



Search and Rescue Conference

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WP/11 – RCC Operations Manual

RCC Operations Manual

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1. INTRODUCTION

The Search and Rescue function is a state obligation imposed by the International Convention on Maritime Search and Rescue (Hamburg, 27 April 1979), the Convention on International Civil Aviation (Chicago, 7 December 1944), and the International Convention on Safety of Life at Sea (SOLAS) (London, 1 November 1974 as amended).

This manual serves as a standard operational reference document for use by the Rescue Coordination Centre(s) in the planning and execution of aeronautical search and rescue operations primarily within the *[State]* Search and Rescue Region. The manual must be interpreted with sound judgement as no set of instructions can apply to every search and rescue situation. The Rescue Coordination Centre should however ensure that the planning of search and rescue operations are not in conflict with this manual.

It must also be noted that this manual does not, on its own, provide all the information necessary for carrying out search and rescue operations but that the users of the manual should be adequately trained and competent Search and Rescue Mission Coordinators. Reference should be made to the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volumes I, II and III for more comprehensive and detailed information.

2. DEFINITIONS AND ABBREVIATIONS

Alerting post. Any facility intended to serve as an intermediary between a person reporting an emergency and a rescue coordination centre or rescue subcentre.

Possibility area.

The smallest area containing all possible survivor or search object locations which it is physically possible for the aircraft to have reached.

Probability Area.

For a scenario, the probability area is the smallest area containing all possible survivor or search object locations which are consistent with the facts and assumptions used to form the scenario.

SRU: Search and rescue unit

ELT: Emergency locator transmitters

RCC: Rescue co-ordination centre

ACC: area control centre

SC: Search and Rescue co-ordinator

SAR: search and rescue

OSC: On-scene co-ordinator (OSC)

ATC: air traffic control

ATS: air traffic services

RSC: Rescue sub-centre (RSC)

SRR: Search and rescue region (SRR)

SMC: search and rescue mission co-ordinator (SMC)

INCERFA: The code word used to designate an uncertainty phase

ALERFA: The code word used to designate an alert phase

DETRESFA: The code word used to designate a distress phase

IFR: instrument flight rules

VFR: visual flight rules

POB: persons on board

IAMSAR:

- International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (Doc 9731)
- International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume I — Organization and Management (Doc 9731)
- International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume II — Mission Co-Ordination (Doc 9731)
- International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual Volume III — Mobile Facilities (Doc 9731)

3. EMERGENCY PHASES

3.1. Definition

Emergency phases are defined in Annex 12 to the Chicago Convention:

- **Uncertainty phase (INCERFA)** : a situation wherein uncertainty exists as to the safety of an aircraft and its occupants.
- **Alert phase (ALERFA)** : a situation wherein apprehension exists as to the safety of an aircraft and its occupants.
- **Distress phase (DETRESFA)** : a situation wherein there is a reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger and require immediate assistance.

[Each State should develop clear criteria for declaration of emergency phases; the following table is presented as a guide]

The phase should be declared within the time specified in the following table:

			INCERFA	ALERFA	DETRESFA
For All Flights	Distress Signal Mayday – SOS – A7700				Within 5 min
	Urgency Signal – Pan Pan XXX – ELT			Within 5 min	Depending on the circumstances
	Unlawful Interference – A7500			Within 5 min	Depending on the circumstances
	Loss of both radio (where required by ATC) and radar contact			Within 5 min	Within 10
	Loss of radio contact in the approach phase and within the aerodrome traffic zone / aerodrome vicinity			Within 5 min	Within 10
	Loss of radio contact with aircraft leaving the aerodrome traffic zone / aerodrome vicinity		Within 10	Within 20	Within 30
Controlled flights	Loss of radio contact		Within 10	Within 20	Within 30
Uncontrolled flights	Flight plans submitted	Loss of radio contact (where required by ATC)	Within 30	Within 60	Within 90 min or when remaining fuel onboard is considered exhausted.
		Delay in arrival	Within 30	Within 60	Within 90 min or when remaining fuel onboard is considered exhausted.
	Flight plans not submitted		Depending on the circumstances		

