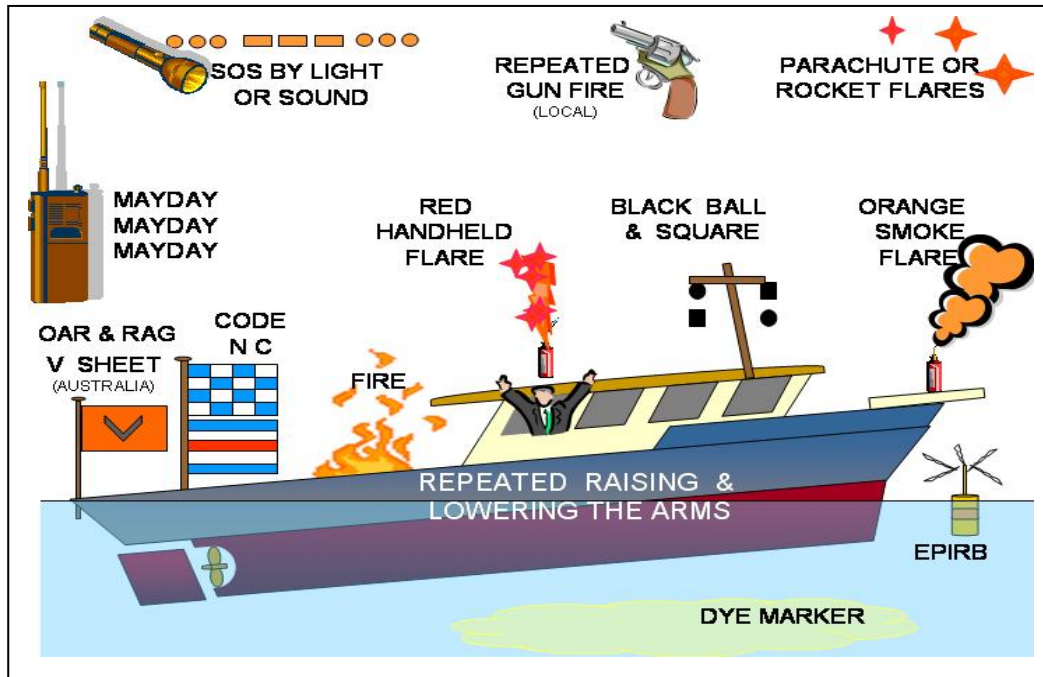


# THE BARE FACTS OF MARINE SAR



## RADIO COMMUNICATIONS:

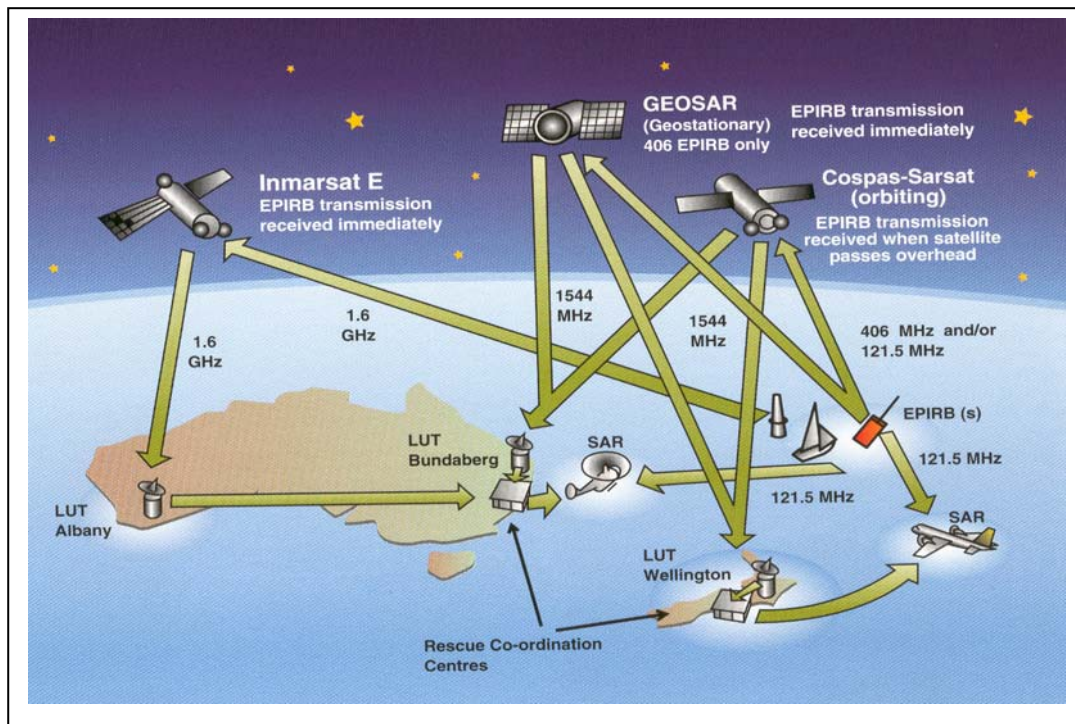
**Distress** - The vessel is threatened by grave and imminent danger and requires immediate assistance and is denoted by the signal MAYDAY.

**Urgent** - The vessel has an urgent message to transmit concerning the safety of a ship, an aircraft or a person and is denoted by the signal PANPAN.

**Safety** - Indicates an important navigational or weather warning and is denoted by the signal SECURITE.

<b>COMMON RADIO FREQUENCIES 2005</b>			
<b>RADIO</b>	<b>INITIAL CALLING &amp; DISTRESS</b>	<b>WORKING</b>	<b>SPECIAL WORKING</b>
<b>27 MHz</b>	Ch 88 Ch 86 Supplementary	Ch 90 Ch 91 Ch 96 Ch 98	Ch 68 Safety Ch 94 Rec. Fishing
<b>VHF</b>	Ch 16 Ch 67 Supplementary	Ch 72 Ch 73	Ch 6 SAR aircraft- ship Ch 8 Ship to ship Ch 13 Ship to ship
<b>MF/HF</b>	2182 KHz 4125 KHz 6215 KHz 8291 KHz 12290 KHz 16420 KHz	2201 KHz	2524 KHz Safety

## GMDSS:







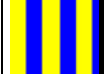



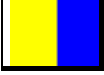






















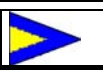
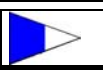







The worldwide system comprises:

- Low orbiting satellites in near polar orbits.
- Satellites in geostationary orbit.
- Local User Terminals (LUTs), (ground stations that receive satellites).
- Mission Control Centres (MCCs) which process beacon detections.
- Frequency stable 406 MHz beacons, each with a unique identification code, capable of transmitting for 24 or 48 hours depending on their use.

