involving ACOs are described throughout this Section. A list of normal duties for an ACO, also contained in IAMSAR Volume II, can include the following tasks:

(a) Contributing to flight safety:

- maintain a safe flow of aircraft
- ensure use of a common altimeter setting for all aircraft involved
- advise the SMC of on-scene weather implications
- determine a direction for entering and leaving an area of SAR action
- determine all points necessary for maintaining safe flow in an area of SAR action
- filter radio messages to and from SAR aircraft

- ensure frequencies are used in accordance with SMC directives
 - coordinate with adjacent air traffic services (ATS) units
- (b) Prioritizing and allocating tasks:
- ensure SAR aircraft are aware of the SMC/OSC overall plan and their own tasks
 - monitor and report search area coverage
 - with appropriate SMC/OSC, identify emerging tasks and direct SAR aircraft to meet them.
- (c) Coordinating aircraft operations:
- respond to changing factors on scene and supervise effectiveness of operations
 - ensure the continuity of aircraft operations in coordination with SMC/OSC
- (d) Informing SAR aircraft:
- Assign tasks to aircraft.
 - Distribute all relevant flight safety information to aircraft (ref sub paragraph (a) above)
 - Provide information about relevant air activity and dangers on scene.
 - Provide information about search areas (if applicable) evacuation points (if applicable) and refuelling facilities.
 - Provide operational information about the ongoing SAR-mission
 - Provide relevant weather information.
- (e) Make periodic situation reports (SITREPs) of SAR aircraft operations to the SMC and the OSC, as appropriate.
- (f) Work closely with the OSC:
- assist in the execution of SMC directives
 - maintain communications
 - advise on how the ACO can assist.
- (g) Coordinate aircraft refuelling.

ACO Location

The ACO function may be carried out from various locations, such as a fixed-wing aircraft, a helicopter, a ship, a fixed structure such as an oil rig, an ATS unit, a coordinating RCC or another appropriate land unit. The procedures used should be similar regardless of the ACO location.

Information from SAR Aircraft to the ACO

In order to enhance situational awareness for ACOs and other SAR aircraft and to assist with safety and the continuity of operations, participating aircraft should report as follows:

- Entry report.
- Reaching assigned points.

- Leaving assigned points.
- Commencing operations (search, investigation during search, approach to the surface/ship, missed approach, hoist, landing, etc.).
- Completing operations, including information regarding results.
- Leaving present altitude.
- Reaching new altitude.
- 30 minutes on scene endurance, expecting fuel at (location).
- 10 minutes to completing hoist operation.
- 10 minutes to completing search
- Exit report

Transfer of ACO tasks

Before accepting the task the new ACO should understand the details of the SAR mission and the SMC's plans. The details required include the aim of the operation, the position of the missing object, number of persons in distress, other units involved, locations of participating aircraft, communications and any limitations to the operation. When possible, basic pre-flight information should be provided by a SMC in order to simplify the transfer to the new ACO.

Checklists and Guides

ACOs and SAR aircraft are recommended to use checklists or guides containing relevant information. Units who are likely to be designated as ACOs or take part as airborne SRUs in the event of a multiple aircraft SAR operation, should always have ACO checklists or guides available whenever they are on duty.

A short reference list known as the 'Pilot Information File' (PIF) contains information useful for all aircraft involved in multiple aircraft operations. The PIF, guides and checklists suitable for ACOs and SAR aircraft are contained in appendix H - 6.

Communications

ACO Call sign

Multiple aircraft SAR operations can involve units from different organizations or SRRs, which might not routinely work together. In order to make the identity of an ACO clear to all participating units, the standard call sign: 'Air Coordinator' should be used by all ACOs.

Radio Voice Communications

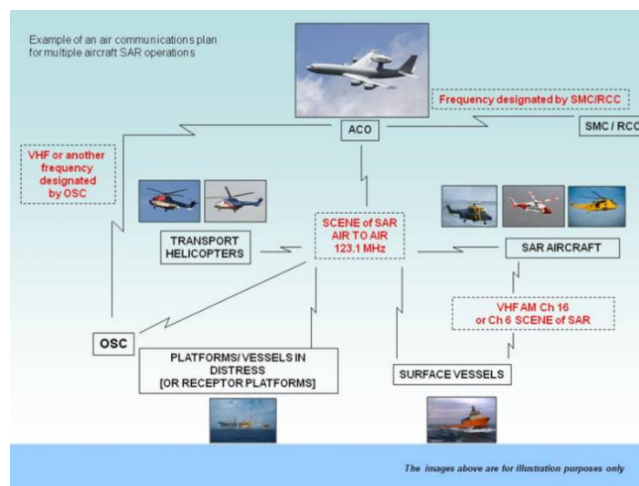
There should be agreed, common, on scene procedures for the following:

- (a) On Scene Coordination Frequency. An agreed coordination frequency for radio voice communications should be used within an area of SAR action or near the scene of operations. This frequency should be one that all aircraft can access, together with the ACO. Information that should be passed between an ACO and SAR aircraft are listed in appendices H-3, H-4 and H-5.
- (b) Alternative Frequencies. Alternative frequencies should also be nominated by an ACO, if the agreed coordination frequency is likely to become too busy or unusable.

- (c) Capabilities. Care should be taken to ensure that aircraft and surface units involved in an operation are capable of complying with the communications procedures.
- (d) Communications with an OSC. Consideration should be given to enabling communications between an ACO and an OSC. However, it should not normally be necessary for SAR aircraft other than an ACO to communicate directly with the OSC.
- (e) Radio Communications Failure Procedures. All SAR plans for multiple aircraft SAR operations should include procedures for use when radio communications fail. A failure of radio communications might affect aircraft, SRUs or persons in distress individually, or might involve a compromise of radio systems affecting several participants. The systems affected might include radio voice communications or radio systems designed to indicate the positions of aircraft, vessels or people, including transponders and other devices. In general, the following principles should apply to most situations in which radio communications fail:
- A backup means of radio voice communication should be determined and then nominated by an ACO, along with the normal communications plan.
 - The backup radio voice communications might include alternative frequencies, alternative radio communications systems or both. In the event of a radio communications failure, with no alternative airborne communications available, aircraft should normally continue with their planned timings, events and flight path, still transmitting all position and altitude reports, until they are clear of the immediate on scene area.
 - If an aircraft has not been given a plan when a radio communications failure occurs, then it should avoid the on scene area, departing by an appropriate route and heights.
 - Once clear of the on scene area, aircraft should consider moving near or landing at a suitable facility in order to establish communications by alternative methods.

If radio voice communications cannot be restored, then alternative procedures could be considered such as increasing the distances between aircraft using time. If not already included in SAR plans, then all participating airborne SRUs might have to be assembled together in order for this procedure to be briefed and understood. In most cases, this would result in considerable delays to a SAR operation.

A diagram illustrating a basic example of communications during multiple aircraft SAR operations, involving an aircraft ACO is as follows:



Long Range Radio Communications

Communications systems designed for long range SAR operations can be different from the types of communications used at shorter ranges.

Some long range communications methods include the following:

- (a) High Frequency radio systems.
- (b) Satellite communications systems.
- (c) Position tracking systems, including those that enable two-way communications.
- (d) The use of high flying aircraft to relay VHF radio communications to and from lower flying SAR aircraft.
- (e) Relay of information to and from SAR aircraft through ATS units.
- (f) Relay of information by ships at sea able to communicate with SAR aircraft on marine band VHF frequencies, whilst a shore based RCC uses satellite, MF or HF communications to communicate with the relaying ship(s).
- (g) Relay of information by any surface units able to communicate with both SRUs and SMCs.

Search missions

General

Factors relevant to search operations are described in IAMSAR Volume II, chapters 4 and 5.

The most likely situations in which multiple aircraft might be involved in searches is when large areas need to be searched in which the confidence of the datum position is low

The procedures described below generally assume that visual search techniques are used. However, other techniques such as radar or FLIR searches might also be required or SAR aircraft might only be able to locate persons in distress by homing onto transmissions from emergency distress beacons, transponders or other devices. In these situations, techniques might have to be modified and the need for multiple SAR aircraft might have to be considered carefully.

Safety and Search Effectiveness

ACO and SAR aircraft should use procedures that ensure flight safety, without making the search ineffective. Aircraft should be given sufficient operational freedom to carry out their searches effectively, but should conform to safety procedures briefed by the ACO. The ACO should encourage a high degree of situational awareness amongst the aircraft.

