4 SEARCH AND RESCUE INFORMATION AND PROCEDURES

New Zealand Search and Rescue Sector (NZSAR)

1. The New Zealand Search and Rescue Sector (NZSAR) provides assistance to ships and aircraft missing or in distress in the New Zealand Search and Rescue Region (NZSRR). The organisation is based on the utilisation of civilian and military facilities which are co-ordinated and controlled through the Rescue Co-ordination Centre New Zealand (RCCNZ).

Note: Towage or salvage operations are not the function of this organisation.

Search and Rescue Co-ordinating Authorities:

2. There are only two Co-ordinating Authorities for Search and Rescue Operations (SAROPs) in the NZSRR, the New Zealand Police for Category I (CAT I) SAROPs, and RCCNZ for Category II (CAT II) SAROPS. Both organisations cooperate closely to ensure the response to a SAR incident is co-ordinated by the appropriate Co-ordinating Authority.

Rescue Co-ordination Centre New Zealand (RCCNZ)

3. RCCNZ is situated in Avalon Business Centre, Percy Cameron Street, Lower Hutt and is responsible for initiating, co-ordinating, and concluding CAT II search and rescue operations within the NZSRR. The RCCNZ Search and Rescue Officer is responsible for co-ordinating representatives of civilian and military organisations considered necessary in order to cover the requirements for any Search and Rescue operation.

	Telephone	*Fax*	*Others*
RCCNZ **24-Hour Emergency** **Administration**	NZ: 0508 472 269 Int: +64 4 577 8030 NZ: (04) 577 8034 Int: +64 4 577 8034	NZ: (04) 577 8038 Int:+64 4 577 8038 NZ: (04) 577 8041 Int:+64 4 577 8041	Inmarsat-C (POR): 451 200 067 e-mail: rccnz@maritimenz.govt.nz
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SAROPS are classified as follows:

CAT I:	A SAROP for which NZ Police obtain assistance from other organisations or persons but in which the control and responsibility remain at all times with the NZ Police.
CAT II:	Means SAROPs other than CAT I, being: (i) all SAROPs associated with activated emergency locator transmitters; (ii) all SAROPs associated with missing or distressed aircraft; (iii) all SAROPs, including those for missing or distressed surface vessels other than those being co-ordinated by the NZ Police as a CAT I SAROP; and (iv) SAROPs which began as CAT I, where responsibility is transferred by mutual agreement to RCCNZ by NZ Police.

Close To-Shore Rescues

4. The NZ Police and RCCNZ are assisted by local organised groups throughout New Zealand to provide voluntary, advisory, and operational assistance to the NZSAR.

New Zealand Search and Rescue Region (NZSRR):

