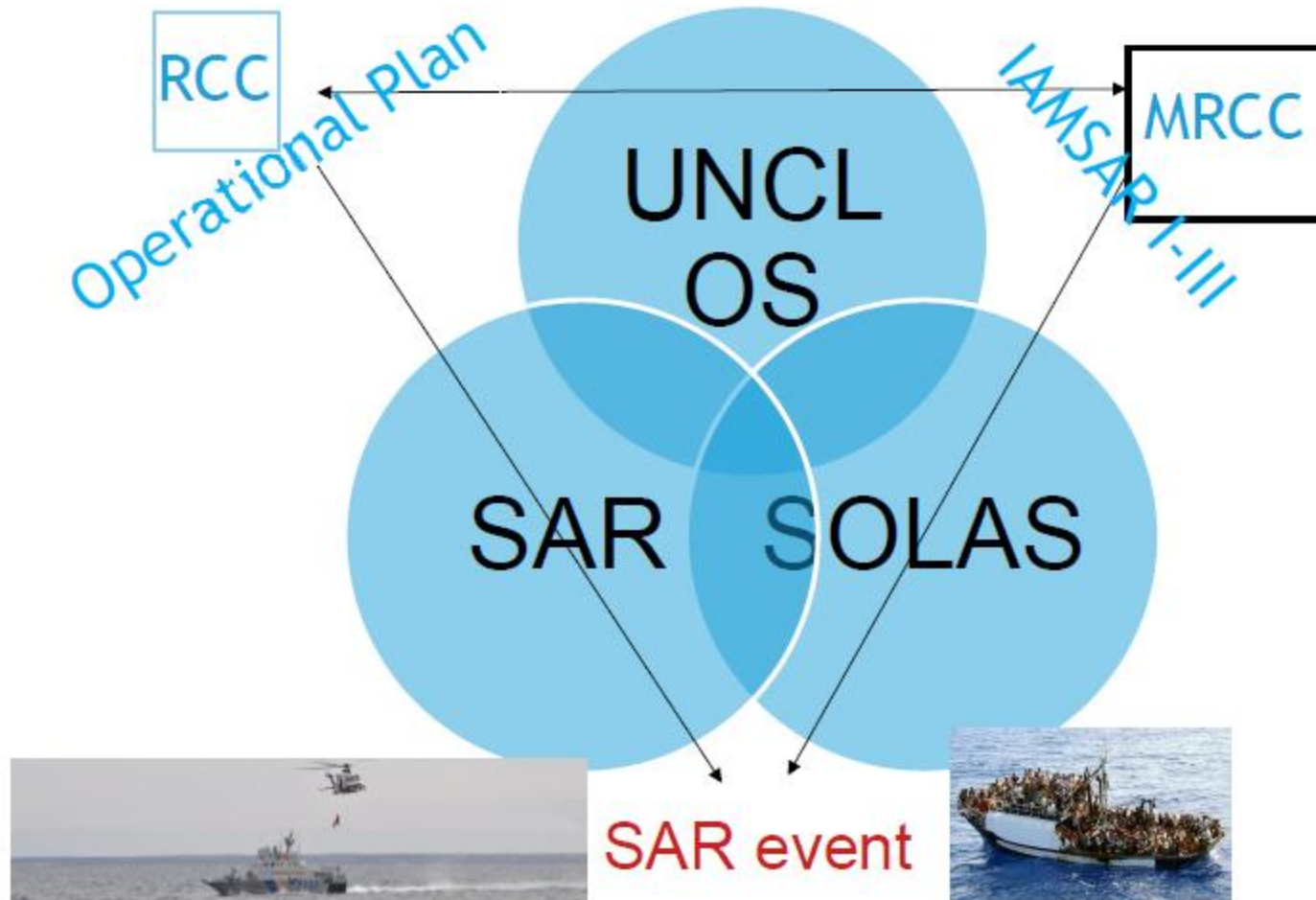


# SAR AND MEDEVAC



## **2.14 False alerts**

- 2.14.1** False alerts are any alerts received by the SAR system which indicate an actual or potential distress situation, when no such situation actually exists. The term “false alarm” is sometimes used to distinguish a false alert known to have originated from an equipment source intended to be used for distress alerting. Causes of false alerts include equipment malfunctions, interference, testing, and inadvertent human error. A false alert transmitted deliberately is called a hoax.
- 2.14.2** It is essential that SAR personnel treat every distress alert as genuine until they know differently.
- 2.14.3** SAR personnel are often in a unique position to be aware of false alerts and investigate their causes; so it is important that records be kept on the numbers of such alerts and their causes, and that these data be provided to authorities who can use regulation enforcement, improved training or equipment standards, etc., to improve alerting integrity. An unnecessary SAR alert (UNSAR) message sent to appropriate authorities for follow-up can be used to prevent further false alerts.

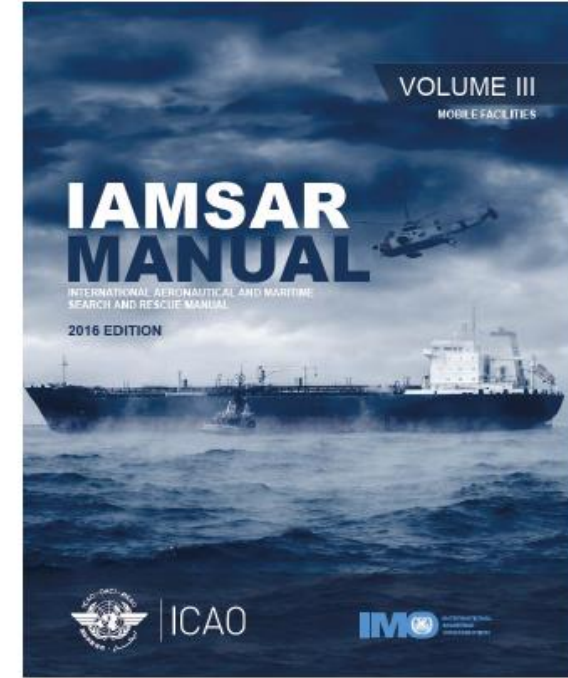
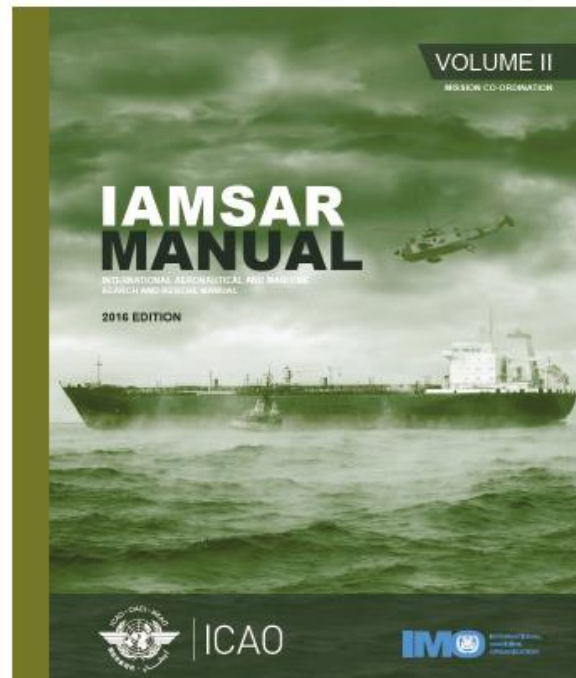
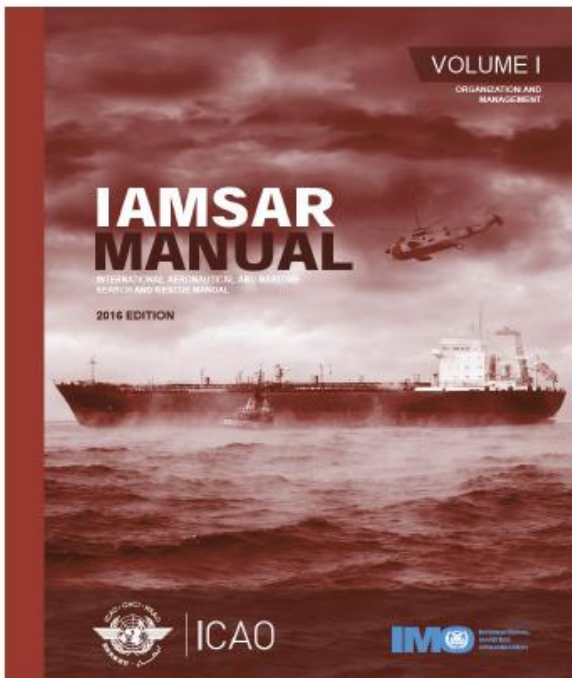
# Organization and Management