Methods used to safely keep aircraft apart will depend on the on scene conditions. Beginning with good weather conditions and progressing to poor conditions, methods for keeping aircraft apart can be as follows:

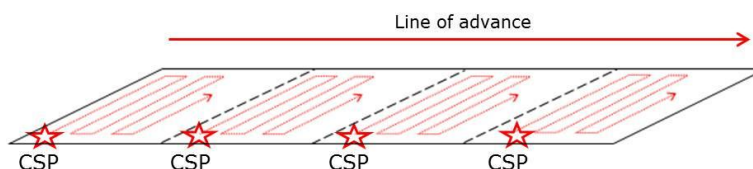
- (a) Visual Methods.
- (b) Flow Methods.
- (c) Coordination Zones.
- (d) No Fly Zones.

Visual Methods

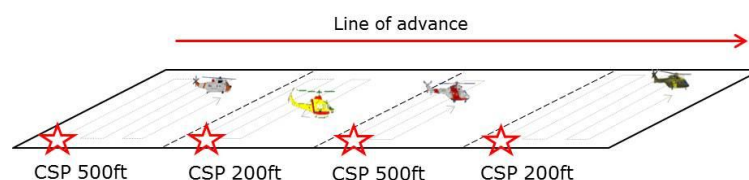
Visual methods involve the ACO allocating aircraft to search areas and aircraft avoiding each other visually. Visual methods may be the only measure necessary when weather conditions on scene are good. When using visual methods, the ACO can allow aircraft more freedom of action compared to other, more restrictive, methods. However, this freedom will not relieve the aircraft or ACOs from other duties outlined earlier in this section, for example providing information on air activity or making aircraft reports.

Flow Methods

Flow methods can be used to keep SAR aircraft apart in slightly poorer conditions, by ensuring that they fly the same search patterns (commence search point /line of advance, etc.) but in adjacent search areas. The first aircraft on scene should be allocated the search area furthest away from the LOA. This method enables aircraft to execute effective searches of areas with a minimum of radio communication.



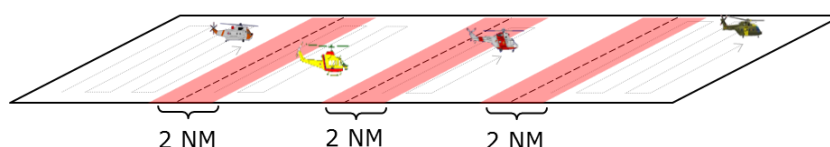
The ACO may order specific search altitudes for SRUs, to allow an extra margin of safety when aircraft operate in close proximity to each other. However, in this situation the ACO should be aware that any limit to the operational freedom of an aircraft, particularly in altitude, could reduce the effectiveness of the search. The ACO should also expect aircraft to deviate from their assigned altitudes if they need to investigate objects on the surface. **ACOs should ensure that all aircraft use the same reference for altitude.**



Coordination Zones

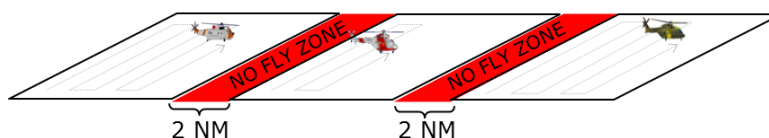
Coordination zones are border areas established by an ACO between adjacent search areas, which SAR aircraft can only enter under specific conditions. Coordination zones enable aircraft to have operational flexibility within their allocated search areas and ensure a level of safety between them.

The dimensions of a coordination zone depend on the on-scene conditions and the size of a search area. As a general guide a coordination zone might be 2 nautical miles across, but this size may be increased or decreased if needed. Before entering a coordination zone, aircraft sharing the zone should communicate with each in order to safely coordinate the entry. The aircraft should call again when leaving the zone. The ACO should ensure that the aircraft have a clear understanding of their mutual operating areas.



No Fly Zones

If on scene conditions are sufficiently difficult, no fly zones can be used in which flight is not permitted while searching is taking place in adjacent areas. The dimensions of no fly zones can be similar to coordination zones. Whenever no fly zones are used, the ACO should coordinate with the SMC and OSC to ensure that the zones are searched appropriately during the SAR mission.



Evacuation missions

Safety Flow Procedures

The main aim of on scene procedures for multiple aircraft operations should be safety. In general, there are two methods that can be used to ensure a safe flow of SAR aircraft, which are as follows:

- (a) Horizontal Spacing. Horizontal spacing of aircraft should be the basic method used by SAR authorities and ACOs. It can be achieved by establishing specific routes to be flown by SAR aircraft to, from and within the area of SAR action.
- (b) Vertical Spacing. For situations in which keeping aircraft apart horizontally will not ensure sufficient levels of safety, or if a cross-over of aircraft flight paths cannot be avoided then, when weather permits, vertical spacing should be considered. It may not always be necessary for SAR aircraft to fly at different altitudes, unless they are likely to fly close to each other or their flight paths cross over. If a significant possibility of collision exists, then different altitudes should be assigned for SAR aircraft.