3.2. Action required

3.2.1. Uncertainty phase (INCERFA)

When an uncertainty phase has been declared by the RCC or an ATS Unit, the RCC should:

- a) Verify details notified by the alerting post. In particular, details of the aircraft involved should be gathered and confirmed, where possible:
 - call sign or registration;
 - description: type of aircraft, colours and marking;
 - passengers on board (POB) and, if available, names;
 - category of operation (visual flight rules (VFR) or instrument flight rules (IFR));
 - pilot rating and experience;
 - place of departure, destination and planned route;
 - actual time of departure and estimated time of arrival;
 - actual route;
 - emergency equipment carried;
 - last communication received;
 - last known position;
 - any available radar plot;
 - fuel endurance and fuel expiry time;
 - communications equipment;
 - navigation aids carried;
 - any dangerous cargo;
 - any other relevant information.

Some information may be obtained from the aircraft involved while still airborne. Otherwise, flight plan information should be researched and supplemented by contact with the owner / operator / family and friends or other contacts. When no flight plan has been filed, attempts should be made to obtain information from which the route and the times of departure and arrivals of the aircraft may be reconstructed.

- b) Enter in a log all incoming information and progress reports, details of action as described below, and subsequent developments.
- c) Maintain close liaison with relevant ATS Units, so that:
 - new information (obtained through e.g. communication search, verification of flight plan and/or review of weather information passed to the pilot before and during the flight) will be available immediately for evaluation, plotting, decision making etc; and
 - duplication of action will be avoided.
- d) Plot the flight path of the aircraft involved, making use of relevant information.
- e) Continue the communication search, the purpose of which is to:
 - attempt to communicate with the aircraft involved on all appropriate frequencies either directly or through other ground or airborne Units; and
 - determine its most probable location or route by;

- making inquiries at all aerodromes (including the aerodrome of departure) and other locations where it might have landed or been observed; and
- contacting other appropriate sources, e.g. aircraft known or believed to be on the same route within communication range.

Note: if the communication search indicates that a SAR operation is probable, the RCC should inform relevant SAR facilities and, as necessary, other RCCs.

When the communication search and/or other information received indicates that the aircraft is not in distress, the RCC will cancel the SAR phase and immediately inform the operator, the reporting source and any alerted facility. However, if the aircraft has not been located after extensive application of the above procedures, the SMC should consider the need to review the emergency phase.

3.2.2. Alert phase (ALERFA)

Upon the declaration of an alert phase, the RCC should:

- a) Complete or initiate all relevant actions as detailed for Uncertainty phase.
- b) Ensure that a SAR Mission Co-ordinator (SMC) has been appointed.
- c) Alert appropriate SAR facilities.
- d) Review all information received;
- e) Continue efforts to obtain information about the distressed aircraft from all available sources e.g. communication stations associated with radar facilities and/or direction finding networks and any other communication stations with which the aircraft might have communicated. These Units should be requested to guard specified radio frequencies.
- f) Thoroughly re-evaluate the flight plan, weather, terrain, possible communication delays, last known position, last radio communication, pilot rating and experience, estimated aircraft endurance and performance under adverse conditions.
- g) Maintain close liaison with relevant ATS Units so that:
 - new information obtained will be made available immediately for evaluation, plotting, decision making etc; and
 - duplication of action will be avoided.
- h) Request ATS Units assistance with respect to :
 - passing instruction/information to the aircraft in distress, aircraft reporting the distress or SAR aircraft;
 - informing aircraft operating in the vicinity of the aircraft in distress of the nature of the emergency; and
 - monitoring the progress of the distressed aircraft;

- i) Estimate and plot the probable position of the aircraft and its maximum range from its last known position.
- j) If appropriate, initiate search planning (cf. chapter 4 – Search planning and operations); and
- k) Whenever practicable, communicate to the operator all information received and action taken.