# Mission Co-ordination



# Mobile Facilities

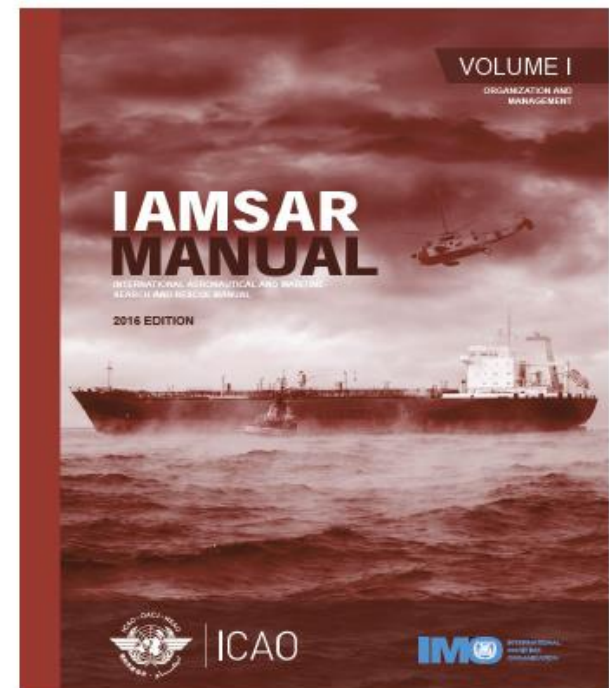




## IAMSAR - VOL I

- ✓ Overview of the SAR concept;
- ✓ Key components of the SAR system;
- ✓ Training, qualification, and certification processes;
- ✓ Communications needs of the SAR;
- ✓ Management perspective of the SAR system;
- ✓ Necessary factors and recommends some techniques.

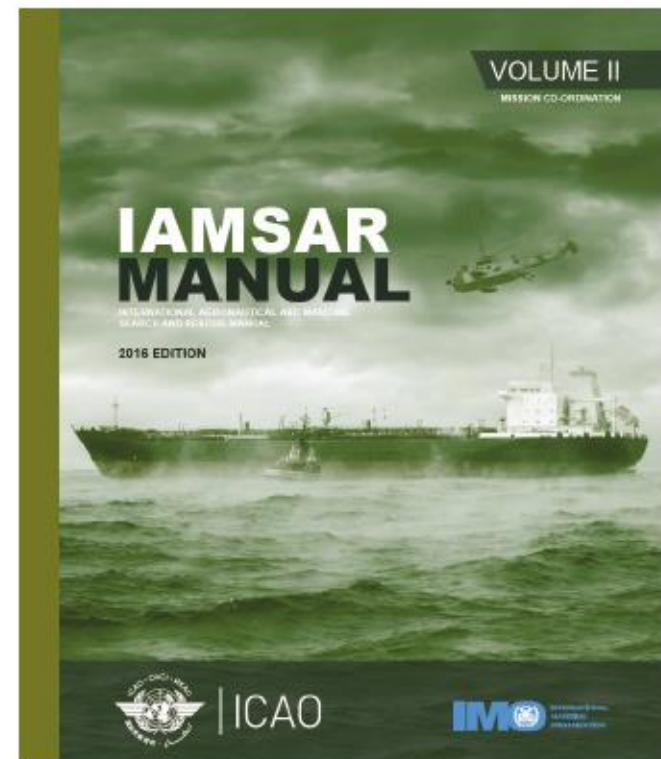
# Organization and Management



## IAMSAR - VOL II

- ✓ Overview of the SAR system concept;
- ✓ SAR communications topics;
- ✓ Five stages (uncertainty, alert and distress) and (awareness and initial action);
- ✓ Search planning;
- ✓ Techniques and operations;
- ✓ Logistics, modes of rescue, care and debriefing of survivors, handling of deceased persons;
- ✓ Multiple aircraft SAR operations;
- ✓ Guidance for other emergency assistance;
- ✓ Conclusion of SAR operations.

## Mission Co-ordination



IAMSAR - VOL II (1.6 and 3.3)

## SAR Emergency Phases

### Uncertainty

(may need to be monitored, ... not require dispatching of resources)

### Alert

(may need assistance, ... not in immediate danger)

### Distress

(is in danger, ... requires immediate assistance)



## IAMSAR - VOL II

- Medical assistance (1.4):

- ◇ - MEDICO

- ◇

- ◇ - MEDEVAC





## IAMSAR - VOL II (2.22)



### ■ Emergency Signals used by aircraft and vessels :

- ◇ Distress signal : ***MAYDAY*** (immediate assistance);
- ◇ Urgency signal : ***PAN-PAN*** (need for assistance);
- ◇ Safety signal : ***SÉCURITÉ*** (safety of navigation or meteorological warnings).

## IAMSAR - VOL II

- Vessel-aircraft communications (2.8 and Vol I Appendix G):

- HF 2182 kHz

Many vessels, especially fishing vessels, and nearly all ships, are equipped;

- HF 4125 kHz

This frequency may be used by aircraft to communicate with ships for distress and safety purposes;

- HF 3023 and 5680 kHz

These are HF on-scene radiotelephony frequencies for SAR.



IAMSAR - VOL II Vessel-aircraft communications (2.8 and Vol I Appendix G):

## VHF

121.500 MHz The international aeronautical distress frequency;

123.100 MHz Aeronautical on-scene frequency jointly used by aircraft and vessels engaged in SAR operations. Also to use by ACO to control several aircraft separately;

156.8 MHz FM (Channel 16)

The VHF maritime distress and calling frequency carried by most ships;

156.3 MHz FM (Channel 06)

may be used for on-scene SAR operations (2.3.5);

## IAMSAR - VOL II

Vessel-aircraft communications (2.8 and Vol I Appendix G):

### Beacons

406 MHz satellite Emergency Position-Indicating Radio Beacons (EPIR

121.5 and/or 243 MHz on ELTs and EPIRBs.



## IAMSAR - VOL II

- The Search action message normally includes six parts (2.28.16):
  - ◇ Situation: Brief description;
  - ◇ Search area(s): Presented in column format;
  - ◇ Execution: Presented in column format;
  - ◇ Co-ordination: Designation on operational details;
  - ◇ Communications: Prescribes several channels;
  - ◇ Reports: Requirements for several reports.
  
- Mission Documentation (1.7)
  - ◇ Logs and Diaries;
  - ◇ SAR Forms;
  - ◇ SAR Charts and Overlays;
  - ◇ SAR Case Files;
  - ◇ SAR Case Analysis.