- (c) In general, altitudes for RPAs should be kept apart from altitudes allocated for other SAR aircraft.
Ideally, the most effective method to ensure a safe flow of aircraft is by using a combination of both horizontal and vertical spacing. The best way to achieve this is through planning by an ACO and a clear understanding of procedures by all of the units and authorities involved.

Aircraft Approach and Departure Flight Paths

Approach and departure flight paths are usually influenced by the prevailing wind direction; factors which might also have to be taken into account are:

- (a) Fumes directly downwind from burning structures may be unsafe – the direction of approach for aircraft might have to be off-set from the wind direction.
- (b) Geographic features or the design of the casualty location might compel aircraft to approach only from certain directions. Structures such as cranes, towers or vertical obstructions in line with the wind direction, might be dangerous.

Long range operations

General

Long range is any distance that significantly limits or compromises the ability of SAR aircraft to operate on scene effectively and safely.

Long range procedures

At long ranges, SAR aircraft might need to minimize the fuel used while flying in transit, in order to permit more time operating on scene. It might be necessary for SAR aircraft to fly as directly as possible to and from an incident, with the result that multiple aircraft SAR procedures have to be modified and rely on basic safety arrangements. These arrangements could include separate arrival times on scene and basic inbound and outbound height differences in order to keep aircraft safely apart. Additional considerations for long range SAR communications are described earlier in this Section.

Bringing a Casualty Vessel Within Range

If the casualty is a vessel underway, SMCs should consider the possibility of directing it to move to a point within the effective range of SAR aircraft or other forms of assistance. Alternatively, it might be possible for SAR aircraft to refuel at locations that effectively bring a casualty within their maximum radius for SAR operations. It is also effective for SMCs to use both of these options at the same time.

Appendix H:

- H-1 Checklist for Multiple Aircraft SAR Operations
- H-2 Example Radio Communications Plan
- H-3 ACO Procedure Form - Mass Rescue Operations
- H-4 Briefings
- H-5 SAR Aircraft Entry and Exit Reports
- H-6 Pilot Information File

9 Action Card

- Add new action card as follows:

Masters checklist

RECOVERY OF PEOPLE IN THE WATER

Additional information may be found in MSC.1/Circ.1182/Rev.1 GUIDE TO RECOVERY TECHNIQUES, the IMO's *Pocket Guide to Recovery Techniques*, and in IAMSAR Manual Volume III, section 2. .

ON PASSAGE TO THE INCIDENT

- Establish communications with the Rescue Coordination Centre (RCC)
- Establish communications with the On Scene Coordinator (OSC), if appointed
- Re-read the ship-specific recovery plan
- Read IMO's recovery guidance: the *Pocket Guide* or the MSC Circular (see above) and the relevant sections of the IAMSAR Manual
- Check the IMO's guidance on cold water survival: the *Pocket Guide to Cold Water Survival* or MSC Circular 1185 (MSC.1/Circ.1185/Rev.1)
- Consider on-scene conditions
- Consider the number and type of people you may have to recover, and the condition they may be in: they may be injured and/or incapable
- Consider whether to launch rescue craft
- Assess the best points of entry into the ship with the prevailing conditions in mind
- Advise RCC and/or OSC of your expected recovery capability
- Brief crew, and any passengers aboard
- Prepare recovery equipment, including control and safety measures
- Prepare additional life-saving equipment in case of accidents during recovery
- Prepare reception facilities for those recovered
- Prepare to provide assistance prior to, or instead of, recovery

Continue other side.....

- Assign crew to
 - handling the ship
 - lookout duties
 - recovery
 - care of survivors – passengers may be able to assist with this
- People who have been in the water should be lifted in a horizontal or near-horizontal position if possible
- A crew member wearing personal protective equipment may be able to go down with the lift to assist those incapable of helping themselves

APPROACHING THE SCENE

- Post lookouts, well-briefed and in communication with the Bridge
- Have recovery team(s) standing by, well-briefed, equipped with personal protective equipment, and in communication with the Bridge
- Assess your ship's manoeuvrability and recovery capability in the prevailing conditions
- Prepare to launch rescue craft, if conditions permit
- Prepare to receive craft and/or people alongside
- Think about your best approach
- Determine the priorities
- Advise RCC and/or OSC of your arrival and capabilities

DURING THE RECOVERY OPERATION

- Continue to assess the priorities
- Continue your risk assessment, including your own ongoing recovery capability, the survival chances of those not yet recovered, and the availability of other recovery resources
- Keep RCC and/or OSC advised of your progress and future capability

10 **Appendix H**

- Add Appendix H as follows:

Appendix H-1 Multiple Aircraft SAR Operations

Checklist for Multiple Aircraft SAR Operations

The Checklist below is for example purposes and for general guidance only. Each SAR operation is different therefore not all of the items below might be needed and additional ones might be required. Some items might also be carried out by different facilities and units from those indicated below.