5. A diagram of the NZSRR which extends to 90° South, is shown below:

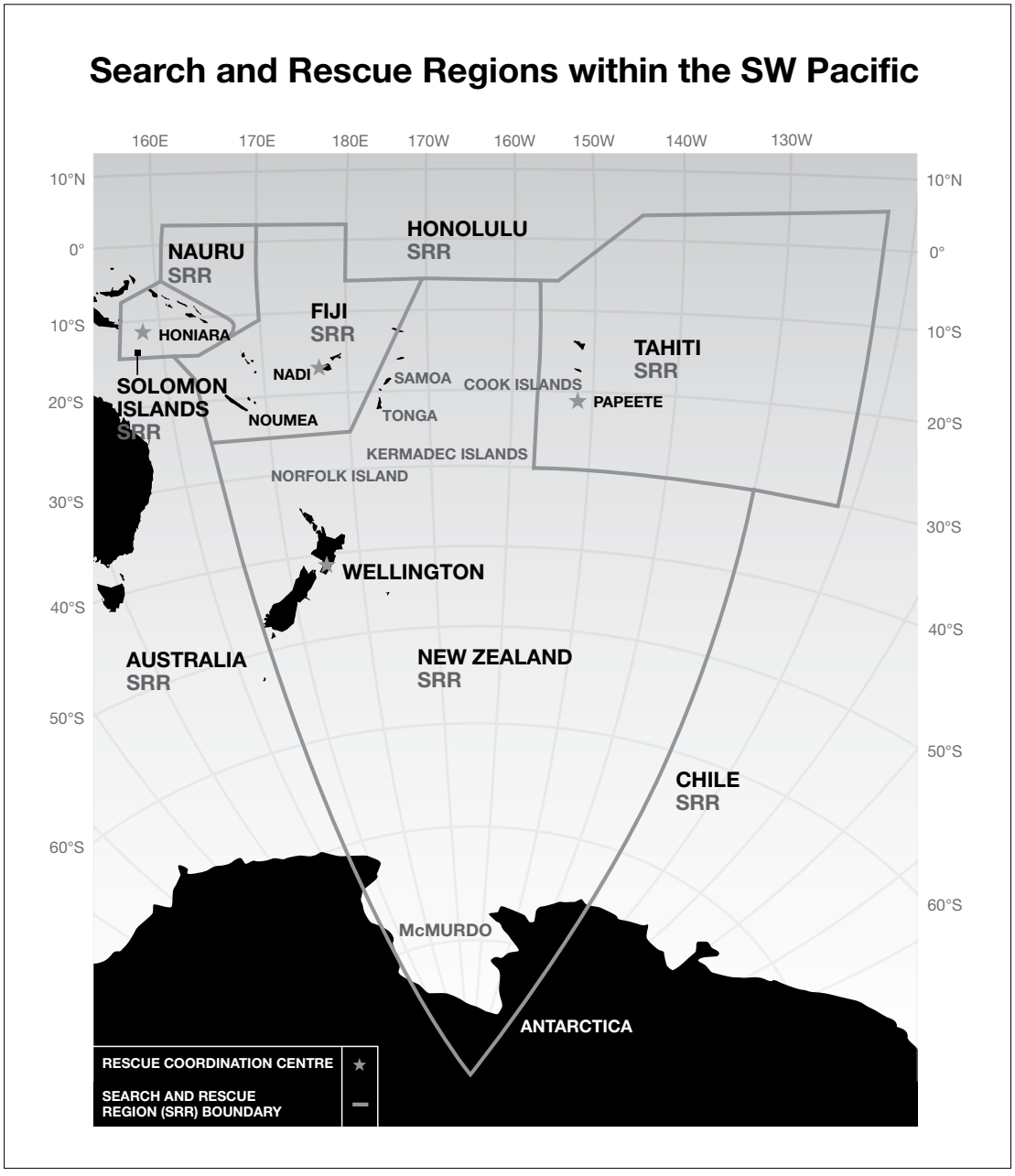
The NZSRR is bounded :

(a) West by meridian 163° 00' East;

(b) East by meridian 131° 00' West;

(c) South to the South Pole;

(d) North by a line joining: 26° 00' S 163° 00' E ; 26° 00' S 170° 20' E; 25° 00' S 171° 25' E ; 25° 00' S 180° 00' W; 05° 00' S 171° 00' W; 05° 00' S 157° 00' W; 30° 00' S 157° 00' W; 30° 00' S 131° 00' W.



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Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

Voluntary Ship Reporting System

6. The New Zealand Search and Rescue Authorities have estabilished a voluntary ship reporting system for all vessels operating in the NZSRR Area south of 60° South for the purposes of assisting RCCNZ in co-ordinating SAR operations in that area.

Area covered: 60°S to the southern edge of the Ross Sea bounded by 163° E to 131° W.

All vessels are requested to notify Taupo Maritime Radio on entry and departure into the area and are also encouraged to make daily position reports. Information provided will be used for SAR purposes only.

Obligation to Render Assistance

7. Masters of vessels in a distress area should endeavour to give the utmost assistance to persons in distress at sea, and co-operate fully in any search and rescue operation which is being directed from RCCNZ.