## IAMSAR - VOL II

- **Electronic Search Patterns (5.6):**
  - ◇ Survival Beacon Search;
  - ◇ Radar Searches.
- **Night Search Patterns (5.7):**
  - ◇ Parachute Flare Searches;
  - ◇ Search by Infrared Devices;
  - ◇ Night Vision Goggles.
- **Land Search Patterns (5.8):**
  - ◇ Visual Search Patterns.

## IAMSAR - VOL II

- **Visual search patterns (5.5):**
  - ◇ Sector Search (VS);
  - ◇ Expanding Square Search (SS);
  - ◇ Track Line Search (TS);
  - ◇ Parallel Sweep Search (PS);
  - ◇ Creeping Line Search (CS);
  - ◇ Creeping Line Search, Co-ordinated (CSC);
  - ◇ Contour Search (OS);
  - ◇ Shoreline Search.

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ Parallel Sweep Search
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

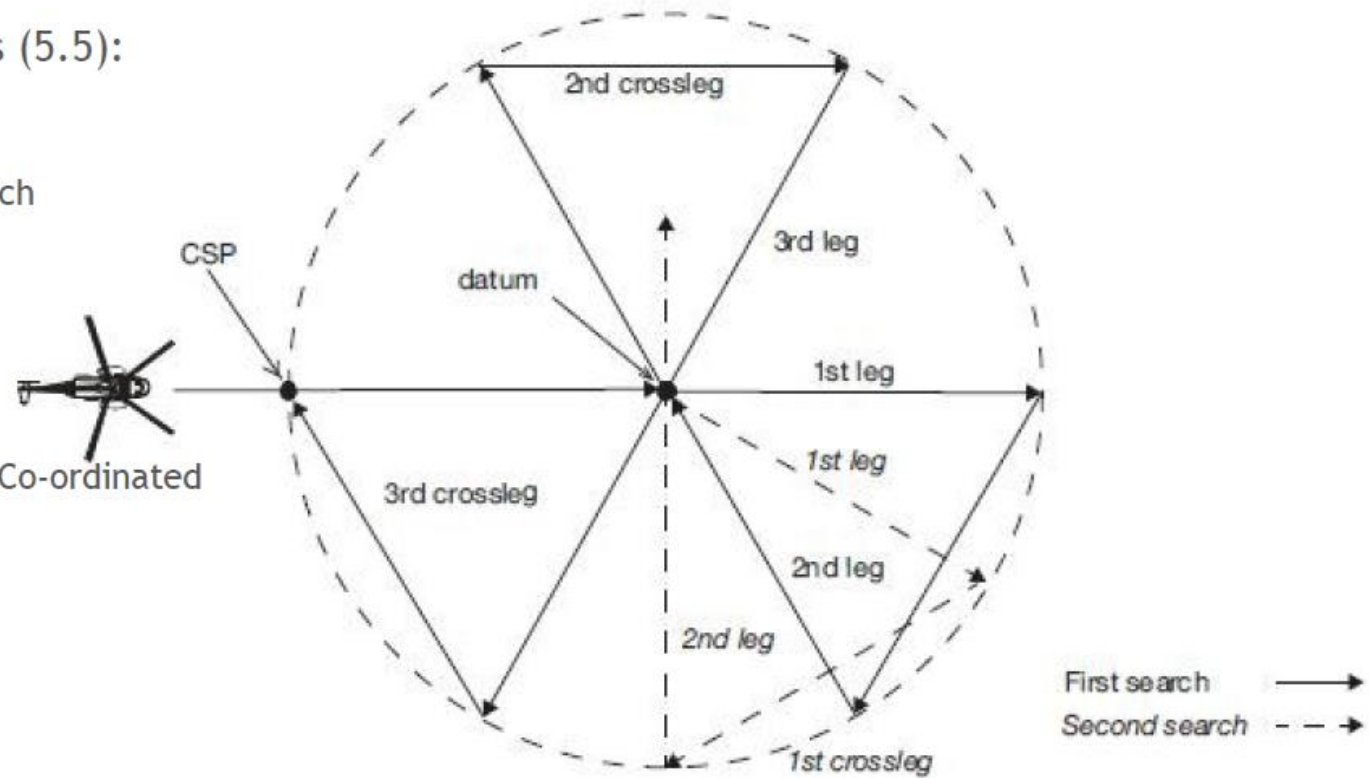


Figure 5-1 – Sector pattern: single-unit

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ Parallel Sweep Search
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

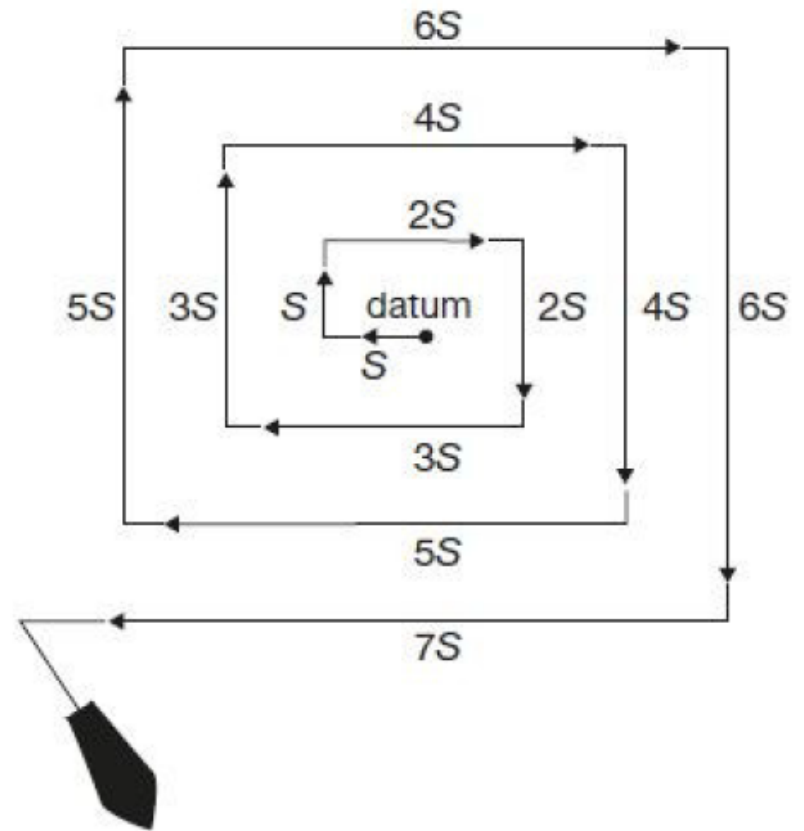


Figure 5-2 – Expanding square search (SS)

## IAMSAR - VOL II

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ Parallel Sweep Search
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

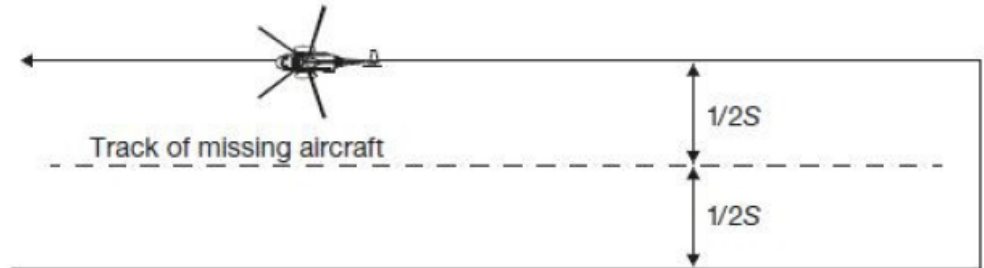


Figure 5-4 – Track line search, return (TSR)

