The International Maritime Rescue Federation Mass Rescue Operations Project:

The Aircraft Coordinator

Overview

The IMRF’s mass rescue operations (MRO) guidance is provided in 30 separate chapters at www.international-maritime-rescue.org. For downloadable documents referenced in this chapter please use the drop-down menus or return to the MRO project main page under ‘Resources’. For a general introduction please see chapter 1, ‘Complex incident planning – the challenge: acknowledging the problem, and mass rescue incident types’.

This chapter discusses:

- the general role of the Aircraft Coordinator
- the ACO’s role in a mass rescue operation
- the ACO as On Scene Coordinator
- the SAR Mission Coordinator / On Scene Coordinator / ACO relationship
- ACO qualification, training and responsibility
- designating an ACO
- ACO workload, transfer, reporting and record-keeping
- aircraft not involved in the SAR operation, including news media aircraft

1 The general role of the Aircraft Coordinator

1.1 The IAMSAR Manual defines the Aircraft Coordinator as “a person or team who coordinates the involvement of multiple aircraft SAR operations in support of the SAR Mission Coordinator and the On Scene Coordinator”. Volume II Chapter 1.2.5 summarises the ACO’s tasks in general:

“The purpose of the aircraft coordinator function is to maintain high flight safety and cooperate in the rescue action to make it more effective. The ACO function should be seen as a cooperating, supporting and advisory service. The ACO should normally be designated by the SMC, or if that is not practicable, by the OSC. The ACO function will normally be performed by the facility with the most suitable mix of communication means, radar, GNSS (Global Navigation Satellite System) combined with trained personnel to effectively coordinate the involvement of multiple aircraft in SAR operations while maintaining flight safety. Generally the ACO is responsible to the SMC; however, the ACO work on scene must be coordinated closely with the OSC [...]. Duties of the ACO
can be carried out from a fixed-wing aircraft, helicopter, ship, a fixed structure such as an oil rig, or an appropriate land unit, such as an ATS [Air Traffic Services] unit or RCC. Depending on needs and qualifications, the ACO may be assigned duties that include the following:

- coordinate the airborne resources in a defined geographical area;
- assist in maintaining flight safety by issuing safety-related information;
- practise flow planning (example: point of entry and point of exit);
- prioritize and allocate tasks;
- coordinate the coverage of search areas;
- forward radio messages (can be the only duty);
- make consolidated situation reports (SITREPs)\(^1\) to the SMC and the OSC, as appropriate; and work closely with the OSC; and
- it is important that the ACO is aware [...] that the participating airborne units [should], if possible, try to avoid disturbing other participating units with, for example, noise and rotor wind [also known as ‘down-draught’ or ‘downwash’].”

1.2 The principal source of international guidance on the ACO role is Volume III, *Mobile Facilities*. The list of ACO duties contained in Volume III, Section 11, is as follows:

- Contributing to flight safety:
  - maintain a safe flow of aircraft
  - ensure use of a common altimeter setting for all aircraft involved
  - advise the SMC/OSC 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
  - manage radio messages to and from SAR aircraft
  - ensure frequencies are used in accordance with SMC directives
  - coordinate with adjacent ATS units

- Prioritising and allocating tasks:
  - ensure SAR aircraft are aware of the SMC/OSC overall plan and their own tasks
  - monitor and report search area coverage and/or rescue action
  - with appropriate SMC/OSC, identify emerging tasks and direct SAR aircraft to meet them

- 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
  - monitor and keep SMC/OSC informed about the progress of tasks assigned to SAR aircraft

- Informing SAR aircraft:
  - assign tasks to aircraft
  - 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

- Make periodic situation reports (SITREPs) of SAR aircraft operations to the SMC and the OSC, as appropriate

- Work closely with the OSC:

\(^1\) The SITREP format is included in IAMSAR Manual Volume III. See also chapter 25.
- assist in the execution of SMC directives
- maintain communications
- advise on how the ACO can assist
  o Coordinate aircraft refuelling.

1.3 A significant amount of additional guidance on multiple aircraft SAR operations has been added to all three volumes of the IAMSAR Manual in recent editions. The appropriate procedures and principles are now described in IAMSAR Volume II Chapter 7 and Volume III Section 10. This guidance should be referred to by MRO planners. See also chapter 23.

1.4 An ACO should be appointed when there is more than one aircraft responding to any SAR incident and assigned to operate within an ‘area of SAR action’, which IAMSAR defines as “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”.  