Section 32 of the Maritime Transport Act 1994 provides that the master or person in charge of a ship shall, so far as he can do so without serious danger to his own ship, her crew, and passengers (if any), render assistance to every person who is found at sea in danger of being lost; and if he fails to do so he is guilty of a crime. Similar provisions are included in the *International Convention for the Safety of Life at Sea 1974 (SOLAS)*.

Merchant Ship Position Reports

8. New Zealand does not operate a merchant shipping reporting system. New Zealand-owned ships are invited to comply with the International Maritime Organisation recommendations which request all ships to participate in other member government merchant shipping reporting systems wherever they exist.

Refer to *New Zealand Annual Notices to Mariners 4A* and *4B* on page 209 for more information.

Guarding of Distress Frequencies

9. The radio watch on the international distress frequencies, which certain ships are required to keep when at sea, is also a vital factor in the co-ordination of rescue of people in distress at sea. This co-ordination will not be possible if ships are unable to alert each other, or to be alerted from shore for distress action. Every ship fitted with suitable radio equipment should make its contribution to safety by guarding those distress frequencies applicable for as long as practicable, whether or not required to do so by regulation.

EPIRBs (Emergency Position Indicating Radio Beacons).

IMPORTANT NOTE:

From1 February 2009, satellite monitoring of 121.5/243Mhz beacons ceased

10. Modern EPIRBS operating on a frequency of 406 MHz, with a low power homing transmitter on 121.5 MHz, can be located very accurately by the COSPAS SARSAT satellite system. The 406 MHz EPIRB has the capability of transmitting unique data containing details such as country of origin, the identity of the vessel and position information derived from either the EPIRB's on board GPS or the vessel's navigation equipment. This information is stored in the satellite memory and down-loaded to a satellite ground station when one comes within range.

A receiving station, or Local User Terminal (LUT), has been installed in New Zealand which, and together with two in Australia, provides coverage of the NZSRR.

Ships are reminded that they must immediately report any accidental activation of an EPIRB, preferably through Taupo Maritime Radio. This is purely to establish whether a vessel is in distress, and no costs or prosecution will result from reporting an accidental activation.

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

Aircraft Used for Search and Rescue Operations

11. Civilian or Royal New Zealand Air Force aircraft may be used for Search and Rescue operations. Search aircraft may be equipped with search radar and VHF/UHF Direction Finding (D/F) and homing capability.

Communications between search aircraft and merchant ships will normally be effected on the following frequencies:

156.8 MHz (Channel 16)	FM Voice	Initial Calling and Distress
2182 KHz	AM Voice	International Maritime Mobile Calling & Distress
3023 Khz	USB Voice	Scene of Search
5680 Khz	USB Voice	Scene of Search

Additionally, communications may be established using a signalling lamp or on the following frequencies:

123.1 MHz	AM Voice	Scene of Search VHF
282.8 MHz	AM Voice	Scene of Search UHF
121.5 MHz	AM Voice	International Aeronautical Emergency (VHF) (this frequency should only be used as a last resort)
243.0 MHz	AM Voice	International Aeronautical Emergency (UHF) (this frequency should only be used as a last resort)

Sea Rescue by Helicopter
Procedures to assist with location by helicopter

12. When a distress message is received from a ship in distress, or a medical evacuation is required, the rescue authorities may despatch a helicopter to assist. Once the helicopter is airborne, the speed with which it locates the ship and the effectiveness of its work depends to a large extent on the cooperation of the ship concerned.

From the air, especially if there is a lot of shipping in the area, it is very difficult for the helicopter pilot to pick out the particular ship he is looking for, unless that ship uses a distinctive distress signal which can clearly be seen.

Especially useful for helicopters are:

(a) By day : orange smoke floats, or orange squares with V or circle, Aldis lamp or heliograph.