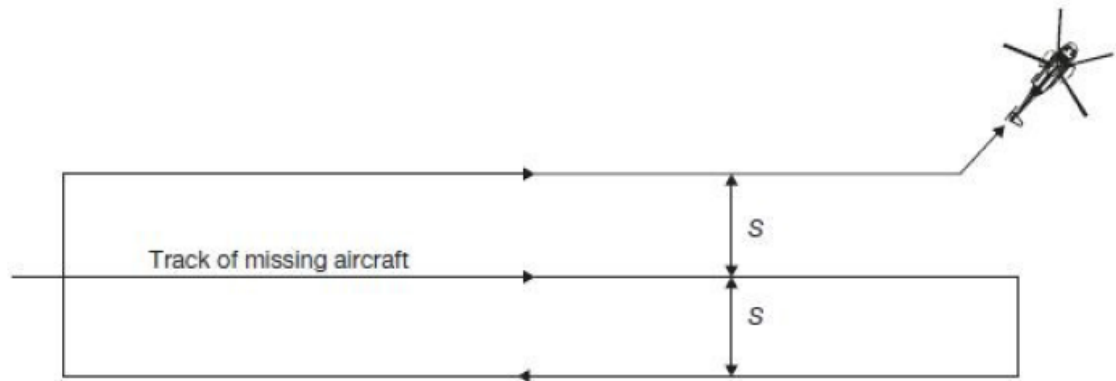


Figure 5-5 – Track line search, non-return (TSN)



## IAMSAR - VOL II

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ **Parallel Sweep Search**
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

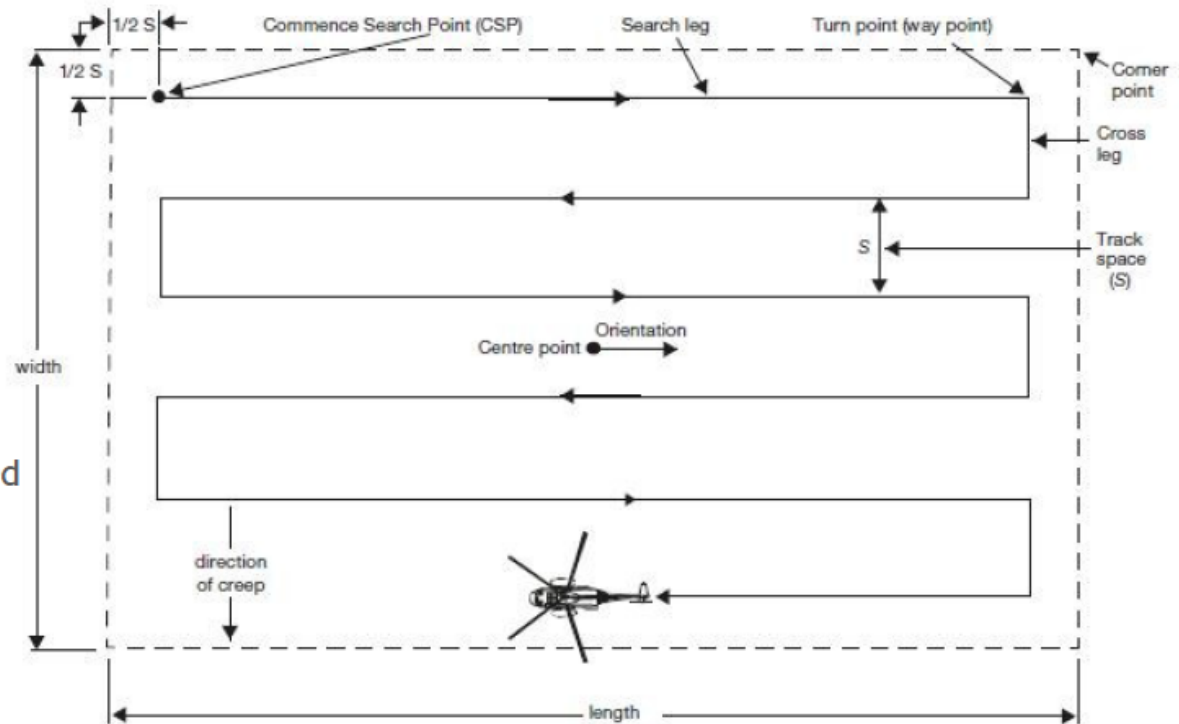


Figure 5-6 – Parallel sweep search (PS)

## IAMSAR - VOL II

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ Parallel Sweep Search
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

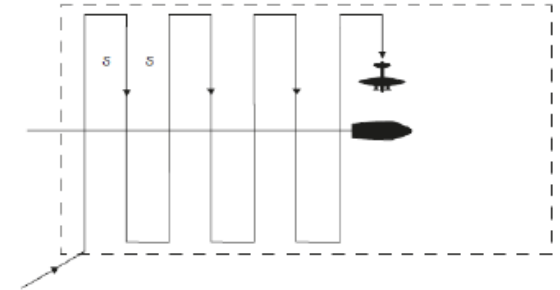


Figure 5-11 – Creeping line search, co-ordinated (CSC)

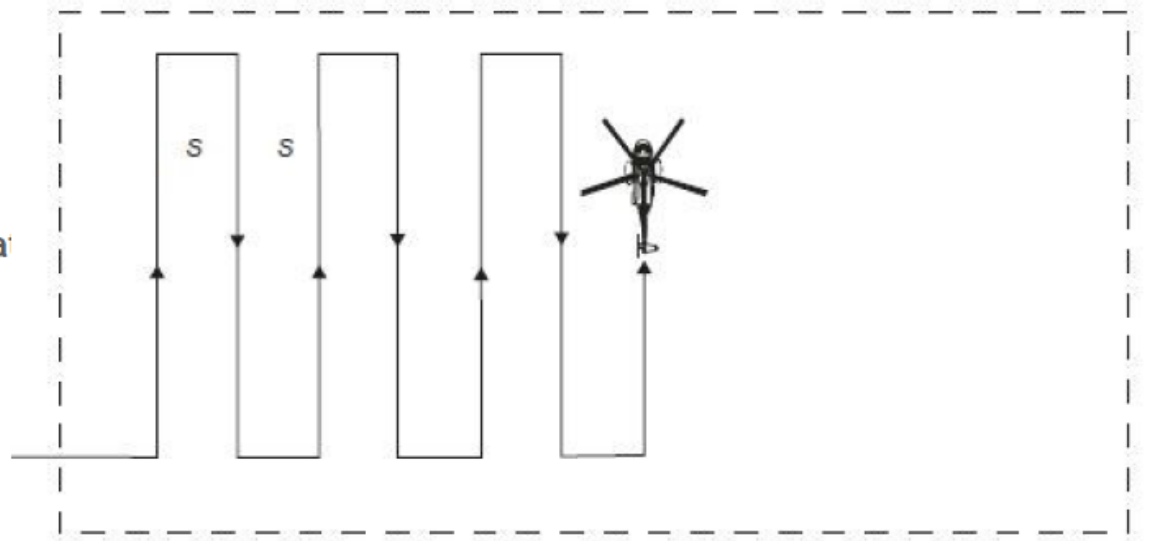


Figure 5-10 – Creeping line search (CS)

## IAMSAR - VOL II

- Visual search patterns (5.5):

- ◇ Sector Search
- ◇ Expanding Square Search
- ◇ Track Line Search
- ◇ Parallel Sweep Search
- ◇ Creeping Line Search
- ◇ Creeping Line Search, Co-ordinated
- ◇ Contour Search (OS);
- ◇ Shoreline Search.