1.5 The SMC should be enabled by national and/or regional agreement to establish an ‘area of SAR action’, and Air Traffic Services (ATS) and other aeronautical organisations should be made aware of it so that aircraft not involved in the operation can be kept clear. IAMSAR explains that:

“SAR authorities should make arrangements to establish temporary airspace reservation, danger areas, restricted areas or other suitable categories of area through appropriate State authorities. These areas should be agreed and put in place as early as possible during a multiple aircraft SAR operation. […]

“The dimensions of the required area of SAR action depend on the circumstances and can be different over land compared to maritime operations. In general, the horizontal and vertical dimensions of an area of SAR action should be large enough to enable safe operations for SAR units, taking into account the need for airborne SAR units to safely manoeuvre throughout their mission profile. SAR plans might involve procedures in which different altitude levels are assigned to different aircraft. This is an important consideration whenever any combination of fixed wing aircraft, helicopters and remotely piloted aircraft are operating in the same area. Factors to be taken into account when considering the dimensions of areas of SAR action include the following:
- the required extent of SAR activities, including searching
- the need for multiple aircraft to manoeuvre safely
- the need to protect SAR aircraft from other types of operations
- the impact that SAR activities might have on other, neighbouring activities.

“If multiple aircraft SAR operations take place within controlled airspace, then either the ATS should control SAR aircraft in accordance with normal ATS procedures or an agreed portion of airspace should be temporarily handed over for coordination by an ACO. The ATS unit involved may also be in a position to carry out some of the duties of an ACO. […]

“Horizontal spacing of aircraft operating visually should be the basic method used by SAR authorities and ACOs. It can be achieved by establishing coordinated specific routes to be flown by SAR aircraft to, from and within the area of SAR action. The minimum components should include:
- a direction for entering and leaving the area of SAR action
- Entry and Exit points

---

2 Volume II, Chapter 7.2.2.
3 Volume II, Chapter 7.2.3-5 & 7.6.1
- adequate horizontal spacing between individual search areas
- same alignment of search legs and direction of creep
- timed entry and exit from individual search areas.

“Vertical spacing of aircraft can be used in combination with horizontal spacing for aircraft operating visually but is a key consideration for safety during poor weather conditions when more segregated operations are likely to be required.

“In general, altitudes for RPAs [Remotely Piloted Aircraft] should be kept apart from altitudes allocated for other SAR aircraft.”

1.6 The ACO coordinates aircraft movements within the area of SAR action, and can advise the SMC and/or OSC on best use of the aircraft available, their limitations, and other issues of importance to the overall coordination of the response, such as the on-scene endurance of the various air assets.

1.7 The ACO will also be involved in flight support issues such as arranging refuelling. Use can be made of strategically located refuelling facilities such as airfields, offshore installations and suitable vessels.

2 The Aircraft Coordinator’s role in a mass rescue operation

2.1 The ACO’s role does not differ in an MRO: it is still to coordinate the involvement of multiple aircraft – but this is more likely in an MRO, and the work will be a part of a more complex whole.

2.2 One of the means of overcoming the ‘capability gap’ discussed in chapter 4 is to share resources regionally. This is more likely to be a practical proposition with SAR aircraft than with surface units, because of aircrafts’ higher transit speeds and the expense of providing air assets locally. IAMSAR Volume I contains the following advice:

“Differences in the availability of airborne SAR units, [their] capabilities and geography across different SAR Regions cause regional differences in plans for multiple aircraft SAR operations. Significant differences may increase risks to safety during operations in which aircraft, SAR units or staff from different SAR organizations work together. In order to promote safety, effectiveness and best practise, it is important that SAR organizations develop plans for multiple aircraft SAR operations based on common procedures and principles.”

2.3 Volume II Chapter 7.1.3-4 adds:

“Whenever multiple aircraft are involved in a SAR operation, there are additional risks to consider and operations should be coordinated. To overcome these risks, SAR authorities should establish plans for multiple aircraft SAR operations. For reasons of safety and the effectiveness of operations, it is important that common procedures are used in SAR plans to ensure the safe flow of aircraft during these operations. If possible, these plans should be harmonized between neighbouring SRRs [SAR Regions…]. SAR authorities are recommended to share their experiences of multiple aircraft SAR operations with recommendations to improve SAR plans and documents.”

It is the ACO’s primary task to implement the plans the SAR authorities establish.