When information received indicates that the aircraft is not in distress, the RCC will cancel the phase and immediately inform the operator and any alerted or activated facility. However, if the aircraft has not been located after extensive application of the above procedures, the SMC should consider the need to review the emergency phase.

3.2.3. Distress phase (DETRESFA)

Upon the declaration of a distress phase the RCC should:

- a) Complete all relevant actions as detailed for Uncertainty and Alert phases.
- b) From the information available, further develop a plan for the conduct of the SAR operation required and communicate such plan to the appropriate authorities/agencies.
- c) Notify relevant details of the plan to :
 - the ACC, for onward transmission to the distressed aircraft (if possible) and for traffic co-ordination purposes; and
 - all RCCs whose SRRs are within the aircraft's maximum range as determined from its last known position.

Note: the ACCs and RCCs should pass any information they receive regarding the incident to the co-ordinating RCC.

- d) Estimate the datum position of the distressed aircraft, evaluate the degree of uncertainty of this position and determine the extent of the area to be searched.
- e) Amend the plan as the operation develops.
- f) Select and notify designated SAR Units for deployment.
- g) Request aircraft, vessels, radio stations, and other facilities not specifically designated as SAR Units, that are appropriate and able to assist, to:
 - maintain a listening watch for transmissions from the aircraft in distress, from survival radio equipment, or from ELT;
 - assist the aircraft in distress as far as practicable;
 - prepare for deployment on SAR tasks;
 - inform the RCC of any developments;
- h) Notify the State(s) of Registry and Operator of the aircraft.

- i) Notify the appropriate accident investigation authorities.
- j) Maintain close liaison with relevant ATS Units so that new information obtained will be made available immediately for evaluation, plotting, decision-making, etc.
- k) On request, ATS Units may assist by:
 - passing instruction/information to the aircraft in distress, aircraft reporting the distress or SAR Units;
 - informing aircraft (operating in the vicinity of the aircraft in distress) of the nature of the emergency; and
- l) Notify the operator and keep them informed of developments.

4. SEARCH PLANNING AND OPERATIONS

Search planning involves the following steps:

- evaluating the situation, including the results of any previous searching;
- estimating the distress incident location and probable error of that location;
- estimating the survivors' post-distress movements and probable error of that estimate;
- using these results to estimate the most probable location (datum*) of survivors and the uncertainty (probable error of position) about that location;
- determining the best way to use the available search facilities so the chances of finding the survivors are maximized (optimal search effort allocation);
- defining search sub-areas and search patterns for assignment to specific search facilities;
- providing a search action plan that includes a current description of the situation, search object description(s), specific search responsibilities to search facilities, on-scene co-ordination instructions,
- and search facility reporting requirements.

These steps are repeated until either the survivors are located or evaluation of the situation shows that further searching would be futile.

4.1. Determination of search areas

Note: the figures in this chapter are for illustrative purposes only.

The many diverse criteria involved in estimating the likely location(s) and condition(s) of the survivors make it impossible to give detailed, step-by-step instructions on how to make such estimates. Sound judgement and careful analysis of all available clues are therefore required to produce a valid assessment on which to base a search.

4.1.1. General

The following factors should be considered for their possible effect on the probability area:

- errors in navigation by missing aircraft;
- drift (if applicable) to include currents and wind effect;
- last known position;
- weather in the area;
- elapsed time from last known position;
- aircraft endurance;
- known hazards along the aircraft's route.

Computer programmes giving aid in search planning may be used to:

- a) calculate drift;
- b) calculate probability of detection;
- c) evaluate many different scenarios with a range of incident times, positions, situations and environmental factors; and
- d) propose locations and areas most likely to contain the search object.

4.1.2. The possibility area

The possibility area is displayed as a circle drawn round the last known position of the aircraft. The radius is determined by the endurance at that time, expressed in terms of distance and taking into

account the wind velocity. It is assumed that the aircraft may have proceeded in any direction, even opposite to that of the flight plan, Until the fuel was exhausted.

Determination of the possibility area will enable the SMC to filter incoming reports to identify those geographically irrelevant.