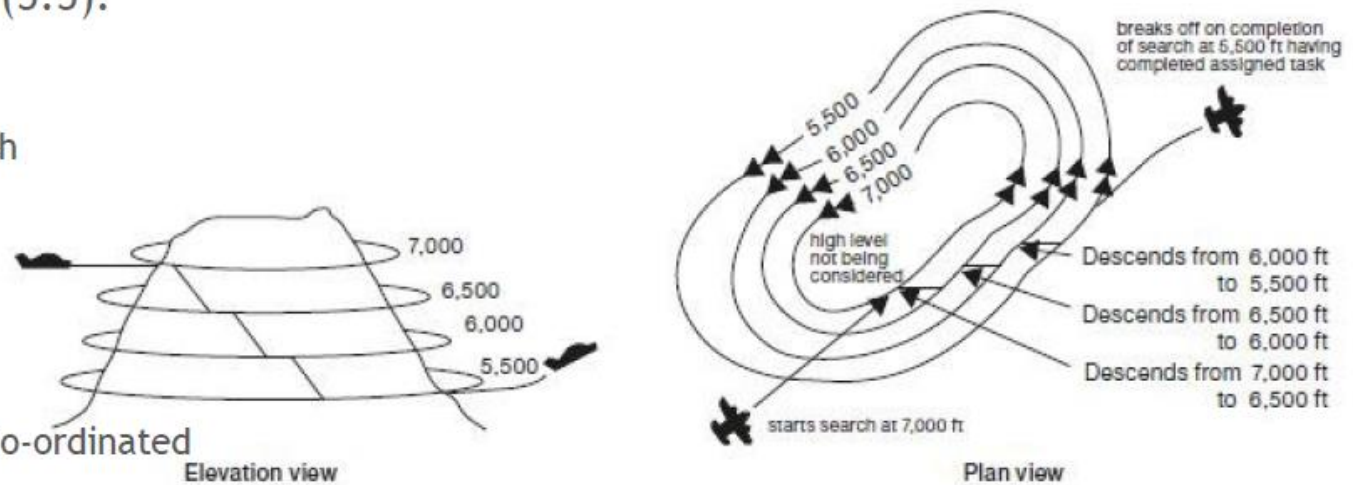
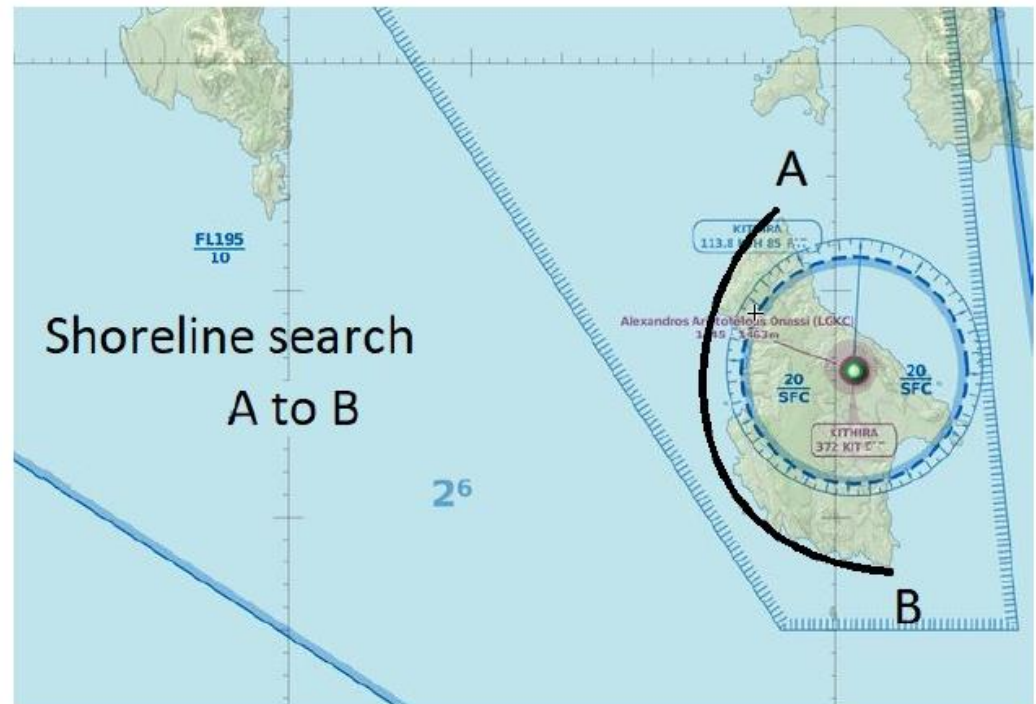


Figure 5-12 –Contour search (OS)

- Visual search patterns (5.5):
  - ◇ Sector Search
  - ◇ Expanding Square Search
  - ◇ Track Line Search
  - ◇ Parallel Sweep Search
  - ◇ Creeping Line Search
  - ◇ Creeping Line Search, Co-ordinated
  - ◇ Contour Search (OS);
  - ◇ Shoreline Search.

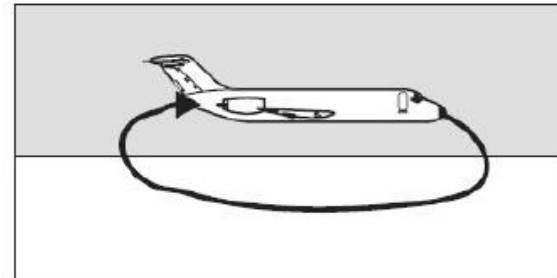


# Fun to know

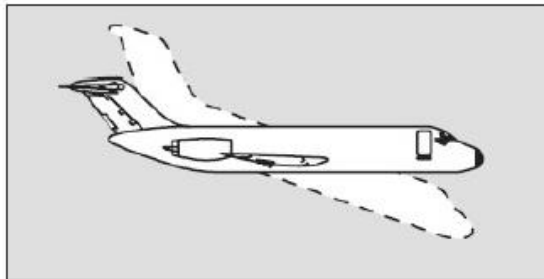
## IAMSAR - VOL II



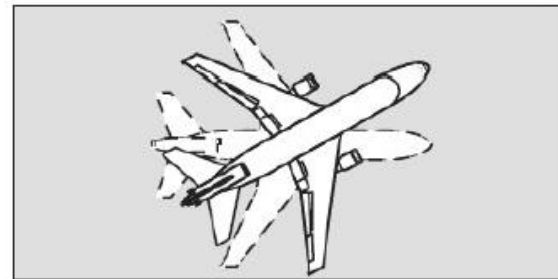
Message received and understood



Message received and not understood



Affirmative



Negative

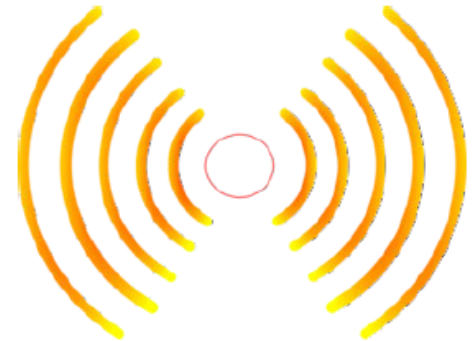
*Appendix A - Distress communications A-5*