<b>RADIO</b>	<b>ALERT CALL ON DIGITAL FREQUENCY</b>	<b>VOICE MESSAGE CHANGE TO ASSOCIATED FREQUENCY</b>
<b>DSC VHF</b>	Ch 70	Ch 16
<b>DSC MF/HF</b>	2187.5 KHz 4207.5 KHz 6312 KHz 8414.5 KHz 12577 KHz 16804.5 KHz	2182 KHz 4125 KHz 6215 KHz 8291 KHz 12290 KHz 16420 KHz
<b>EPIRB</b>	121.5 - 243 MHz & 406MHz	

## SIGNALS:

Appendix A		International Code Flags					
	<b>A</b> Diver below A000 - Azimuth or bearing		<b>B</b> I am loading carrying or discharging dangerous cargo				
	<b>C</b> Affirmative C000 course		<b>D</b> keep clear manoeuvring with difficulty D00 00 00 - Date				
	<b>E</b> I am altering my course to starboard		<b>F</b> I am disabled, communicate with me				
	<b>G</b> I require a pilot fishing vessel - I am hauling my nets G0000 - Longitude		<b>H</b> I have a pilot on board				
	<b>I</b> I am altering my course to port		<b>J</b> I am on fire with dangerous cargo				
	<b>K</b> I wish to communicate with you		<b>L</b> you should stop instantly L0000 - Latitude				
	<b>M</b> my vessel is stopped and making no way		<b>N</b> no (negative)				
	<b>O</b> man overboard		<b>P</b> Vessel is about to sail fishing vessel nets are fast				
	<b>Q</b> my vessel is healthy and I request free practice		<b>R</b> No meaning R0000 - range Nm				
	<b>S</b> I am operating astern propulsion S00 - Speed in Knots		<b>T</b> I am engaged in pair trawling T0000 - Time Local				
	<b>U</b> you are standing into danger		<b>V</b> I require assistance V00 - Speed in K.P.H				
	<b>W</b> I require medical assistance		<b>X</b> stop carrying out your intentions and watch for my signals				
	<b>Y</b> I am dragging anchor		<b>Z</b> I require a tug fishing vessel shooting nets Z0000 - Time UTC				
Code and answering pennant and full stop							
	Answering			Zero			
	1		2		3		4
	5		6		7		8
	9		Sub 1		Sub 2		Sub 3

## SAR SIGNALS:

<b>Current Maritime signalling procedures:</b>	
<b>Meaning</b>	<b>Signal</b>
Understood	Code Pennant (red/ white stripes) close up
Understood	Flashing of T's by signal lamp in Morse code.
Understood	Changing of heading.
Understood	Aldis lamp - Green flashes.
Not understood	Aldis lamp - Red flashes.
Inability to comply	Flag N (a blue and white checked)
Inability to comply	Flashing of a succession of N's in Morse code
<b>Australian Civil Air-Ground Code:</b>	
I require your attention.	Aircraft orbits ground party at low level changing engine noise.
Follow aircraft in same direction.	Aircraft flies overhead ground party at low level and sets off in a particular direction.
Investigate object/position underneath aircraft orbit.	Aircraft rocks wings and orbits.
Investigate object/position adjacent to smoke.	Aircraft drops smoke on a particular location.
Retrieve and read instructions contained in the Canister.	Aircraft drops message canister.
<b>International SAR Air-Ground Code (MERSAR)</b>	
Understood	Daylight - rocking the aircraft's wings Night - flashing lights ON and OFF twice.
Not understood	Lack of the above signals.
Follow me	Aircraft circles, flying low, crosses ahead, throttles back or rocks its wings. The direction it departs is that to follow.
You are no longer required	If the assistance of the vessel is no longer needed it will repeat the manoeuvre over the vessels wake.

<b>Air-Ground Visual Signal Code International SAR Signals</b>		
<b>Ground - Air Visual Signal Code for use by Survivors</b>		
<b>Number</b>	<b>Message</b>	<b>Code Symbol</b>
1	Require Assistance	V
2	Require Medical Assistance	X
3	Proceeding in this Direction	→
4	Yes or Affirmative	Y
5	No or Negative	N
<b>Ground - Air Visual Signal Code for use in Civil Emergencies</b>		
1	Require Fodder	FF
2	Require Evacuation	III
3	Power Failure	VI
<b><i>If in doubt use international symbol – SOS</i></b>		

## TWO LETTER CODE SIGNALS:

Appendix B THE MORE COMMON TWO LETTER CODE SIGNAL			
AA	Repeat all after.....	MG	You should steer course....
AB	Repeat all before.....	NC	I am in distress
AC	I am abandoning my vessel	NF	You are running into danger.
AE	I must abandon my vessel.	NG	You are in a dangerous position.
AN	I need a doctor.	PD	Your navigation lights are not visible
AP	I have..... (the number) casualties	PP	Keep well clear of me
BR	I require a helicopter	QD	I am going ahead
CB	I require immediate assistance	QI	I am going astern
CDW	I require medical assistance	QQ	I require health clearance
CJ	Do you require assistance?	QU	Anchoring is prohibited
CN	I am unable to give assistance.	QX	I request permission to anchor
CQ	Call for unknown station.	RU	Keep clear of me; I am maneuvering with difficulty
DC	Land (where flag is waved or light is shown.)	SO	You should stop your vessel instantly
DD	Boats are not allowed to come alongside.	UM	The Harbor is closed to traffic
DV	I am drifting	UP	I have an emergency (Permission to enter urgently requested.)
DX	I am sinking	YU	Communicate the International Code of Signals
EF	SOS/MAYDAY has been canceled	ZL	Your signal has been received but not understood
EL	Repeat the distress position.		
FA	Will you give me my position?		
GW	Man overboard. Please take action to pick him up		
JI	Are you aground?		
JL	You are running the risk of running aground.		
JW	I have sprung a leak.		
KN	I cannot take you in tow.		
LN	Light ( name here) is not functioning.		
LO	Lightship not in my correct position)		
LR	Bar is not dangerous.		
LS	Bar is dangerous.		
MF	Course to reach me is....		