(b) By night : Aldis lamp.

i) It is essential that the ship's position be given as accurately as possible.

ii) As many aircraft are equipped with GPS, latitude and longitude may be used.

iii) Bearings should be described as true or magnetic, and must be given **FROM** a fixed object, such as a headland or lighthouse.

iv) The description of the vessel and local weather conditions should be included if time allows.

vi) Because of operational limitations, helicopters should not be delayed at the rescue scene. On large vessels a clear stretch of deck should be made available as a pick-up area if possible, and marked with a large letter "H" in white.

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

For all vessels, the following preparations need to be completed to ensure a safe transfer is made:

Note: These procedures may be modified on instructions from the pilot if communications exist.

(a)	Lower all masts, derricks, and radio aerials to provide a clear area for the helicopter to conduct the hoist.
(b)	Keep all unnecessary personnel out of the way while the helicopter is conducting hoist operations.
(c)	Under no circumstances must the hoist cable be attached to the vessel, sudden movements could cause the helicopter to crash if this is done.
(d)	Tie down or stow all loose gear which may be blown by the rotor wash, which can be up to 45 knots downwards. This includes hats, fishing gear, beverage cans, and paper. Nothing must be blown into the rotors, or become entangled with the hoist wire.
(e)	Allow the helicopter's rescue equipment to touch the vessel's deck before handling it. This will allow any static electricity charge present to dissipate. However this should be clear of any inflammable mixture spillage or venting area to preclude a possible fire or explosion from an electrostatic discharge.
(f)	Ensure the person being hoisted is wearing a lifejacket, if at all possible. If it is a patient, they should be made as comfortable as possible, and if conscious, informed of the procedure of rescue.
(g)	When the helicopter arrives, change course to place the wind thirty degrees on the port bow, and continue at standard speed.
(h)	At night, floodlights are useful to illuminate the vessel, but they must be facing down.
(i)	By day the vessel should indicate the apparent wind by flag, smoke, or other means, as long as it does not impair the pilot's visibility.
(j)	Personnel on the ship, and survivors leaving the helicopter when it has landed ashore, must obey the instructions of the pilot or crewman. Approach and leave the helicopter only from forward, in clear view of the pilot, and stay well clear of the after part of the helicopter, in particular the tail rotor and engine exhausts.

Specifications for helicopters involved in SAR in NZ

13. The main type of military helicopter used for SAR duties in New Zealand is the Iroquois, which at short range can rescue up to eight persons at a time. The Seasprite may also be used, and can rescue up to six persons. For the Iroquois, maximum distance from the last refuelling point to the rescue area shall not exceed 150 nautical miles. The maximum distance from the nearest land shall not exceed 60 nautical miles. Helicopter rescue is not normally undertaken over the sea at night, or when winds exceed 45 knots. The Iroquois and Seasprite are fitted with Marine VHF and UHF. The Iroquois is also fitted with MF/HF equipment, so messages may be passed via shore.

Civil helicopters used by RCCNZ vary in capacity for survivors and range offshore to which they can operate. They may be able to operate at night, or in greater wind speeds. Many civil helicopters are fitted with Marine VHF.

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

14. Medical Evacuation (MEDEVAC) Checklist

(a)	Craft with medical emergency - name, callsign;	(i)	Medication available;
(b)	Position - lat/long or bearing/distance;	(j)	Radio frequencies in use, monitored, or scheduled;
(c)	Date/time of position;	(k)	Craft description
(d)	Craft's course and speed	(l)	Local agent and telephone/fax numbers;
(e)	Patient's name, nationality, age, sex, race;	(m)	Last port of call, destination, ETA;
(f)	Patient can/cannot speak English	(n)	On-scene weather and sea state;
(g)	Patient's symtoms;	(o)	Assistance required;
(h)	Medication given;	(p)	Other pertinent information.

Use of Ships in Assisting to Locate Aircraft in Distress
Masters Responsibilities

15. Aircraft which ditch cannot be assumed to stay afloat for long, but it should always be assumed that there will be survivors. Masters of ships within reasonable distance of an aircraft in distress should proceed with the greatest possible speed to its assistance.