4.1.3. The probability area

Systematic search of a large area is normally not practicable, and concentrating the search in the area where the search object is most likely to be located (the probability area) will make better use of the search Units available.

Unless the position of an aircraft in distress is accurately known, the most probable location of the missing aircraft should be calculated. This location, corrected for surface movements over time, is known as the datum.

Determination of the probability area is based on the navigational accuracy of the last known position of the aircraft. For positions reported as navigation fixes, the fix errors listed below can be assumed for SAR purposes;

- a) radar: 1.8 km (1 NM);
- b) INS : 0.9 km (0.5 NM) per flight hour without position update;
- c) OMEGA: 7.5 km (4 NM);
- d) LORAN C: 1.8 km (1 NM); and
- e) VOR/DME : +/- 5° ARC AND +/- 0.9 km (0.5 NM) or 3 % of distance to the antenna, whichever greater.

[Values and Units to be checked / updated]

If the means of navigation of the distressed aircraft are unknown, the SMC should apply error factors as follows:

- a) aircraft with more than two engines : 9 km (5 NM);
- b) twin-engine aircraft: 18.5 km (10 NM); and
- c) single-engine aircraft: 28 km (15 NM).

When the reported position is based on dead reckoning (DR), an additional error factor should be applied consistent with the distance travelled since the last fix:

- a) aircraft with more than two engines: 5 % of the DR distance;
- b) twin-engine aircraft : 10 % of the DR distance;
- c) single-engine aircraft: 15 % of the DR distance.

4.1.3.1. Basic determination of the probability area

4.1.3.1.1. Approximate position at time of landing or ditching is known

When the approximate position of a distress scene is known, (e.g. witnessed or reported by radar, another aircraft or the distressed aircraft itself) or can be estimated with reasonable accuracy, the radius of the most probable area will be small. If there is more uncertainty about the position, the radius must be increased to ensure the inclusion of the search target in the area to be searched. Except when executing a sector search, the area should be squared off.

The search radius R is the radius of a circle centred on the datum. The initial value of R is determined by the SMC on the basis of the parameters of the SAR operation (search environment, accuracy of the approximate position...). If the first search of the area is unsuccessful, the search area will have to be expanded in stages. The search radius is normally called R_1 for the first search, R_2 for the second; etc (see Illustration 1 – Probability area – radii expanded in stages). R_n is computed by multiplying R_{n-1} by the appropriate safety factor F as follows :

$$R_2 = R_1 \times F$$

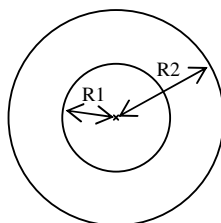


Illustration 1. Probability area – radii expanded in stages

The safety factor is determined as follows:

Search Number	Safety factor
1	1.1
2	1.6
3	2.0
4	2.3
5	2.5
Subsequent searches	2.5

When a search area is extended or additional areas must be searched, more search units will be required or the track spacing will have to be increased unless an increase of the duration of the search is permissible.

4.1.3.1.2. Only reported time of crash, forced landing or ditching is known

If an accident occurs between two reporting points, the approximate position of the accident may be calculated from navigational data derived from the flight plan.

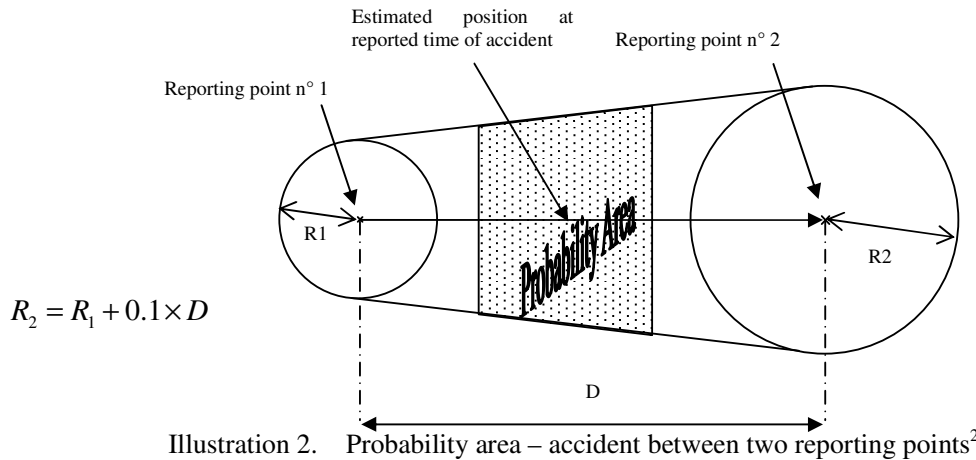
The probability area is determined as follows:

- draw a circle with a radius R (e.g. 18.5 km (10 NM)¹) around the last reported position;
- draw a circle around the next reporting point with a radius of R plus 10 % of the distance between the two points; and

¹ 18.5 km (10 NM) is used for illustrative purposes only

- c) draw straight lines tangential to the circles.

The datum area will be centred on the probable location of the aircraft based on the reported time of crash. (cf. Illustration 2 - Probability area – accident between two reporting points)



4.1.3.1.3. Only the planned route is known

When an aircraft disappears en-route, the first theory is that the aircraft is located on or near the intended track, or that it has experienced a communication failure and is proceeding in accordance with the flight plan. In this case, the search will be confined to the immediate vicinity of the track.

Probability area No 1 – Draw a circle with a radius of 18.5 km (10 NM³) around the last reported position or the aerodrome of departure. Next, draw a circle around the next reporting point with a radius of 18.5 km (10 NM) plus 10 per cent of the distance between the two points. Continue in the same way along the route to the destination and square off both ends .

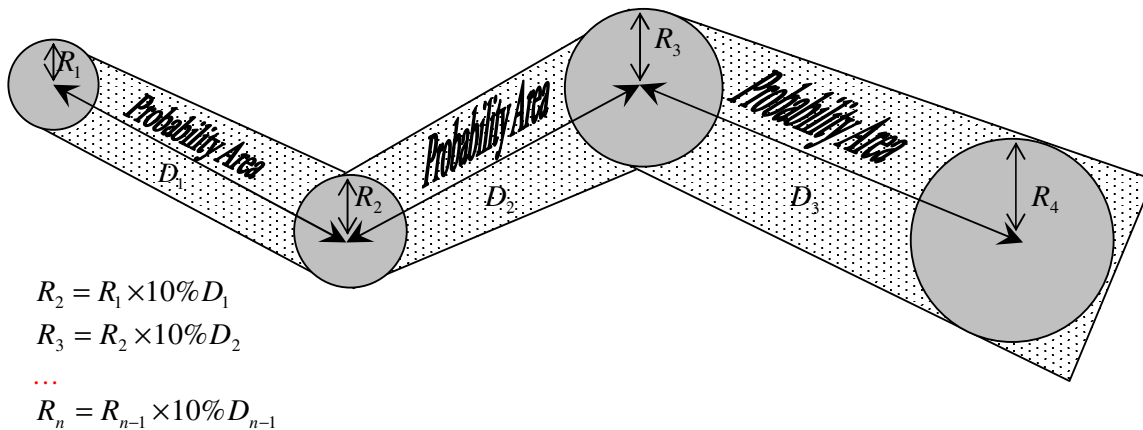


Illustration 3. Search area – accident somewhere in between several expected reporting points

² The figure, used for illustrative purposes only, does not respect proportions between R1, R2 and D

³ 18.5 km (10 NM) is used for illustrative purposes only

In the above example, the first area (radius R_1) is drawn around the last reported position or the aerodrome of departure, and the fourth area is drawn around the destination aerodrome. The probability area is the area enclosed by the tangents to circles whose radii are R_1 to R_4 .