## GENERAL DEFINITIONS:

**Assist** - Any form of assistance to person, vessel or property where the threatened danger of physical harm is negligible i.e. a tow, supply of fuel, etc.

**Casualty** - A person, animal or vessel that is at risk of threatened danger of physical harm.

**Escort** - Maintaining close contact with (usually) a vessel to show an advised route or in order that further assistance, if the situation deteriorates, is close at hand.

**Marine Casualty** – An incident where a vessel suffers lack of propulsion or steering, grounding, collision, fire or founder.

**Marine Incident** - When a risk or potential risk to life and property from some event has caused concern for the safety of the Master and those on board, with due regard to the operational status of the incident vessel or vessels.

**Patrol** - A precautionary activity of monitoring an aquatic area for hazards and ensure that, if needed, assistance is available close at hand.

**Rescue** - The Act (NSW) more widely defines “rescue” as the safe removal of persons or domestic animals from threatened danger of physical harm.

**Search and Rescue (SAR)** - The integrated activities to ascertain the location of a casualty and remove them to safety.

## NATIONAL RESCUE ORGANISATIONAL STRUCTURES:

<b>SAR-</b>	The National Authorities, AusSAR.
<b>RCC -</b>	AusSAR maintains a rescue coordination centre.
<b>RSC -</b>	Rescue sub coordination centre.
<b>FCP-</b>	Forward Command Post at a suitable location.
<b>CSS-</b>	Coordinator surface search (civil vessel)
<b>SMC -</b>	The RCC is under the authority of a SAR mission coordinator.
<b>A/SMC-</b>	An assistant SAR mission coordinator is subordinate to the SMC.
<b>OSC -</b>	On-scene coordinators are specifically designated by the SMC.

## NSW STATE RESCUE ORGANISATIONAL STRUCTURES:

<b>SAR-</b>	State Authorities - State Rescue Board of New South Wales
<b>VMRC-</b>	Volunteer Marine Rescue Council of New South Wales.
<b>NSW Police-</b>	Responsible for coordination of all State SAR.
<b>Water Police-</b>	Marine Area Command
<b>OIC -</b>	An Officer in charge may be appointed by the SMC or police.
<b>SARcc-</b>	SAR coordination centre (radio base).
<b>MRU-</b>	Marine rescue unit (boat & crew)
<b>AVCGA-</b>	Australian Volunteer Coast Guard Association
<b>VRA-</b>	NSW Volunteer Rescue Association Inc
<b>VRCP-</b>	Royal Volunteer Coastal Patrol



## OPERATIONAL TERMS:

**Operation** - An activity to aid vessels, persons at risk of injury or loss life (distress) or damage to their property. The stages of a rescue operation are to:

***Plan & prepare***  
***Assess dangers***  
***Perform rescue***  
***Conclude rescue***

**Operational Plan** - This is the considered method by which the Squad intends to complete the operation. It documents the elements of the operation, providing a factual report of the Squad's efforts. A blank planner form may be available for use in the operations room, then printed and given to the Duty Skipper or a land / foreshore search party for on scene recording. It should record:

- Task information gathered.
- Briefing instructions and details of the Rescue Vessel's Crew.
- Communication frequencies and skeds (schedules) to be used.
- Incident position reports, en route and arrival (at predetermined datum point).
- Hazard assessments at the incident and response required determination.
- Position and status reports on return passage (stand down).
- Time of return, make and mend details, complete reports.
- De- briefing with outcome details / recommendations.
- SAR administration review details. (dates to review procedure and implement.)

**Task information** - The information gathered in order to appraise the needs of the operation. It seeks answers to the questions:

**Who** - The names and details of all involved parties.  
**What** - What has happened with as much detail as can be obtained.  
**When** - When did this all happen.  
**Where** - Charted, natural features, bearings, soundings, distances off.  
**Why** - Information on hazards that could recur in the rescue attempt.  
**Conditions** - Forecast for both operational sea area and the incident scene.  
**Injuries** - Minor or major, indicating the needs for specialist resources.

**Emergency phases**- Classifying SAR incidents by the appropriate emergency phase

**Incertfa-** Uncertainty phase requiring more task information.  
**Alertfa-** Alert/Urgency phase requiring stand by.  
**Detresfa-** Distress requiring immediate SAR.

**Operational information** -The information needed by the rescue crew to complete the operation. It seeks answers to the questions:

**Distance to go** - This will allow the calculation of fuel requirements to the incident.  
**Departure point**- Relevant to trailer mounted craft.  
**Sea conditions** - En route / at scene including traffic and nearby vessels.  
**Forecast** - For the expected duration of the operation.  
**Tides** - Times, heights, range and bar conditions.  
**Daylight** - Projected arrival at the incident scene.  
**Hazards** - Routing information to avoid dangers and ensure safe passage.

**Briefings** -The informing of the operational rescue personnel of allocations of duties, timings, procedures, communications details and equipment needs & allocation to assist in the response.

**Dangers and hazards** - These must be continually assessed. The rescue vessel is of no use to the vessel in distress if the rescue vessel arrives at the incident scene, damaged and only partly operational, or worse, does not arrive at all.

**De-Briefings** - The meeting of all operational personnel as can be spared from continuing operations for a full discussion and analysis. All participants are invited to contribute their view point in order that the successes can be confirmed, and the failures reviewed, so promoting future improvement. Agreed recommendations should be made to those with the relevant responsibility, but it is the Organisation Management's responsibility to ensure the squad is trained, capable and equipped to meet the next operational challenge. The management has a duty to review such implementations regularly to confirm it is all working satisfactorily and efficiently.