# HOW TO REPORT ?

## SITREP FORMAT

DISTRESS  
152230Z SEP 13  
FROM RCC LA GUIRA VENEZUELA  
TO SANJUANSARCOORD SAN JUAN PUERTO RICO  
BT  
SAR SITREP ONE  
A. N999EJ (US)  
B. 14-20N 064-20W  
C. DISTRESS/152200Z/AIRCRAFT DITCHING  
D. 4  
E. REQUEST SANJUANSARCOORD ASSUME SMC AND CONDUCT SEARCH  
F. RCC LA GUIRA VENEZUELA  
G. CESSNA CITATION III/EXECUTIVE JETS, INC, MIAMI, FL/ ORIGINATOR  
VERIFIED AIRCRAFT ON VFR FLIGHT PLAN DEPARTED PORT OF SPAIN TRINIDAD  
152100Z EN ROUTE AGUADILLA, PUERTO RICO/8 PERSON LIFERAFT WITH CANOPY  
AND SURVIVAL SUPPLIES/FLARES  
H. WEATHER ON SCENE UNKNOWN  
J. AIRCRAFT ISSUED MAYDAY BROADCAST ON 121.5 MHZ WHICH WAS HEARD BY  
AIR FRANCE 747. PILOT OF DISTRESS AIRCRAFT GAVE POSITION, STATED BOTH  
ENGINES FLAMED OUT AND DESCENDING THROUGH 5000 FEET WITH INTENTIONS TO  
DITCH.  
K. NO SEARCH ASSETS AVAILABLE  
BT



# SITREP FORMAT

TRANSMISSION

DATE AND TIME

FROM:

TO:

S/R SITREP (NUMBER)

A. IDENTITY OF CASUALTY

B. POSITION

C. SITUATION

D. NUMBER OF PERSONS

E. ASSISTANCE REQUIRED

F. CO-ORDINATING RCC

(Distress/urgency)

(UTC or Local Date Time Group)

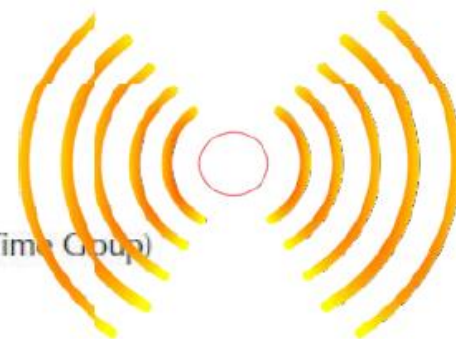
(Originating RCC)

(To indicate nature of message and completeness of sequence of SITREPs concerning the casualty)

(Name/call sign, flag State)

(Latitude/longitude)

(Type of message, e.g., distress/urgency; date/time; nature of distress/urgency, e.g., fire, collision, medico)



# SITREP FORMAT

## G. DESCRIPTION OF CASUALTY

(Physical description, owner, charter, cargo carried, passage from/to, life saving equipment carried, attach photography, if available)

## H. WEATHER ON SCENE

(Wind, sea/swell state, air/sea temperature, visibility, cloud cover/ceiling, barometric pressure)

## J. INITIAL ACTIONS TAKEN

(By casualty and RCC)

## K. SEARCH AREA

(As planned by RCC)

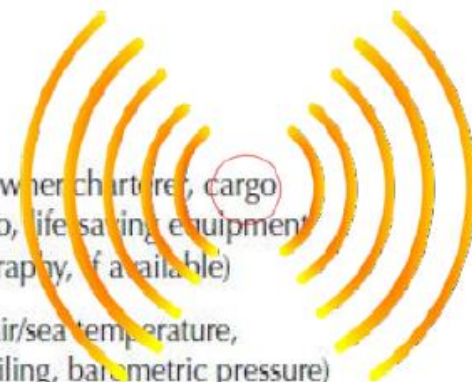
## L. CO-ORDINATING INSTRUCTIONS

(OSC designated, units participating, communications, AIS and/or LRIT data available on ships in the vicinity)

## M. FUTURE PLANS

## N. ADDITIONAL INFORMATION

(As appropriate, pictures, maps or links to websites where further information is available, include time SAR operation terminated)



# SITREP FORMAT

## Notes

- (1) Each SITREP concerning the same casualty should be numbered sequentially.
- (2) If help is required from the addressee, the first SITREP should be issued in short form if remaining information is not readily available
- (3) When time permits, the full form may be used for the first SITREP, or to amplify it.
- (4) Further SITREPs should be issued as soon as other relevant information has been obtained. Information already passed should not be repeated.
- (5) During prolonged operations, "no change" SITREPs, when appropriate, should be issued at intervals of about 3 hours to reassure recipients that nothing has been missed.
- (6) When the incident is concluded, a final SITREP should be issued as confirmation.



## IAMSAR - VOL II

- **Conclusion of SAR operations**

(IAMSAR VOLII Ch9 9.1.1):

- ◇ The information is received no longer distress;
- ◇ The ship, aircraft, other craft, or persons have been located and the survivors rescued;

◇ During the distress phase,

the SMC or other proper authority determines

**THE END OF SAR OPERATION**



# Aircraft SAR mission Report

(IAMSAR VOLII AppH H-7):

Operational information;  
Medical relevant information;  
Equipment report and malfunctions;  
Attachments as Maps, photographs, etc.

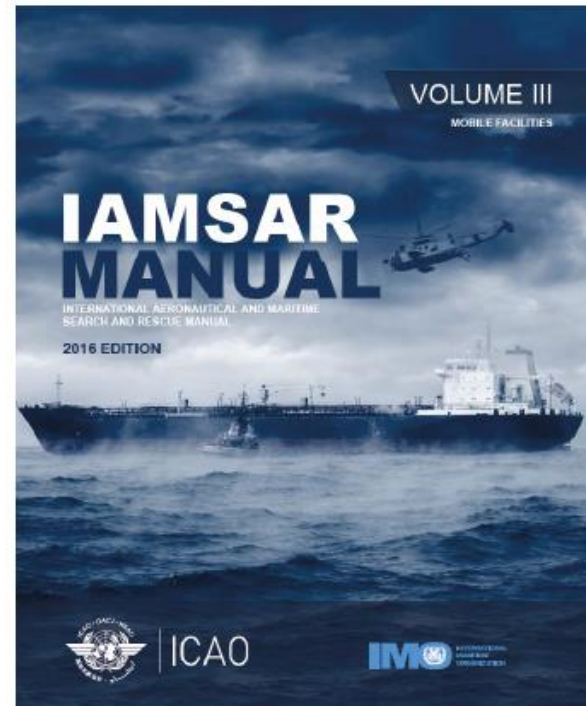
This report will be ingrated by the SMC  
in the report of the whole operation.

## IAMSAR - VOL III

- ✓ Overview of the SAR concept;
- ✓ Rendering assistance;
- ✓ On-scene coordination;
- ✓ On board emergencies;
- ✓ Multiple aircraft SAR operations;
- ✓ Regulation;
- ✓ Search action message;
- ✓ Factors affecting observer effectiveness;
- ✓ Standard format for SAR SITREP;
- ✓ SAR briefing and debriefing form;
- ✓ Own emergency;
- ✓ Rendering assistance;

Multiple aircraft SAR operations.

## Mobile Facilities



## IAMSAR - VOL III

*“The responsibilities to render assistance  
to a distressed vessel or aircraft  
are based on humanitarian considerations  
and established international practice.*

*Specific obligations can be found in several conventions”*

(IAMSAR VOLIII 1.1)

## IAMSAR - VOL III

- ✓ Overview of the SAR concept;
  - ✓ Rendering assistance;
  - ✓ On-scene coordination;
  - ✓ On board emergencies;
  - ✓ Multiple aircraft SAR operations;
  - ✓ Regulation;
  - ✓ Search action message;
  - ✓ Factors affecting observer effectiveness;
  - ✓ Standard format for SAR SITREP;
  - ✓ SAR briefing and debriefing form;
  - ✓ Own emergency;
  - ✓ Rendering assistance;
- Multiple aircraft SAR operations.