If a ship receives a distress message direct from an aircraft or liferaft, a D/F bearing should be taken and passed to a Maritime Radio Station and other vessels in the area, together with the callsign of the aircraft, time taken, and position of the ship.

Means by which a ship may receive distress signals

16. Ships may receive distress signals in the following ways:

(a) By Radio Telephony (R/T) or Radio (Wireless) Telegraphy (W/T) on the appropriate international distress frequency

(b) By visual signals

Radio Telephony (R/T) or Radio (Wireless) Telegraphy (W/T) Distress Signals

17. Can be received from:

(a) A distressed aircraft still in flight (see Appendix A, page 208);

(b) Survivors after the casualty has occurred, by a hand-operated emergency radio transmitter (see Appendix B, page 208);

(c) Maritime Radio Station;

(d) A search of other aircraft.

References:

(i) For communications between aircraft stations and stations of the maritime mobile service, the provisions of Article 37 of the *ITU Radio Regulations (Geneva 1990)* are obligatory.

(ii) For International Regulations on Distress, Urgency, and Safety Signals, see *Admiralty List of Radio Signals, Volume 1*.

Visual Distress Signals

18. Can be received from:

(a) A distressed aircraft

(b) An aircraft with an urgent message concerning safety

(c) A Search Aircraft

(d) Survivors in the sea

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

19. **A distressed aircraft**: Apart from obvious signs, an aircraft may indicate that it is in distress by firing rockets or shells throwing red lights fired one at a time or at short intervals or by firing a parachute flare showing a red light. Navigation markers dropped by aircraft at sea, emitting white or yellow smoke or flame and smoke, should not be mistaken for distress signals. Low flying is not in itself an indication of distress. Aircraft in distress which are forced to alight on the sea are instructed to do so ahead and in the lee of a ship.

20**. An aircraft with an urgent message concerning safety**: An aircraft having an urgent need to notify information relating to its own safety or that of another aircraft or ship, or the safety of any person on board or within sight may use one of the following signals:

(a) A succession of green pyrotechnic signals

(b) A succession of green flashes with signal apparatus

21. **A Search Aircraft**: When it is necessary for an aircraft to direct a ship to an aircraft or ship in distress, the aircraft will do so by transmitting precise instructions by any means at its disposal. If not by radio or signal lamp, the instructions will be given by carrying out the following manoeuvres:

(a) Circling the ship at least once

(b) Crossing the projected course of the ship close ahead at low altitude; and rocking the wings or opening/closing the throttle, or changing propeller pitch*

(c) Heading in the direction in which the ship is to be directed. Repetition of such manoeuvres has the same meaning. If carried, smoke markers may be laid in the direction to proceed

* Important Note: Due to high noise levels on board ships, these sound signals may be less effective than the visual signal in (B) (i) and are regarded as alternative means of attracting attention. They are no longer carried out on turbo-prop aircraft. Green flares and/or white smoke markers may also be released by Orion aircraft in the vicinity of vessels to indicate that assistance is required, and that the aircraft wishes to establish communications.

22. **Survivors in the sea**, in a liferaft or other flotation device may use any of the following signals:

(a) Pyrotechnic signals emitting one or more red stars

(b) Flashing a heliograph

(c) Flashing SOS or other distinctive signal by hand torch or other signalling lamp

(d) Blowing of whistles

(e) Fluorescent dye marker giving an extensive bright green colour to the sea around the survivors

(f) A liferaft may also be located by yellow kite or balloon being flown to support the aerial for the emergency radio transmitter

(g) EPIRB

(h) Hand Held Marine VHF transceiver.

When assistance is no longer required

23. The following aircraft manoeuvres shall mean that the assistance of the ship to which the signal is directed is no longer required:

Crossing the wake of the ship close astern at a low altitude and:

(a) rocking the wings or

(b) opening or closing the throttle or

(c) changing the propeller pitch.