**Home port or destination** - Situations are encountered when the distressed vessel did not depart from the same "home port" as the Rescue Vessel. The RV Skipper will have to assess the situation and decide a safe port of return.

**Incident scene** -This is the immediate area of the distressed vessel that has become involved in an event. This location is sought whilst gathering task information.

**Position reports**- Regular position reports enable a positive and timely search for a rescue vessel that encounters its own operational problems. These should not be more than 30 minutes apart, even more frequent if travelling at speed in difficult conditions. This is for the safety of the Master and crew.

**Post-departures (*Make and Mend*)** - Leaving the vessel ready to respond to the next callout. The vessel should be refuelled, items checked as per SOP's, cleaned and consumables replenished, including the first aid kit, drinking water and rations.

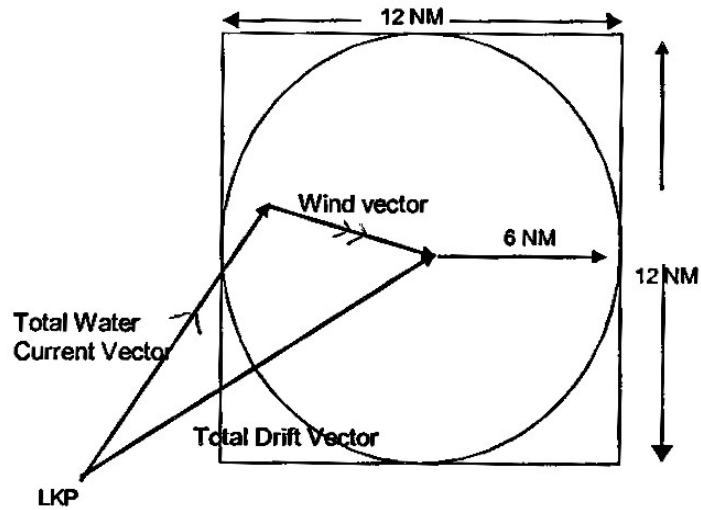
**Situation reports (*Sitreps*)** - During the operation, regular reports to the OIC of current position, local conditions and situation of the casualty will enable revision of the operational plan and increase its likelihood of success.

**Standing Operating Procedures (SOP's)** – Marine SOP's are published by the NSW SRB to ensure operational uniformity. Squads should develop Organisational policies to ensure Safety Management appropriate to the premises, vessels, vehicles, trailers and ancillary equipment used in their core business. Members should be trained in the SOP's, and have access to written copies.



## SEARCH PLOTTING:

Appendix G - Plotting Symbols	
	Heading and TAS
	Track and ground speed
	Wind velocity
	Position line
	Transferred position line
	Average position line
	Air position
	Dead reckoning position
	Most probable position (MPP)
	Fix (position line)
	Fix (Other than position line – Radar, GPS etc.)
	Visual fix (pin-point)
	Ship position
	Sighting and Hearing Reports red - probable black - all other sighting and hearing reports
	Aircraft position

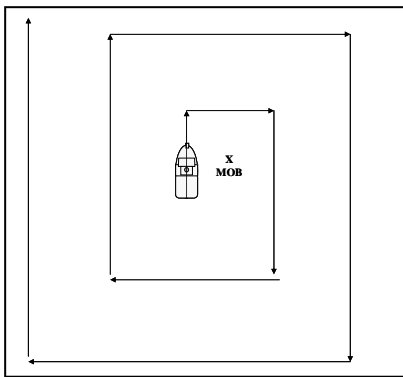


*Drift = Time x Current*

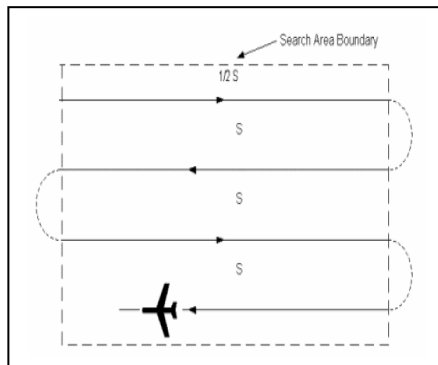
*Leeway = Wind speed x Time x Multiplier (+ or - Modifier)*

Downwind Direction + De R= Angle to right of Downwind Direction  
 Downwind Direction - De L= Angle to left of Downwind Direction

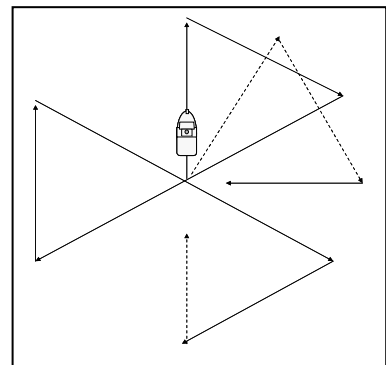
*Coverage Factor =  $\frac{\text{Sweep Width}}{\text{Track spacing}}$*