# Checklist



## ■ A multiple aircraft SAR operations

(IAMSAR VOLIII Sec5 Pag5-6)

- ◇ 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.

# Reminder of *ACO duties*

- *Contributing to flight safety*
- *assist in maintaining flight safety and safe separation of aircraft;*
- *ensure common pressure setting used;*
- *advise the SMC of on-scene weather implications;*
- *determine aircraft entry and departure points and altitudes;*
- *filter radio messages to and from SAR aircraft;*
- *ensure frequencies are used in accordance with SMC directives;*
- *coordinate with adjacent area control centres (ACCs) and airfields.*



## *ACO duties:*

- *Prioritize and allocate tasks;*
- *Coordinate the coverage of search areas;*
- *Make periodic consolidated reports (SITREPs) of SAR aircraft to the SMC and the OSC, as appropriate;*
- *Work closely with the OSC.*



## ■ Factors to consider in deciding what type of search pattern

(IAMSAR VOLIII Sec2 Pag2-11)

- ◇ Size of area to be searched;
- ◇ Type and size of distressed craft;
- ◇ Meteorological visibility.
- ◇ ...



**Uncorrected sweep widths ( $W_U$ ) for visual land search (km (NM))**

Search object	Height (m (ft))	Visibility (km (NM))				
		6 (3)	9 (5)	19 (10)	28 (15)	37 (20)
Person	150 (500)	0.7 (0.4)	0.7 (0.4)	0.9 (0.5)	0.9 (0.5)	0.9 (0.5)
	300 (1,000)	0.7 (0.4)	0.7 (0.4)	0.9 (0.5)	0.9 (0.5)	0.9 (0.5)
	450 (1,500)	—	—	—	—	—
	600 (2,000)	—	—	—	—	—
Vehicle	150 (500)	1.7 (0.9)	2.4 (1.3)	2.4 (1.3)	2.4 (1.3)	2.4 (1.3)
	300 (1,000)	1.9 (1.0)	2.6 (1.4)	2.6 (1.4)	2.8 (1.5)	2.8 (1.5)
	450 (1,500)	1.9 (1.0)	2.6 (1.4)	3.1 (1.7)	3.1 (1.7)	3.1 (1.7)
	600 (2,000)	1.9 (1.0)	2.8 (1.5)	3.7 (2.0)	3.7 (2.0)	3.7 (2.0)
Aircraft less than 5,700 kg	150 (500)	1.9 (1.0)	2.6 (1.4)	2.6 (1.4)	2.6 (1.4)	2.6 (1.4)
	300 (1,000)	1.9 (1.0)	2.8 (1.5)	2.8 (1.5)	3.0 (1.6)	3.0 (1.6)
	450 (1,500)	1.9 (1.0)	2.8 (1.5)	3.3 (1.8)	3.3 (1.8)	3.3 (1.8)
	600 (2,000)	1.9 (1.0)	3.0 (1.6)	3.7 (2.0)	3.7 (2.0)	3.7 (2.0)
Aircraft over 5,700 kg	150 (500)	2.2 (1.2)	3.7 (2.0)	4.1 (2.2)	4.1 (2.2)	4.1 (2.2)
	300 (1,000)	3.3 (1.8)	5.0 (2.7)	5.6 (3.0)	5.6 (3.0)	5.6 (3.0)
	450 (1,500)	3.7 (2.0)	5.2 (2.8)	5.9 (3.2)	5.9 (3.2)	5.9 (3.2)
	600 (2,000)	4.1 (2.2)	5.2 (2.9)	6.5 (3.5)	6.5 (3.5)	6.5 (3.5)

Datas regarding

Search height  
vs  
Sweep width

And  
more



**Uncorrected sweep widths ( $W_U$ ) for  
fixed-wing aircraft (km (NM))**

Search object	Meteorological visibility (km (NM))		
	1.9 (1)	9.3 (5)	> 37 (> 20)
Person in water	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)
4-person liferaft	0.6 (0.3)	2.4 (1.3)	4.3 (2.3)
8-person liferaft	0.7 (0.4)	3.1 (1.7)	5.6 (3.0)
15-person liferaft	0.7 (0.4)	3.7 (2.0)	6.9 (3.7)
25-person liferaft	0.7 (0.4)	4.3 (2.3)	8.7 (4.7)
Boat < 5 m (17 ft)	0.7 (0.4)	2.4 (1.3)	3.7 (2.0)
Boat 6 m (20 ft)	0.9 (0.5)	4.6 (2.5)	9.3 (5.0)
Boat 10 m (33 ft)	0.9 (0.5)	6.3 (3.4)	14.4 (7.8)
Boat 24 m (80 ft)	1.1 (0.6)	9.4 (5.1)	30.9 (16.7)

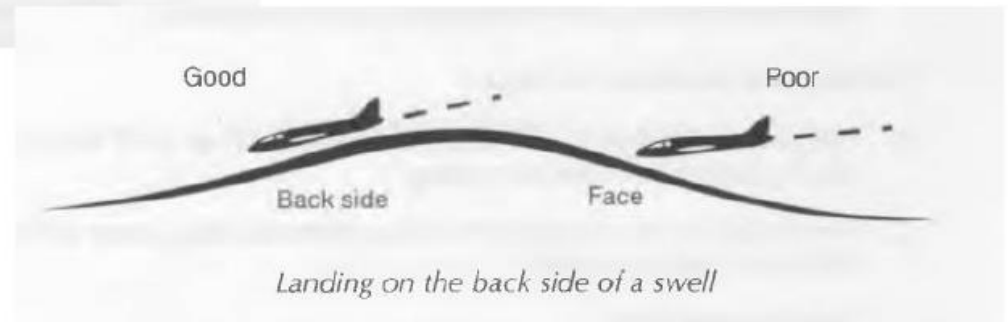
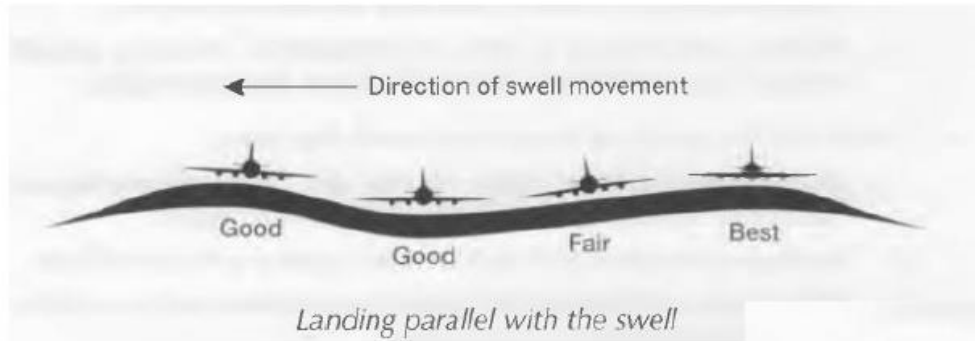
### Correction factors – vegetation and high terrain

Search object	15–60% vegetation or hilly	60–85% vegetation or mountainous	Over 85% vegetation
Person	0.5	0.3	0.1
Vehicle	0.7	0.4	0.1
Aircraft less than 5,700 kg	0.7	0.4	0.1
Aircraft over 5,700 kg	0.8	0.4	0.1