24. Ships should acknowledge receipt of signals from aircraft by hoisting the answering pennant (red and white vertical stripes), or by flashing a succession of "T"s by signal light in morse code, or by making a change of heading to follow aircraft. Ships should immediately set watch on radio distress frequencies. If a ship is unable to comply, it should indicate this by hoisting the flag "N" (blue and white checkered squares), or by flashing a succession of "N"s in morse code.

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

Use of Aircraft in Assisting to Locate Shipping in Distress
Importance of a Distinctive Distress Signal

25. From the air, especially if there is a lot of shipping in the area, it is very difficult for a pilot to pick out the particular ship in distress, unless that ship uses a distinctive distress signal which can clearly be seen. Especially useful are orange smoke floats, orange day glo sheet with letter V or circle, during the day, or an Aldis lamp during the day or night. In bright sunlight a heliograph may also be used.The display of these signals will save valuable time in locating the casualty, and may mean the difference between success and failure.

Providing ship's position

26. It is essential that the ship's position be given as accurately as possible. Bearings should be described as true or magnetic, and must be given **FROM** a fixed object, such as a headland or lighthouse. The description of the vessel and local weather conditions should be included if time allows.

Night Search Technique **(See diagram on page 206)**

27. This technique takes advantage of the greater visibility of pyrotechnics at night. The aircraft will fly through the search area at between three and five thousand feet and use track spacing of five to twenty miles and a green flare will be fired approximately every five-ten minutes and on turning.

When a green flare is sighted, it is most important that the following actions are taken:

(a) Wait for the glare of the green flare to die out;

(b) Fire one red flare;

(c) Fire another red flare after about one minute to enable the aircraft to line up on your bearing

(d) Fire a third flare when the aircraft is overhead or appears to be going badly off course.

Important Notes:

(i) Each lifeboat or liferaft should carry at least three red flares

(ii) If all else fails, use any means at your disposal to attract attention

(iii) The aircraft will probably drop a marine marker to mark your position **DO NOT TOUCH THE MARKER** - to do so could result in severe burns or major damage to a liferaft

(iv) The aircraft may also drop a sonobuoy to act as an electronic marker. Ships may talk to aircraft by recovering the sonobuoy hydrophone hung approximately 30 metres below the sonobuoy and speaking into it in a normalvoice. The sonobuoy cannot receive transmission from the aircraft. A written message may also be attached to the buoy or dropped from the aircraft in a small package.

Action to be Taken When an Aircraft is Forced to Ditch

28. The captain of a distressed aircraft will be materially assisted in locating a ship if the latter:

(a) Transmits homing bearings to the aircraft or (if so requested) transmits signal enabling the aircraft to take its own bearings;

(b) By day makes black smoke;

(c) By night directs a searchlight vertically.