Probability area No 2 – If the area described in the previous paragraph is searched without locating the missing aircraft, an expanded area should be plotted in the same manner as before except that the radii of circles should be progressively increased and the area therefore expanded.

$$R'_1 = R_1 \times f \quad \text{where } f = 20 \% \text{ for example, and } R'_n = R'_{n-1} \times 15\% D_{n-1}$$

4.1.3.1.4. Information, other than position, received since last position report

When the last communication received from an aircraft is not a position report but some other communication which did not indicate a distress, the probability area would be centred on the probable position of the aircraft based on the time of its last transmission. In such a situation, it will not be known whether the pilot has elected to continue, divert or turn back. Consequently, there could now be various subsequent areas of priority for search.

4.1.3.2. Adjustment of the probability area

4.1.3.2.1. General

While the search is in progress, all information received must be given careful consideration. Some of the factors that must be taken into account are :

- a) serviceability of ground navigation aids and airborne equipment;
- b) meteorological conditions;
- c) nature of terrain;
- d) pilot training and/or habits; and
- e) life raft and/or parachute drift; etc.

These factors may influence modification of the probability area. Some of these points are discussed below.

4.1.3.2.2. Meteorological conditions

In adverse weather conditions, some meteorological factors may be of particular influence in determining the pilot's probable actions. Some of these factors that should be considered are:

- a) deviation in wind velocities from the forecast;
- b) areas of low cloud or reduced visibility;
- c) marked variation in barometric pressure;
- d) thunderstorm activity;
- e) severe turbulence;
- f) icing; and

- g) frontal conditions.
- h) weather conditions at the last known position and along the intended route to the destination (AIREPs, special AIREPS, regular weather observations, reports from reliable local sources);
- i) meteorological briefing given to the pilot; and
- j) any disparity between the forecast and actual weather en route.

4.1.3.2.3. The nature of terrain

A map, giving sufficient details of the area where the aircraft has disappeared, should be studied carefully to determine the pilot's possible course of action. A very high mountain or mountain range close to its intended track should be given a high priority for search, particularly in adverse weather conditions. On the other hand, a pilot encountering adverse weather conditions may choose to avoid high terrains and attempt to follow valleys or proceed towards low terrain. When the terrain over which the aircraft is proceeding is too rough for an emergency landing, a pilot may head for an area where a landing would be less hazardous.

4.1.3.2.4. The pilots known record and habits

The pilot's experience, local knowledge and stated opinions should be assessed in determining his/her possible actions in an emergency. The opinions of the pilot's colleagues may also prove useful.

4.1.3.2.5. Company practices and procedures

The views of the owner / operator should be obtained, as company practices and procedures may provide indications as to the probable actions of the pilot.

5. SAR FACILITIES

[It is crucial for the SMC to be aware of the available units in or close to the SRR. Therefore, there must be an asset register in the RCC. Ideally, for easy regular updating, it could be available in electronic format / online. It may then appear as a separate document.

However, if it is not the case, at least a list of available assets should be maintained. The following tables give an indication of the type of information that this register should comprise.]

5.1. Air Units

Operator	Type	Base	Range	Cruise speed (Kts)	Specialized equipment	Response time	Flight conditions	Others
					<i>Example: Radio-direction finder Winch Ramp Etc.</i>		☒ IFR ☒ VFR ☒ Night ☒ Day	

...

5.2. Maritime Units

Operator	Type	Base	Range/endurance	Maximum speed	Specialized equipment	Response time	Weather limitations	Others

5.3. Land Units

It is not possible to list individual land units. However, the RCC should have rapid contact with:

- The police,
- Fire and rescue services,
- Medical services,
- The armed forces,
- Parks and forestry departments,
- Local volunteer organizations,
- Etc.

6. RESCUE OPERATIONS

6.1. Overview of rescue planning and implementation

The primary purpose of rescue is the expeditious removal to safety of the survivors of a distress situation. The following list provides an overview of the steps involved in rescue planning and implementation:

- Assess the rescue requirements of the distress situation.
- Determine the rescue unit based on the requirements of the case and available assets.
- Plan (including a contingency plan) and implement the rescue.
- Monitor the rescue units and facilities until all survivors have reached a place of safety.
- Provide further assistance to the rescue assets and facilities as required.