Expanding square search



Parallel track search pattern



Sector search pattern

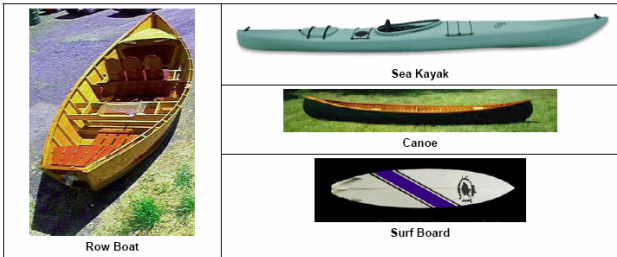


Figure I-3 Person-Powered Craft

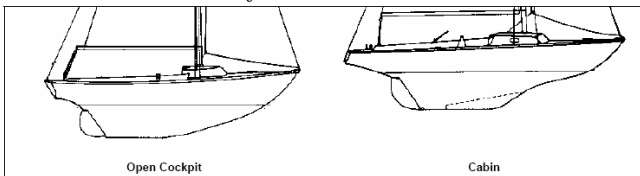


Figure I-4 Full Keel One-design Sailboat

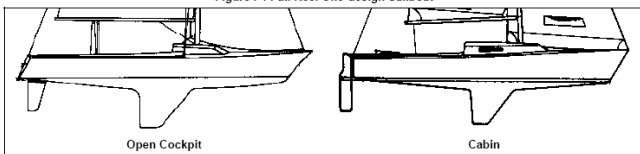


Figure I-5 Dagger Keel One-design Sailboat



Figure I-6 Skiffs



Figure I-7 Personal Water Craft



Figure I-8 Sport Boats



Figure I-9 Sport Fishers

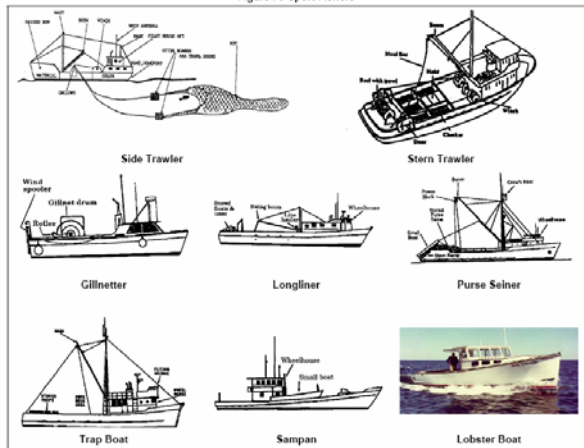
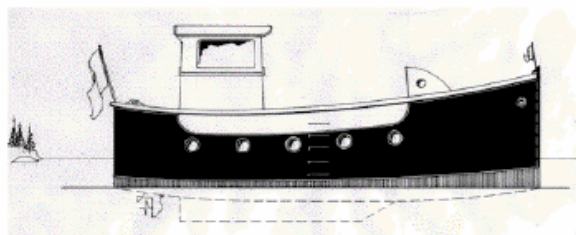


Figure I-10 Commercial Fishers



Coastal Freighter with Mid Deckhouse



Coastal Freighter with Aft Deckhouse

Figure I-11 Coastal Freighters

## Leeway tables

Table I-1: Leeway speed and direction values for drift objects (kts)

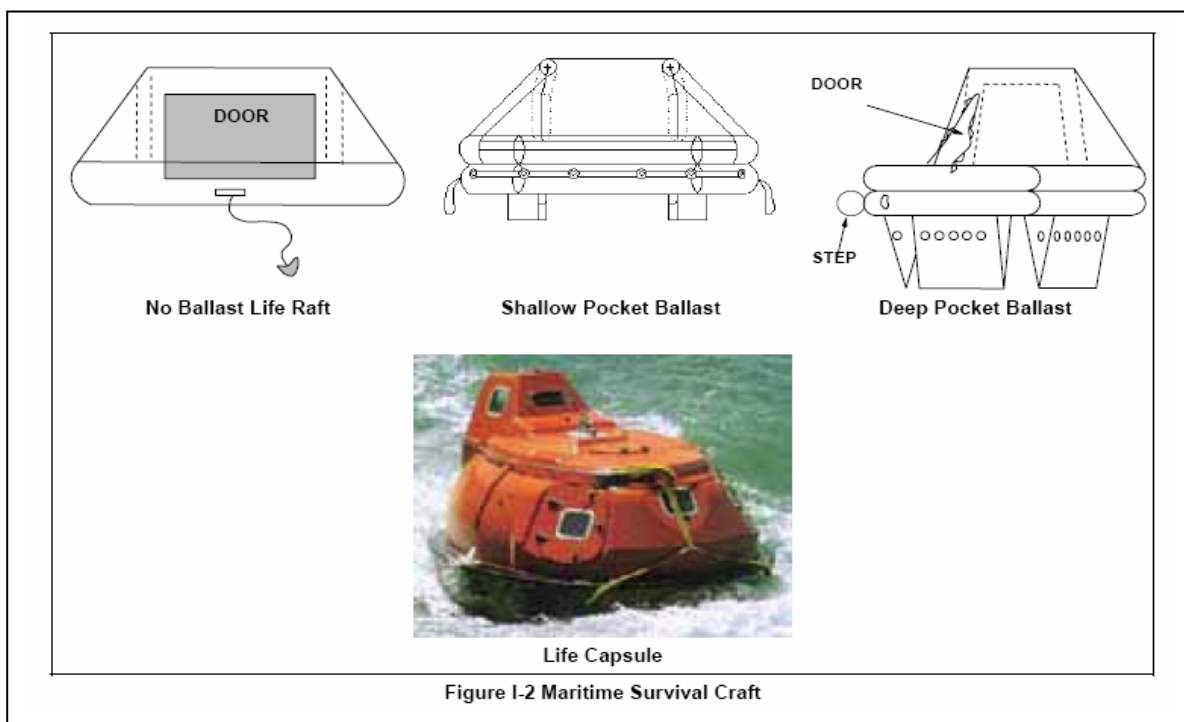
Leeway Target Class				Leeway Speed		Divergence
Category	Sub Categories	Primary Leeway Descriptors	Secondary Leeway Descriptors	Multiplier	Modifier (kts)	Angle (deg)
PIW				0.011	0.07	30
	Vertical			0.005	0.07	18
	Sitting			0.012	0.00	18
	Horizontal	Survival Suit		0.014	0.10	30
		Scuba Suit		0.007	0.08	30
		Deceased		0.015	0.08	30
Survival Craft	Maritime Life Rafts	No Ballast Systems		0.042	0.03	28
			no canopy, no drogue	0.057	0.21	24
			no canopy, w/ drogue	0.044	-0.20	28
			canopy, no drogue	0.037	0.11	24
		canopy, w/ drogue	0.030	0.00	28	
		Shallow Ballast Systems and Canopy		0.029	0.00	22
			no drogue	0.032	-0.02	22
			with drogue	0.025	0.01	22
	Capsized		0.017	-0.10	8	
	Deep Ballast Systems & Canopies	(See Table I-2 for Levels 4-6)	0.030	0.02	13	
	Other Maritime Survival Craft	life capsule		0.038	-0.08	22
		USCG Sea Rescue Kit		0.025	-0.04	7
Aviation Life Rafts	no ballast, w/canopy Evac/ Slide	4-6 person, w/o drogue	0.037	0.11	24	
		46-person	0.028	-0.01	15	
Person-Powered Craft	Sea Kayak	W/ Person on aft deck		0.011	0.24	15
	Surf board	w/ person		0.020	0.00	15
	Windsurfer	w/ person and mast & sail in water		0.023	0.10	12
Sailing Vessels	Mono-hull	Full Keel	Deep Draft	0.030	0.00	48
		Fin Keel	Shoal Draft	0.040	0.00	48
Power Vessels	Skiffs	Flat Bottom	Boston whaler	0.034	0.04	22
		V-hull	Std. Configuration.	0.030	0.08	15
			Swamped	0.017	0.00	15
	Sport Boats	Cuddy Cabin	Modified V-hull	0.069	-0.08	19
	Sport Fisher	Center Console	Open cockpit	0.060	-0.09	22
Power Vessels	Commercial Fishing Vessels	Sampans		0.037	0.02	48
		Side-stern Trawler		0.040	0.00	48
		Longliners		0.042	0.00	48
		Junk		0.037	0.00	48
		Gill-netter		0.027	0.10	48
		Gill-netter	w/rear reel	0.040	0.01	33
	Coastal Freighter		0.028	0.00	48	
Boating Debris	F/V debris		0.020	0.00	10	
	Bait/wharf box holds a cubic meter of ice		0.013	0.27	31	
		lightly loaded	0.026	0.18	15	
		fully loaded	0.016	0.16	33	