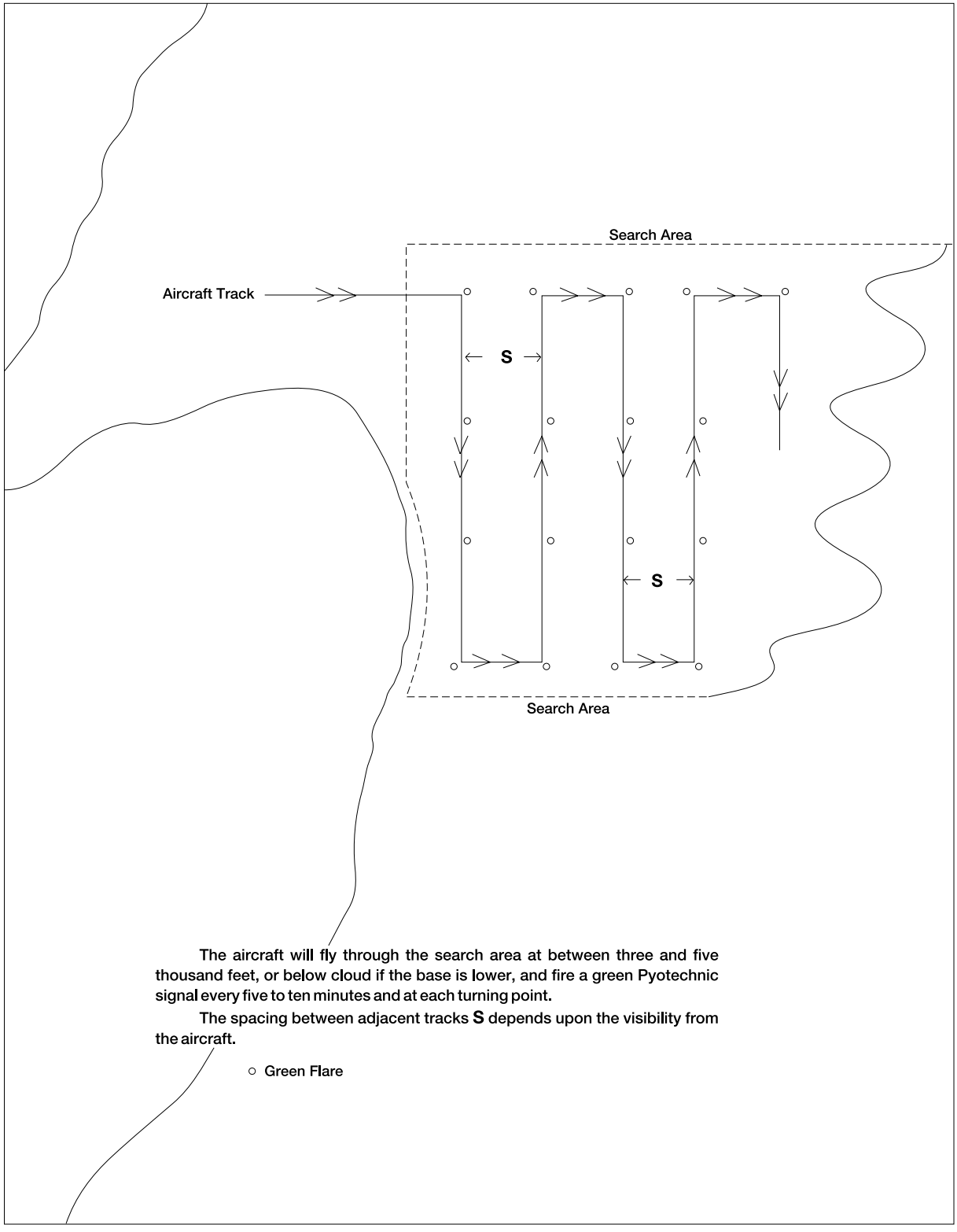
Ditching an aircraft is difficult and usually dangerous. A ship which knows that an aircraft intends to ditch should, if practicable, try to provide a lee of calm water. This may be achieved by any means at the master's discretion, such as steering on a circular course through 360°.

An aircraft will usually ditch on the starboard side of a ship and heading into the wind, although, when seas are running high, it may attempt to land along the trough of the seas. In the absence of communication, the former should be assumed.

At night the ship should floodlight the ditching area as much as possible, without dazzling the pilot, who could lose control at a critical moment. If flame floats are available, six should be laid at 200 metre intervals in line astern to indicate the suggested alighting area.