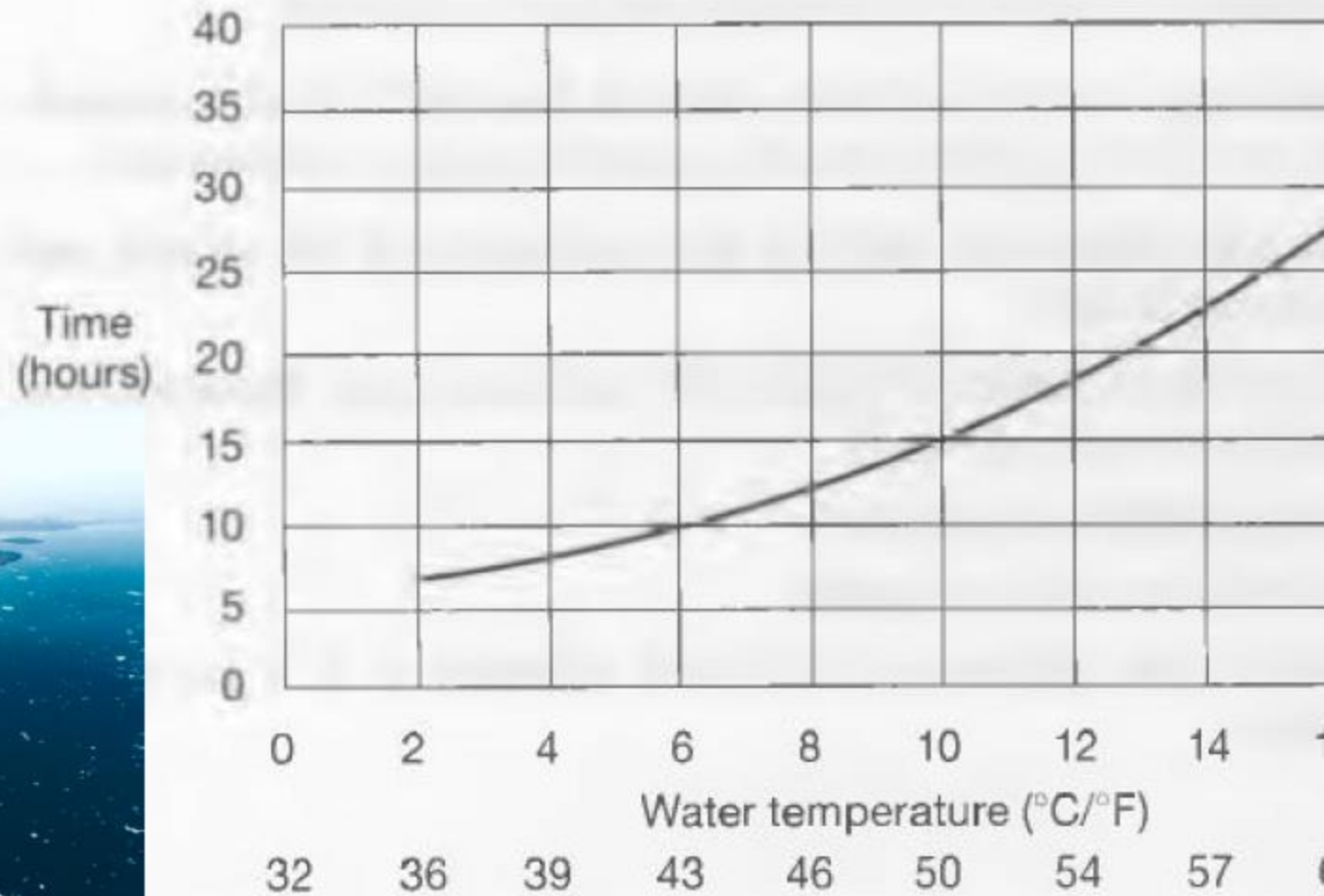


IAMSAR Vol 3

## DITCHING Tips







*Graph on realistic upper limit of survival time for people wearing normal clothing, from time of entry into the*



## ■ Briefing to vessel prior to helicopter winching

- Provide a clear area for winching,
  - ◇ Lower all masts and booms that can be lowered;
  - ◇ Keep all unnecessary people clear of the pick-up area;
  - ◇ Just before the helicopter arrives, secure the ship's radar or put it in standby mode;
  - ◇ Do not direct lights towards the helicopter as it will adversely affect the pilot's vision.  
Direct available lighting to illuminate the pick-up area;
  - ◇ When the helicopter arrives, change course to place the wind 30° on the port bow and maintain a steady course and steerageway.



## IAMSAR - VOL III

### ■ Briefing to vessel prior to helicopter winching or MEDEVAC (IAMSAR VOL III 2.20)



- ◇ A line will probably be trailed from the helicopter for your crew to guide the rescue device as it is lowered;
- ◇ Before touching the rescue device, allow it to touch your vessel. This will discharge static electricity;
- ◇ Do not attach the loose hook or the trail line to your vessel;
- ◇ When you reach the end of the trail line, gently toss it over the side.



## ■ Hi-line technique (IAMSAR VOL III 2.23)

- ◇ Poor weather, obstructed vision or confined winching area;
- ◇ A weighted line, attached to the aircraft's hook by a weak link, is lowered to the vessel (transfer area unobstructed);
- ◇ The line should be handled by one member of the vessel's crew;
- ◇ ONLY WHEN INSTRUCTED BY THE HELICOPTER CREW the slack should be hauled in (it is advisable to wear gloves);
- ◇ **THE LINE MUST NOT BE MADE FAST;**
- ◇ When the helicopter crewman or lifting harness reaches deck height the line must be hauled in to bring the winch hook on board (considerable effort may be required);

## IAMSAR - VOL III



- **Hi-line technique** (IAMSAR VOL III 2.23)

- ◇ Static discharge line must first touch the vessel;
- ◇ Discontinue the operation, the line must be paid out immediately, clear of obstructions;
- ◇ Ready hand by signals;
- ◇ The helicopter will climb and winch in the cable. The line must be paid out maintaining sufficient force to prevent a swing.

## IAMSAR Vol 3

### BASIC COMMUNICATIONS PLAN STRUCTURE

ADDITIONAL INFORMATION IN IAMSAR MANUAL VOLUME III, SECTION 3

The OSC should ensure that reliable communications are maintained on scene and maintain communications with all SAR facilities and the RCC/SMC

- A primary and secondary frequency should be assigned for on-scene communications
- If there are several aircraft involved in the SAR operation and the OSC does not have specific aircraft co-ordination capability, an aircraft co-ordinator (ACO) should be appointed to maintain flight safety
- If there are relatively few units responding, communications may be kept on one co-ordinating frequency, usually VHF channel 16 in distress cases



  
**IAMSAR MANUAL**  
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### ON-SCENE CO-ORDINATION

ADDITIONAL INFORMATION IN IAMSAR MANUAL VOLUME III, SECTION 3

Duties which the RCC may assign to the OSC depending on needs and qualification

- Co-ordinate operations of all SAR facilities on-scene
- Receive the search action plan from RCC or plan the search or rescue operation, if no plan is otherwise available
- Co-ordinate on-scene communications
- Monitor the performance of other participating facilities
- Ensure operations are conducted safely
- Make periodic SITREPs to the RCC
- Maintain a detailed record of operation
- Advise the RCC to release facilities no longer required
- Report the number and names of survivors, and on which facility, to the RCC
- Request additional RCC assistance, when necessary

  
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# Useful Action Cards