**Table I-2: Sub-table for maritime life rafts with deep ballast systems and canopies (kts)**

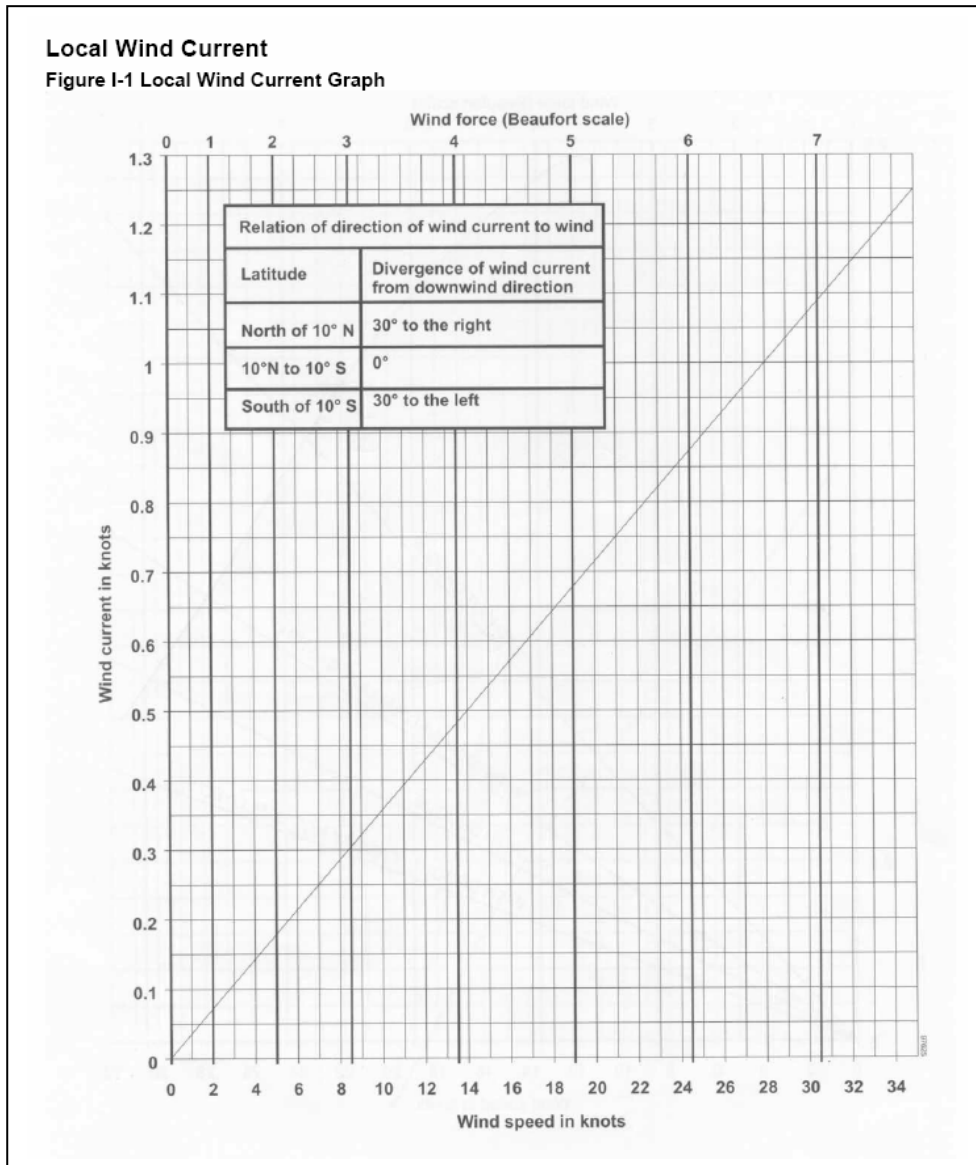
Leeway Target Class				Leeway Speed		Divergence
Secondary Leeway Descriptors	Capacity Modifier	Drogue Modifier	Loading Modifier	Multiplier	Modifier (kts)	Angle (deg)
Maritime Life Rafts with Deep Ballast Systems and Canopies	4-6 person capacity	without drogue		0.029	0.04	15
				0.038	-0.04	15
			light loading	0.038	-0.04	15
			heavy loading	0.036	-0.03	15
		with drogue		0.018	0.03	12
			heavy loading	0.021	0.00	20
	15-25 person capacity	w/o drogue		0.036	-0.09	10
			light loading	0.039	-0.06	9
		with drogue		0.031	-0.07	9
			heavy loading			
Capsized				0.009	0.00	12
Swamped				0.010	-0.04	8