2.4 IAMSAR Volume II Chapter 7.1.10 notes that:

---

4 Chapter 6.7.3-4.
“RCCs may have dedicated civil, military and/or other government SRU aircraft available as part of their national SAR plans. In some situations, such as mass evacuations from offshore drilling platforms, large scale incidents over land areas etc, supplementary aircraft with SAR capability belonging to other commercial companies or organisations might be able to respond to incidents as part of existing emergency plans. During SAR operations, it is essential that the activities of these aircraft be coordinated with the overall SAR response in order to reduce the risk of collisions and to make the overall operation safe and effective. SAR authorities and SMCs should therefore make agreements also with these commercial companies and other organisations describing how SAR operations should be coordinated, when both dedicated SAR and other aircraft are involved. SAR authorities and SMCs should be aware of the SAR capabilities of relevant companies and organisations in their SRRs [SAR Regions].”

2.5 There is a common theme in all these extracts: the ACO’s is primarily a safety role, communicating with and coordinating the actions of all aircraft involved in the response so as to ensure that they are kept safely apart and able to operate efficiently in accordance with the search, rescue and/or support plans developed by the SMC and implemented by the OSC (see chapters 19 & 20). As a corollary of this, the ACO will be able to advise the SMC and OSC on aircraft safety issues and the capabilities and potential uses of the aircraft available, as in turn advised by the aircraft commanders.

2.6 Knowing that their movements are being monitored by an ACO enables individual aircraft commanders to focus on the tasks given to them. If aircraft were to participate in a search, for example, without ACO cover, their crews would be obliged to spend significant amounts of time looking out for other aircraft rather than search objects.

2.7 Similarly, granted that very few aircraft will be able to operate simultaneously over a ship or installation in distress – often only one at a time – an ACO is required to establish and maintain traffic flow into and out of the area of SAR action and into and out of the immediate rescue area.

3 The Aircraft Coordinator as On Scene Coordinator

3.1 The ACO role is clearly distinct from that of the OSC in the classic division of SAR coordination work as envisaged in IAMSAR – an SMC developing plans in conjunction with an OSC who organises their implementation on scene, and an ACO who looks after the aircraft safety element. The ACO need not actually be ‘on scene’ so long as s/he has sufficient overview to be able to carry out the task. On the other hand, the ACO can operate from the same unit as the OSC, providing that unit has the capability – surveillance and communications equipment and trained specialist staff – to undertake both functions.

3.2 There are some circumstances in which this relationship might be reversed. An aircraft can be appointed OSC if it is the most suitable unit available for the task. If other SAR facilities on scene are best used for immediate search, rescue or support work that will fully occupy them, for example, a fixed-wing aircraft, with a full communications fit, a SAR-trained crew and enough on-scene endurance, can be more efficiently used as OSC.

3.3 It may also be that aircraft are the main or, conceivably, the only SAR facilities able to undertake the rescue, in which case the on-scene coordination work becomes largely an ACO function. There have been SAR cases in which evacuation has had to be done mostly by helicopter, for example.⁵

⁵ The latter part of the Norman Atlantic ferry rescue in late 2014 was such a case. After the ship’s evacuation systems were rendered unusable by fire, trapping passengers and crew on upper decks, they were recovered, over many hours, by a
3.4 ‘Areas remote from SAR facilities’ are discussed in chapter 12, and some of the implications for coordination in such areas in chapters 19 & 20. In these circumstances a fixed-wing aircraft may be the only designated SAR unit able to reach the scene, and is likely to be the best choice as OSC, if its crew are suitably trained and equipped and if its on-scene endurance is sufficient.

3.5 How the work is best divided between an OSC and ACO is a matter for the SMC to decide, in discussion with the units concerned.

4 The SMC / OSC / ACO relationship

4.1 In the classic tripartite division of SAR coordination activity, the ACO will work closely with an SMC and OSC in a mass rescue operation as well as with all the aircraft assigned to the operation (see chapter 23).

4.2 Like the OSC, part of the ACO’s function is to act as a communications node, receiving plans from the SMC and/or OSC and, after any necessary discussion and agreement, relaying them to the aircraft involved and passing reports back. This requires a reliable and clearly understood communications network: see chapter 25.

4.3 IAMSAR contains a diagram illustrating the relationship, reproduced below. The diagram shows the SMC acting in support of the casualty, planning the maritime response and linking it to the commensurate response ashore. The OSC and ACO act in the SMC’s support in turn, the OSC primarily responsible for implementing the plan as regards surface units, and the ACO as regards aircraft. (Other aspects of the diagram are discussed in chapter 25.)

---

carefully coordinated stream of helicopters. The partial evacuation of the cruise ship Viking Sky in March 2019 is another example.
ACO qualification, training and responsibility

5.1 IAMSAR\(^6\) says that:

“ACOs fulfil a vital function during SAR operations and their duties can be complex and require specialist knowledge. […] In order to ensure the best standard of SAR operations and safety, people likely to be designated as ACOs should be specially trained to carry out this duty. Once trained, SAR authorities should ensure that exercises take place to train ACOs and to practice multiple aircraft operations. RCCs should be aware of trained ACOs in their SRRs and establish procedures for tasking them whenever they might be needed for a SAR mission.”