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

DIAGRAM SHOWING NIGHT SEARCH TECHNIQUE



Ditching Reports from Ships to Aircraft

29. Ditching reports when requested by aircraft should be transmitted in plain language and should comprise the following in the order indicated:

(a) Unless previously established, position of the ship in lat/long at the time the observation was taken;

(b) Corrected barometric pressure;

(c) Surface wind direction in degrees magnetic;

(d) Surface wind speed in knots;

(e) Swell length, height, and direction;

Use one of the following terms:

Swell Length

Term	*Criteria*
Short	0 - 100 metres
Average	100 – 200 metres
Long	over 200 metres

Swell Height

Term	*Criteria*
Low	0 - 2 metres
Moderate	2 - 4 metres
Heavy	over 4 metres

(f) State of sea, specified by one of the terms from table on next page, selected according to theaverage wave height as obtained from the larger well-formed waves of the wave system being observed;

Beaufort Force	*Wind speed (Knots)*	*Sea State*	*Mean Wave Height (Metres)*	*Probable Maximum Wave Height (Metres)**
0-1	<4	Calm	<0.2	0.3
2-3	4-10	Smooth	0.5	1.0
4	11-16	Slight	1.0	1.5
5	17-21	Moderate	2.0	2.5
6	22-27	Rough	3.0	4.0
7	28-33	Very Rough	4.0	5.5
8	34-40	High	5.5	7.5
9-10	41-55	Very High	8.0	12.5
11-12	>55	Phenomenal	13.0	>16

* The extreme height may be greater

(g) Visibility (miles or metres);

(h) Amount and height above sea level of base of low cloud (both main layer and any scattered cloud below);

(i) Present weather;

(j) Remarks.

Action to be Taken When Aircraft Survivors are Rescued

30. A survivor from any aircraft casualty at sea who is rescued by a ship may be able to give information which will assist in the rescue of other survivors. Masters should ask the following questions and communicate the answers together with the position of the rescuing vessel and the time the survivor was rescued to a Maritime Radio Station:

(a) Did you bale out, or was the aircraft ditched? What was the type and identification of the aircraft, and date and time of the accident?

(b) If you baled out, at what altitude?

(c) How many others did you see leave the aircraft by parachute?

(d) How many ditched with the aircraft?

(e) How many did you see leave the aircraft after ditching?

(f) How many survivors did you see in the water?

(g) What flotation gear did they have?

(h) What was the total number of persons aboard the aircraft before the accident?

(i) What caused the emergency?

Authorities: Civil Aviation Authority ; Maritime New Zealand ; Royal New Zealand Navy

APPENDIX A

Form of Distress Call and Message Transmitted by an Aircraft in Distress:

Aircraft will make distress calls on the air-to-ground frequency in use at the time, but may also make them on maritime R/T calling frequencies.

Aircraft rarely use W/T, but when used for distress will follow maritime procedures.

Distress Communication:

MAYDAY (preferably spoken three times) followed by as many as possible of the following elements:

Identification of the aircraft;

Nature of distress;

Intention of person in command;

Present position, altitude, and heading.

Note: The point of ditching could be appreciably different from "present position" depending on the altitude, heading and speed.

APPENDIX B

IMPORTANT NOTE:

From1 February 2009, satellite monitoring of 121.5/243Mhz beacons ceased

Form of Distress Signals from an Aircraft Liferaft:

Survival equipment normally includes either one or a combination of the following radio or visual facilities:

(a) A 406 MHz radio distress beacon (The 406 MHz frequency is monitored by the COSPAS-SARSAT satellite system alone.)

(i) Radio beacons which are buoyant, water resistant, portable devices, normally activated by immersion in water and are capable of being operated away from the aircraft by unskilled persons. By international agreement, this type is mandatory equipment for aircraft on extended over-water flights.

(ii) Emergency Locator Transmitters (ELTs): there are two main types - those attached to the aircraft structure and either automatically ejected or permanently mounted. Both of these are automatically activated. Then there is the automatic portable type, which is normally fixed inside the aircraft but can be removed by survivors for use away from the aircraft.

(iii) Personal Locator Beacons (PLBs), which are designed to be carried by survivors and not intended to be fixed to the aircraft. Location of the beacon position is by satellite and/or by aircraft using Direction Finding (D/F) equipment.

(b) Light signalling by means of a lamp and hand key, or handheld reflecting mirror.