**Notes:**

1. These tables are adapted from Allen and Plourde 1999 Review of Leeway: Field Experiments and Implementation. USCG Research and Development Centre Report No CG-D-08-99.
2. Prior to the publication of the data the USCG Research and Development Centre made the decision that the only data published would be data that was based on actual results derived from documented research and observation during controlled field experiments. However it has been recognised that some anomalies exist in the data pertaining to maritime life rafts with no ballast systems. There had been significant time between the initial research done by Hufford and Broida in 1974 and later research by Nash and Willcox in 1991. Also it is probable that the make of life raft used for the experiments may no longer be in use.
3. SMCs should evaluate the calculated results obtained from using the tables with actual known conditions and adjust leeway values as appropriate.



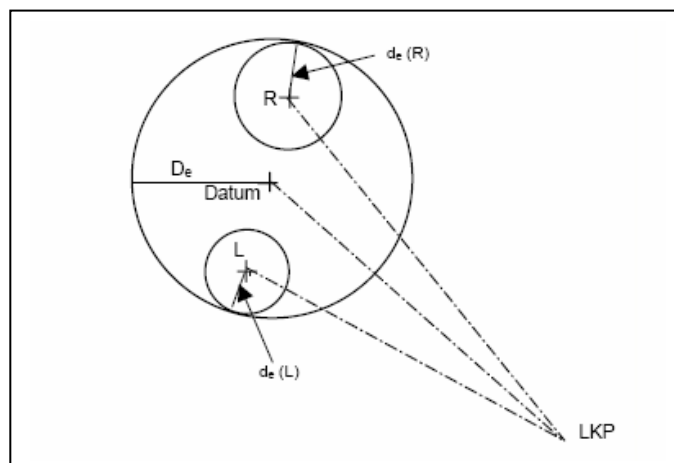
**Figure I-2 Maritime Survival Craft**



$$\text{Leeway} = \text{Wind speed} \times \text{Time} \times \text{Multiplier (+ or - Modifier)}$$

Downwind Direction + De R= Angle to right of Downwind Direction

Downwind Direction - De L= Angle to left of Downwind Direction





$$\text{Coverage Factor} = \frac{\text{Sweep width}}{\text{Track spacing}}$$

**Sweep Width Tables For Visual Search Over Water**

**Table I-3. Uncorrected visual sweep width for vessels and small boats (NM)**

SEARCH OBJECT	Height of eye 8'						Height of eye 14'					
	Visibility in kilometres						Visibility in kilometres					
	2	5	10	15	20	>25	2	5	10	15	20	>25
Person in water	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.6
Raft 1 Person	0.7	1.2	1.8	2.1	2.4	2.5	1.0	1.6	2.5	2.9	3.2	3.3
Raft 4 Person	0.8	1.5	2.3	2.9	3.2	3.4	1.1	2.0	3.1	3.8	4.2	4.4
Raft 6 Person	0.9	1.7	2.7	3.4	3.8	4.1	1.2	2.2	3.5	4.4	5.0	5.3
Raft 8 Person	0.9	1.7	2.8	3.5	4.0	4.2	1.2	2.3	3.6	4.5	5.1	5.4
Raft 10 person	0.9	1.8	2.9	3.7	4.2	4.6	1.2	2.3	3.7	4.7	5.4	5.8
Raft 15 Person	1.0	2.0	3.2	4.0	4.5	4.9	1.2	2.5	4.0	5.1	5.7	6.2
Raft 20 Person	1.0	2.1	3.5	4.4	5.1	5.6	1.3	2.6	4.3	5.7	6.4	6.9
Raft 25 Person	1.0	2.2	3.7	4.7	5.5	6.0	1.3	2.7	4.3	5.8	6.7	7.5
Power Boat <5m (15 ft)	0.5	0.7	1.0	1.2	1.3	1.4	0.5	1.0	1.5	1.8	1.9	2.0
Power Boat 5-8m (15-25 ft)	0.8	1.4	2.3	2.9	3.4	3.8	1.0	1.9	3.0	3.9	4.5	5.0
Power Boat 8-12m (25-40 ft)	0.8	1.8	3.1	4.1	4.9	5.6	1.2	2.3	4.0	5.3	6.4	7.3
Power Boat 12-20m (40-65 ft)	0.9	2.2	4.2	5.9	7.4	8.7	1.2	3.0	5.4	7.6	9.6	11.3
Power Boat 20-27m (65-90 ft)	0.9	2.3	4.6	6.8	8.8	10.6	1.2	3.0	6.0	8.7	11.3	13.6
Sail Boat 5m (15 ft)	0.8	1.4	2.2	2.7	3.1	3.4	1.0	1.8	2.8	3.5	4.1	4.5
Sail Boat 6m (20 ft)	0.8	1.6	2.6	3.3	3.9	4.4	1.1	2.0	3.3	4.3	5.0	5.6
Sail Boat 8m (25 ft)	0.9	1.8	2.9	3.9	4.6	5.1	1.1	2.2	3.8	5.0	5.9	6.7
Sail Boat 9m (30 ft)	0.9	2.0	3.4	4.6	5.5	6.3	1.2	2.5	4.4	5.9	7.1	8.1
Sail Boat 12m (40 ft)	0.9	2.2	4.1	5.7	7.0	8.1	1.3	2.8	5.2	7.2	9.0	10.5
Sail Boat 15m (50 ft)	0.9	2.2	4.3	6.1	7.7	9.1	1.2	2.9	5.2	7.9	9.9	11.7
Sail Boat 20-23m (65-75 ft)	0.9	2.3	4.5	6.5	8.3	9.9	1.2	3.0	5.8	8.4	10.8	12.9
Sail Boat 23-17m (75-90 ft)	0.9	2.4	4.7	6.8	8.9	10.7	1.2	3.1	6.1	8.9	11.5	13.8

Note: A sailboat is only a sailboat if the sails are up. If the sails are down, the craft should be classed as a powerboat.