5.2 As regards responsibility for flight safety, IAMSAR\(^7\) says that:

“Assessment procedures should be used to assist decisions regarding safety of operations including risk inputs such as number and performance of aircraft, capacity for aircraft pilots to deconflict from other aircraft, accuracy of aircraft navigation capability, manoeuvring requirements, wake turbulence, current and forecast weather, sea conditions, terrain, time of day and other applicable risk factors (environmental, aircraft, airspace, other air traffic and location).

“Information from ACOs to aircraft on scene is advisory, but should nevertheless be followed as closely as practicable. If necessary to ensure flight safety, pilots-in-command should take whatever measures they assess are needed. If they decide to deviate from advice passed by an ACO, or observe any potential hazard to flight operations, 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. […]

“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 to enhance flight safety are as follows:

- Visual methods
- Flow methods
- Coordination zones
- No fly zones.”

5.3 More information on these and other aspects of multiple SAR aircraft coordination, together with checklists, is contained in IAMSAR. Units likely to be designated as ACOs or to take part as airborne SAR units in a multi-aircraft operation should always have these checklists and guidance available. Carriage of Volume III of the IAMSAR Manual by these units is recommended.

6 Designating an ACO

6.1 Careful consideration should be given to the appointment of an ACO. Chapter 20 notes that pre-selection is the preferable option for OSCs whenever possible. This is at least as beneficial for ACOs. IAMSAR says\(^8\) that:

\(^6\) Volume II, Chapter 7.3.2.
\(^7\) Volume II, Chapter 7.3.3 & Volume III, Section 12.
\(^8\) Volume II, Chapter 7.3.5-7.
“Whenever multiple aircraft are taking part in a SAR operation and are likely to operate close to each other, SAR authorities should consider designating a person, unit or organization as an ACO.

“An ACO is designated by a SMC and should carry out missions under a SMC’s direction. ACOs should be notified of their mission as early as possible, in order to give them the maximum time to prepare for their tasks.

“There are many factors for SMCs to consider when designating an ACO [...]. Some significant considerations are as follows:

- Designating an ACO should be considered when multiple aircraft are involved in a SAR mission.
- An ACO should be equipped with appropriate forms of communication for the SAR mission, such as the appropriate radios for communicating with aircraft, ATS units, SAR authorities and SRUs [SAR units] on the surface. ACO situational awareness can also be assisted by equipping with surveillance capabilities such as ADS-B, AIS or other flight tracking capabilities.
- An ACO should clearly understand the overall objective of the SAR operation and relevant SMC plans.
- ACOs should be provided with sufficient information to carry out their mission or have access to sufficient information.
- An ACO should know which authority to report to (normally the SMC) and which other units are involved in a mission.
- ACOs should be able to reach the required location in sufficient time for them to prepare for and carry out their duties.
- A person or SAR unit designated as an ACO should have received appropriate training in advance.
- An ACO should be familiar with the types of aircraft involved and their flying operations.
- An ACO should be familiar with SAR operations involving multiple aircraft.
- ACOs should ideally be familiar with the environment, normal procedures, activities and air traffic systems in the areas of operation.
- The time that ACOs may be available to carry out their missions should be considered. If an ACO is on board an aircraft, then aircraft endurance might limit the amount of time for which that ACO can be available.”

6.2 IAMSAR also notes⁹ that:

“ACOs should ideally be as close to the scene of a SAR incident as practicable. However, the choice of location of an ACO is flexible, and they should operate in locations which best help them to carry out their duties, such as on 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.”

---

⁹ Volume II, Chapter 7.3.8.
ACO workload, transfer, reporting and record-keeping

7.1 The workload of an ACO can be intense. IAMSAR says\(^{10}\) that:

“As much as possible, SMCs should aim to reduce an ACO’s workload by coordinating SAR activities taking place within an area of SAR action with relevant ATS units, airfields and other facilities. However, depending on the location and circumstances of an incident, ACOs should also be prepared to carry out these duties. […]

“During some SAR operations, particularly those lasting for long periods of time, it may be necessary to transfer the tasks from one ACO to another. This might be due to fatigue, factors affecting an ACO’s location, such as the requirement for an ACO’s aircraft to refuel, or for other reasons.

“Before accepting the task the new ACO should understand the details of the SAR operation and the SMC’s plans. The details required may 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. […]

“A new ACO will need enough time to obtain information, study it and then prepare to accept the task from the previous ACO. Every SAR mission may be different, but as general guidance, a handover of information should begin approximately thirty minutes before a new ACO formally takes over.