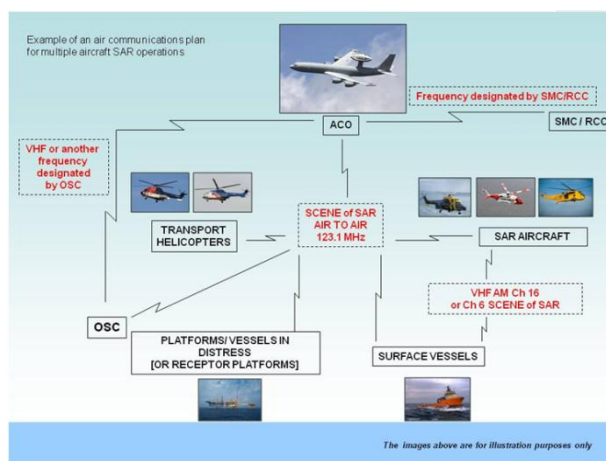
SERIAL	TASK	ACO	SMC	ATS	SRU
1	Declare Emergency Phase		X		
2	Identify Requirement for ACO		X		X
3	Designate and Notify ACO	X	X		
4	Inform ATS units & Establish Area of SAR Action		X	X	
5	Identify Aircraft And Capabilities	X	X		
6	Develop and Promulgate Plan	X	X		X
7	Establish Co-operation with OSC	X	X		
8	Co-ordination with ATS	X	X	X	X
9	Manage Aircraft Activities	X	X	X	
10	Call ACO before Entering Area	X			X
11	Call ACO when leaving Area	X			X
12	Monitor and Update On Scene Plan	X	X		
13	Provide Regular Situation Reports	X	X		
14	Manage Fuel & Numbers of airborne SRUs	X	X	X	X
15	Stand Down or Relieve the ACO	X	X		
16	Cancel/ Terminate the SAR Operation	X	X	X	X
17	Cancel Area of SAR Action	X	X	X	X

Notes:

1. 'X' signifies action required or the receipt of information
2. For the purposes of this checklist, 'SRU' refers to aircraft involved in the SAR operation.

Appendix H - 2 Multiple Aircraft SAR Operations

Example Radio Communications Plan



Appendix H - 3 Multiple Aircraft SAR Operations

ACO Procedure Form-Mass Rescue Operations

GENERAL INFORMATION	
OPERATION	
EMERGENCY LOCATION	
IDENTIFICATION (VERSION)	
TIME ZONE	
ACO INFORMATION	
ACO FREQUENCY	
ACO TEL / EMAIL	
WAYPOINTS	
REFERENCE POINT	
EXIT POINT	
HOLDING POINT	
HOLDING POINT	
HOLDING POINT	
EVACUATION SITE	
EVACUATION SITE	
REFUELING/CREW SUPPORT	
ALTITUDES	
ENROUTE/ENTRY	
HOLDING POINT(S)	
EXIT POINT	
ENROUTE/LEAVING AREA	
NATURE OF DISTRESS AND/OR SEARCH OBJECTS	
SAFETY BRIEF	
<p><i>"The Air Coordinator will only provide advisory information. You (the Aircraft Commander) are responsible for the safety of your own aircraft at all times. If you, because of safety reasons, are unable to comply with instructions given by ACO, you are to notify me (ACO) immediately."</i></p>	
PICTURE OF ACO PROCEDURE	
MISSED APPROACH PROCEDURE	
OPERATIONAL INFORMATION	
COMM PLAN	WEATHER ON SCENE + QNH
ACO 123,100 RCC/OSC CH SHIPS CH OTHER	WIND VIS CLDS TEMP QNH

Appendix H-4 Multiple Aircraft SAR Operations

Briefings

The ACO should ensure that the following information is briefed to the SAR aircraft after check in and when appropriate