6.2. Assessing the rescue requirements

The initial assessment of the rescue requirements commences at the onset of a search and rescue incident and continues until all survivors have reached safety. Reassessment of the rescue requirements will occur throughout the incident and will be based on the following information as it becomes available:

- Action taken by the sighting unit.
- Location of survivors.
- Number of persons.
- Condition of survivors and medical considerations.
- Possible movement of survivors.
- Available assets.
- The need for life-sustaining equipment to be provided to survivors until the rescue can be executed.
- Environmental considerations.
- Effect of the weather.
- Time of day.
- Risks to search and rescue personnel due to hazardous material and hazardous environmental conditions, e.g. weather, terrain, time of day.
- Support methods available pending arrival of rescue assets, e.g. dropping of supplies.

6.3. Determining the rescue units

6.3.1. Rescue on land

Based on the assessment of the rescue requirements and the available assets identified, the SMC must determine the most appropriate rescue unit based on the following considerations:

- Urgency of the rescue situation.
- Ability to provide life supporting assets until the rescue is completed.
- Time of day and its implications for an air rescue.
- Medical advice concerning rescue methods.
- Land and air assets available and their suitability for the task.
- Weather conditions.
- Potential risk to rescue assets.

6.3.2. Maritime and inland waters rescue

Based on the assessment of the rescue requirements and the available assets identified, the SMC must determine the most appropriate rescue unit; considerations for maritime and inland waters rescue are:

- All of the list in paragraph 6.3.1 above.
- Distance from land and its implication for available rescue assets.
- Surface assets available and their suitability for the task at hand.

6.4. Implementing the rescue

- Task the most suitable rescue units based on the rescue requirements and provide such rescue units with a briefing including the following information as a minimum:
 - location of survivors;
 - communication available en route and on scene;
 - weather on scene;
 - nature of the task;
 - return location for survivors;
 - condition of survivors (if known);
 - specialised medical treatment required (if known).

Note: Detailed briefing forms can be found in Appendix H to IAMSAR MANUAL Vol. II.

- Coordinate with appropriate authorities for survivor transfer and any post-incident / accident requirements.
- Arrange logistics to support rescue units. The following are common support requirements for rescue units:
 - Equipment.
 - Communications.
 - Top-cover aircraft.
 - Medical assistance.
 - Fuel.
 - Accommodation.
 - Food.
 - Consideration of relief crew.
- Consider stand-by resources.
- Display rescue units in the RCC.
- Display the unit information on boards including:
 - call sign;
 - type of aircraft;
 - equipment carried on board;
 - estimated time of arrival on scene.

6.5. Monitoring the rescue

Once the rescue units have commenced their task, their progress is monitored to ensure a successful outcome. Monitoring the rescue may involve:

- Maintaining communication with each rescue unit (where possible).
- Assisting communication between rescue units and survivors through appropriate means.
- Continuing the search for missing survivors, if all persons on board are not accounted for.
- Continuing coordination with appropriate authorities by providing situation updates.
- Providing assistance to external search and rescue authorities as requested.
- Maintaining communication with stand-by resources to ensure continued availability and state of readiness.

7. DELEGATION

7.1. Rescue sub-centres

In some situations, the RCC may delegate some or all of its responsibility to an RSC, where these have been established, including communications, search planning and arrangements for SAR facilities.

7.2. On-Scene Coordination

In some situations, the RCC may delegate some of its responsibility to an on-scene coordinator (OSC). The function of the OSC is to provide co-ordination at the scene and to carry out the RCC plan to locate and rescue survivors.