“A change of ACO might also involve a change of ACO location. If this is the case then, upon taking over, the new ACO should make a general communications broadcast announcing the new information and, whenever possible, obtain acknowledgements from all the participating aircraft. A new ACO should inform all participating aircraft that a handover has taken place.”

7.2 Reports to the OSC and/or SMC as appropriate form an inevitable part of the ACO’s workload, as does record-keeping. These tasks are discussed in chapter 20 as regards the OSC, and most are the same for the ACO. IAMSAR says\(^{11}\) that:

“The ACO should make regular reports of on scene activity to the SMC and aircraft involved in the SAR operation. When possible, these reports should be made when ACOs or aircraft are not busy with other operational tasks. […] A general guide is for ACOs to make reports every thirty minutes during a SAR operation or when anything of significance occurs.”

7.3 In MROs an indicative list of what should be recorded, with all entries timed, is as follows:

- time of appointment as ACO and time of relief or release from ACO duties, and by whom
- location when appointed, and own unit’s subsequent actions
- weather conditions, with changes and forecasts received
- the search, rescue and/or support action plans received from the SMC or OSC
- any discussion of the plans with the SMC and/or OSC, and modifications agreed
- the identities of SAR facilities assigned to the ACO

\(^{10}\) Volume II, Chapter 7.3.10 & 7.3.14-17.

\(^{11}\) Volume II, Chapter 7.3.12.
o their times of arrival at, and departure from, the scene
o the tasks allocated to each
o communications with the SAR facilities assigned
o communications with the SMC and/or OSC, including SITREPs
o any safety concerns, and actions taken to resolve or mitigate them
o areas searched; the track spacing achieved; and the results
o rescue action plan results
o support action plan results
o numbers of people retrieved, with any other identity detail received
o SAR facilities with survivors and/or the dead aboard; their numbers and condition
o destinations and ETAs of SAR facilities departing the scene
o requests for medical or other specialist assistance.

8 Aircraft not involved in the SAR operation, including news media and VIP aircraft

8.1 The ACO coordinates aircraft movements within the area of SAR action, as discussed, and aircraft not involved in the operation – and which are not needed for it – should be notified of the area’s dimensions and should keep well clear.

8.2 There may be a need to accommodate flights into or near to the area of SAR action by aircraft carrying Government officials, Ministers or other VIPs. The ACO must be given early notice of such flights so that they can be coordinated in such a way as to ensure that SAR aircraft operations are not compromised or impeded.

8.3 News media interest in a mass rescue operation may be intense, and editors will want pictures of the scene (see chapter 7). This may lead to attempts to fly into the area of SAR action – which may be dangerous. The relevant aviation authorities should ensure that regulations are in place, and are enforced, to prevent uncontrolled entry.

8.4 This is not to say that the news media should be prevented from acquiring the pictures they need. Pictures obtained for SAR purposes may be shared, by agreement; and/or overflights by aircraft chartered by the news media may be allowed, again with the ACO’s approval and avoiding any adverse impact on SAR aircraft operations.

9 Summary

o The tasks that may be delegated to an Aircraft Coordinator are described in the IAMSAR Manual, particularly Volume III. The ACO’s main duties are to ensure flight safety and, in an MRO, to assist in implementing the response plans under the SAR Mission Coordinator’s general direction, working closely with the On Scene Coordinator.

o An ACO should be appointed, normally by the SMC, whenever there is more than one aircraft assigned to operate within an ‘area of SAR action’.

o The ACO function should be seen as a cooperating, supporting and advisory service.
The ACO function will normally be performed by the facility with the most suitable mix of communications, radar and GNSS equipment and trained personnel.

It is important that SAR organisations develop plans for multiple aircraft SAR operations based on common principles and procedures.

In order to ensure the best standard of SAR operations and safety, people likely to be designated as ACOs should be specially trained to carry out this duty.

Knowing that their movements are being monitored by an ACO enables individual aircraft commanders to focus on their primary tasks.

The ACO should make regular reports of on scene activity to the SMC, OSC and the aircraft involved in the operation.

Aircraft not involved in the operation should be kept well clear. Aircraft carrying VIPs and/or news media teams must only be allowed into or near to the area of SAR action in consultation with the ACO, and should not be allowed to impede SAR operations.

10 Further reading

10.1 Volume III of the IAMSAR Manual, especially Sections 10 & 11, is the principal source of guidance for the ACO. Volume II also provides guidance on the role, with a summary at Chapter 1.2.5 and additional guidance in Chapter 7.

***