SAFETY BRIEF	"The Air Coordinator will <u>only</u> provide advisory information. You are responsible for the safety of you own aircraft at all times. If you because of safety reasons are unable to comply with instructions given by the Air Coordinator , you are to notify me immediately"
QNH/ALT.	Which reference is used for common altimeter setting?
ORGANISATION ON SCENE	Who is acting Aircraft Coordinator? Who is acting On Scene Coordinator? Who is acting SMC.?
OTHER SRUs	Other airborne SRUs on scene (call sign, position, task) Ships on scene (call sign, task)
FREQUENCY PLAN	What frequencies are the SRU expected to use and/or monitor? - co ordination with other SAR aircraft - coordination with OSC/ships - hoist frequency? - frequency for transit back after mission.
WEATHER ON SCENE	Flight conditions on scene.



SEARCH MISSION		MASS. EVACUATION	
ROUTEPOINTS	Position of: - Entry point - Exit point	HOIST POSITION	Position of hoist
PATTERN	Search directions Track spacing	ROUTEPOINTS	Position/altitude of: - Reference point - Holding points - Exit point
SEARCH OBJECTS	Primary search object Secondary search object	EVACUATION SITE	Position of evacuation site/post mission landing site.
ADJACENT SRU	Which SRU are operating in close proximity.		
SAFETY ON SCENE	Which safety methods have been implemented.		

Appendix H - 5 Multiple Aircraft SAR Operations

SAR Aircraft Entry and Exit Reports

Aircraft Entry Report

The Entry Report should be given to ACO/RCC before entering the area of SAR action (at least 20NM/10 minutes flight time to casualty).

1. Call sign
2. Nationality
3. Type (specify fixed-wing or helicopter and type)
4. Position
5. Altitude and altimeter setting
6. Estimated Time of Arrival
7. Endurance on scene
8. Remarks (specific equipment or limitations)
9. POB (crew, other personnel)

Example of Entry Report: "Air Coordinator, Lifeguard 901; one Swedish S-76 rescue helicopter; position 25 NM south of Ronneby; 1500 ft. on QNH 1013; ETA holding point North 1015Z; Endurance on scene 2 hours; no limitations, 4 crew on board"

Aircraft Exit Report

The Exit Report should be given to the ACO/RCC before leaving the area of SAR action.


1. **CALL SIGN**
2. **Persons on Board (crew, other personnel, rescued)**
3. **Estimated Time of Arrival at destination**
4. **Requirements at destination (fuel, medical care, food etc.)**
5. **Estimated Time of Arrival back in operations area**
6. **Remarks (e.g. Hoist position, weather, etc.)**

Example of Exit Report: "Air Coordinator, Lifeguard 901; total POB 9, 4 crew and 5 rescued; ETA to EVAC 1230Z; Require fuel after landing; ETA back in area 1430Z; hoist position 5535.9N 01659E"

Appendix H - 6 Multiple Aircraft SAR Operations

Pilot Information File

"AIR COORDINATOR" 123.100 MHz

<p style="text-align: center;">ENTRY REPORT / 20 NM before reaching area!</p> <ol style="list-style-type: none">1. Callsign2. Nationality3. Type (FIXED/HELICOPTER AND TYPE)4. Position5. Altitude and altimeter setting6. ETA (RELEVANT POINT OR SEARCH AREA)7. Endurance on scene8. Remarks (EQUIPMENT – LIMITATIONS)9. POB (crew, other personnel)
<p style="text-align: center;">REPORTING</p> <ul style="list-style-type: none">• Reaching assigned points.• Leaving assigned points.• Commencing operations (search, investigation during search, approach to surface/ship, missed approach, hoist, landing etc).• Completing operations, including information regarding results.• Leaving present altitude.• Reaching new altitude.• 10 minutes to completing hoist operation or search.• 30 minutes on scene endurance, expecting fuel at (location)• Exit Report: POB, ETA and requirements at destination, ETA back in operations area and any remarks (hoist position and weather)
<p style="text-align: center;">SEARCH MISSION</p>  <ol style="list-style-type: none">1. Visual – no restrictions, only traffic reports2. Flow – spacing by flow: separation of ETA, CSP's3. Coordination zones – example 1 NM on each side of border. Call neighbouring helo before entering coordination zone and when exiting 1NM4. No fly zones – Do not enter buffer zone.
<p>NOTE: The ACO provides only ADVISORY information, aircraft commanders are responsible for the safety of own aircraft. Notify ACO immediately if unable to comply with instructions received.</p>