**Table I-4. Visual sweep widths for merchant ships (NM)**

Height of eye correlates to bridge of a merchant ship	Meteorological visibility [km]				
	5 km	10 km	20 km	30 km	40 km
Search Object					
Person in water	0.4	0.5	0.6	0.7	0.7
4-person liferaft	2.3	3.2	4.2	4.9	5.5
6-person liferaft	2.5	3.6	5.0	6.2	6.9
15-person liferaft	2.6	4.0	5.1	6.4	7.3
25-person liferaft	2.7	4.2	5.2	6.5	7.5
Boat <5m (17ft)	1.1	1.4	1.9	2.1	2.3
Boat <7m (23ft)	2.0	2.9	4.3	5.2	5.8
Boat <12m (40ft)	2.8	4.5	7.6	9.4	11.6
Boat <24m (79ft)	3.2	5.6	10.7	14.7	18.1

**Table I-7. Weather correction factors for all types of search facilities**

Weather: winds km/h (kt) or seas m (ft)	Search Object	
	Person in water, raft or boat < 10m (33ft)	Other search objects
Winds <28 km/h (<15 kt) or seas 0-1 m (0-3ft)	1.0	1.0
Winds 28-46 km/h (15-25 kt) or seas 1-1.5 m (3-5ft)	0.5	0.8
Winds >46 km/h (> 25 kt) or seas > 1.5 m (> 5ft)	0.25	0.5

Note: Table I-7 differs from IAMSAR for other search objects in winds above 15 kts. The correction factors are based on a combination of the values previously used by AusSAR and observations of the reported effect of high winds on sweep width values in actual SAR incidents.

# NATSAR WORKSHEETS

## Appendix K – Worksheets

Worksheet 1: Maritime Planning			
<b>INCIDENT</b>			
Search target (description):			
LKP (lat/long):			
@ Time (UTC):			
Hours of drift (a):			
<b>SEA CURRENT</b>			
Sea / tidal current/knots:	° (T)	knots	
Sea Current vector/distance:	° (T)	knots x	(a)hrs = nm
<b>SURFACE WIND and CALCULATION OF WIND CURRENT</b>			
Surface winds/knots	° (T)	knots	Wind Current Divergence = Reciprocal Surface Wind - 30° for LKP greater than 10° South Latitude
Reciprocal of Surface Winds/Knots (b)	° (T)	knots	- 30° T = ° (T) knots
Wind current vector: (use reciprocal bearing and divergence (Figure I-1))	(a) hours x	knots (Figure I-1) =	° (T) nm
<b>TARGET LEEWAY</b>			
Leeway Angles (divergence) (Table I.1 or I.2):	Reciprocal Surface Wind (b)	° (T)	± ° (T)
Leeway vector: (LW)	L W (L) -	° (T)	L W (R) + ° (T)
Leeway speed: (knots) = (Multiplier x Wind Speed) ± Modifier (Table I.1 or I.2)	[	Multiplier x Wind Speed =	] ± Modifier =
Leeway distance:	(Leeway speed	x (a)	hrs = nm
<b>DRIFT ERROR</b>			
Distance (L)	nm	Distance (R)	nm
d <sub>e</sub> (L):(12.5 to 33% of Distance L)	nm	d <sub>e</sub> (R):(12.5 to 33% of Distance R)	nm
Distance Left/Right = nm	De = $\frac{[de (L) + de (R) + \text{Distance L/R}]}{2}$		De =
<b>FIX ERRORS</b>			
Distress craft error (x): (Table J.1, J.2 or J.3)	nm		
Search craft error (y): (Table J.1, J.2 or J.3)	nm		
<b>TOTAL ERROR (E)</b>			
Total probable error (E): $E = \sqrt{(De^2 + x^2 + y^2)}$	E =		
<b>SEARCH AREA</b>			
Safety factor (circle) (fs)	1.1	1.6	2.0 2.3 2.5
Search radius (E x fs)	nm		
Search radius rounded up to whole figure:	nm		
Search area:	nm <sup>2</sup>		



### **Closed questions**

Closed questions follow on from an open question, helping to refine the information already given. They usually require a yes or no answer and are good for gaining information quickly. For example: Are you saying the colour of the aircraft was white?  
The closed question usually begins with:

Do  
Is  
Are  
Can  
Have.

### **Leading questions**

The problem with leading questions is that they can elicit unreliable information. The individual being questioned may tell you what they think you want to hear. For example, do not ask: 'You say you saw an aircraft. Was it white with a red tail?' Ask: 'You say you saw an aircraft. What colour was it?'

### **Instructions for Completing Sighting and Hearing Reports**

The objective is to obtain the maximum information available from an observer at the initial contact. When taking a call, introduce yourself with your organisation such as 'Australian Search and Rescue'.

- Establish follow-up by first obtaining a call back number and the person's availability.
- Print CLEARLY on the Sighting or Hearing Report.
- Number each report by referral to the Sighting and Hearing Log.
- If you find that a component of the report is important, put the caller on hold and obtain the attention of the Intelligence Officer. Use your initiative.
- Be cautious; use local time only.
- Attempt to obtain as much detail as possible.
- Be on the lookout for key words. Words like 'slow' can help to assess a report.
- The broadcast is normally a little vague and you must be likewise. Do not ask if the aircraft was a high-wing aircraft, as the caller may tend to agree with you.
- Weather. Obtain accurate reports of cloud, rain, and fog. Most people will report wind speed as 'light' or 'strong'. Direction may be only known as 'north'.
- Obtain full details from other witnesses and interview these separately.
- Reliability. Annotate only if this is obvious, for example, whether the person reporting was a police officer or an intoxicated person.

Final check. Check the entire form before hanging up.  
Ensure the form is SIGNED, DATED and your NAME IS PRINTED.

[View extracts of the Natsar Manual Glossary.](#)

[View extracts of the Natsar Manual Abbreviations & Acronyms.](#)

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