Tasks that may be assigned include:

- Co-ordinate operations of all SAR facilities on-scene and ensure that operations are conducted safely.
- Brief and debrief search crews.
- Make periodic situation reports (SITREPs) to the SMC. The standard SITREP format should include but not be limited to:
 - weather and sea conditions
 - the results of search to date
 - any actions taken
 - any future plans or recommendations.
 - status of local resources such as aircraft, fuel, crew and observers.
- Modify the search action or rescue action plan as the situation on-scene dictates, keeping the SMC advised (do in consultation with the SMC when practicable).
- Where possible, ensure fresh observers are allocated to aircraft conducting more than one sortie.
- Co-ordinate on-scene communications.
- Report the number and names of survivors to the SMC.
- Liaise with local authorities.

A comprehensive list of OSC duties is presented in IAMSAR MANUAL Vol III. Section 3.

Tasks that may NOT be assigned include:

- Tasking aircraft.
- Providing information to the media.
- Communicating with aircraft on ATC operational frequencies.

8. CONCLUSION OF SAR OPERATIONS

8.1. Termination of SAR operations

SAR operations enter the conclusion stage when:

- information is received that the aircraft which is the subject of the SAR incident is no longer in distress;
- the aircraft or persons for whom SAR facilities are searching have been located and the survivors rescued; or
- during the Distress Phase, the proper authority determines that further search has no significant chance of succeeding.

Prior to suspending search operations, a thorough case review should be made. The decision to suspend operations should be based on an evaluation of the probability that there were survivors from the initial incident, the probability of survival after the incident, the probability that any survivors were within the computed search area, and the effectiveness of the search effort as measured by the cumulative probability of success. The reasons for search suspension should be clearly recorded. The case review should also examine:

- search decisions for proper assumptions and reasonable planning scenarios;
- certainty of initial position and any drift factors used in determining search area;
- significant clues and leads re-evaluated;
- data computations;
- the search plan, to ensure that:
 - all assigned areas were searched;
 - the probability of detection is as high as desired; and
 - compensation was made for search degradation caused by weather, navigational, mechanical, or other difficulties; and
- the determination about the survivability of survivors, considering:
 - time elapsed since the incident;
 - environmental conditions;
 - age, experience, and physical condition of potential survivors;
 - survival equipment available; and
 - studies or information relating to survival in similar situations.

A search should normally be terminated only when there is no longer any reasonable hope of rescuing survivors from the SAR incident. Considerations for suspending a search include:

- all assigned areas have been thoroughly searched;
- all reasonable probable locations have been investigated;
- all reasonable means of obtaining information about the whereabouts of the aircraft or persons who are the subject of the search have been exhausted; and
- all assumptions and calculations used in search planning have been reviewed.

When a SAR case is closed or search efforts are suspended, every authority, centre, service, or facility activated should be notified. This is normally done via radio or telephone, and then followed by a final situation report (SITREP) from the RCC.

8.2. Records and reports

A record of SAR operations is required to improve methods, evaluate mistakes, if any, provide statistics for the appropriate authority to justify SAR system support and for any subsequent investigation. This record should include all information gathered during the operation. If the SAR service maintains computer files of SAR cases, appropriate information from this case file should be extracted and entered into the database for future analysis.

All information pertaining to a specific SAR incident should be placed in an easily identified and labelled file folder and then placed in storage. This folder will comprise a final report whose format should be as follows:

[To be confirmed by each State; here's an example of suggested sections for this report:

- Final report number*
- Date and time*
- RCC*
- Aircraft registration, type and call sign*
- Aircraft operator*
- POB*
- Narrative [description of incident]*
- RCC actions (operations conducted by RCC etc.)*
- SAR units – identity, time alerted, time on task, time released, time returned*
- Other organizations*
- Result of operation*
- Number of persons – rescued, deceased, missing*
- Any other information*

]

9. APPENDICES

9.1. Check lists

[To be developed by each State depending on local circumstances

Sample Checklists are presented in IAMSAR MANUAL Vol. II Appendices D, E and F]

9.2. Communications

[To be developed by each State depending on local circumstances; this appendix could include a list of telephone numbers, frequencies, fax numbers, AFTN addresses etc.

Additional relevant guidance information may be found in IAMSAR MANUAL Vol. II Appendix A and B]

10.LIST OF ILLUSTRATIONS

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