MARINE RADIO OPERATOR'S HANDBOOK

2013 Edition

Produced by the
Australian Maritime College

acma
Australian Communications and Media Authority

UNIVERSITY of TASMANIA
AMC
Australian Maritime College

BLUE WATER
SAILING SCHOOL

FOREWORD

This handbook is intended for the guidance of radio operators:

(a) on Australian vessels which are compulsorily fitted with marine radiotelephony, marine radiotelephony with digital selective calling capability, and/or Inmarsat satellite communications, in accordance with State or Territory government legislation; or

(b) on Australian vessels which are voluntarily fitted with marine radiotelephony, marine radiotelephony with digital selective calling capability, and/or Inmarsat satellite communications; or

(c) at limited coast stations, particularly those operated by marine rescue organisations.

It is the recommended textbook for candidates undertaking examination for the Marine Radio Operators Certificate of Proficiency (MROCP), the Marine Radio Operators VHF Certificate of Proficiency (MROVCP), and the Marine Satellite Communications Endorsement.

Procedures and requirements outlined in the handbook are based on the International Radio Regulations formulated by the International Telecommunication Union (ITU), on provisions governing the use of radio transmitters in Australia laid down in the *Radiocommunications Act 1992*, and on radiocommunications station licence conditions set by Australian Communications and Media Authority (ACMA).

Careful observance of the procedures covered by this handbook is essential for the efficient exchange of communications in the marine radiocommunications service, particularly when the safety of life at sea is concerned. Special attention should be given to those sections dealing with distress, urgency and safety.

It should be noted that no provision of this handbook, the *International Radio Regulations*, or the *Radiocommunications Act 1992,* prevents the use by a vessel in distress of any means at its disposal to attract attention, make known its position and obtain help.

Similarly, no provision of this handbook, the International Radio Regulations, or the *Radiocommunications Act 1992,* prevents the use by vessels engaged in search and rescue operations of any means at their disposal to assist a vessel in distress. This edition of the *Marine Radio Operators Handbook* reflects the new arrangements for maritime communication stations from 1 July 2002. These arrangements include substantial changes to the frequencies monitored by these stations for distress and safety, and changed requirements for ships wishing to participate in the AUSREP reporting system.

It also contains information about the Global Maritime Distress and Safety System (GMDSS) marine communications techniques which are available for use by small vessels in Australia. The system uses advanced technology and automation to ensure that search and rescue authorities, as well as ships in the vicinity of an emergency, are alerted reliably and rapidly. Both satellite and terrestrial communications form essential components of the GMDSS.

The Australian Maritime College acknowledges the contribution of ACMA, Australian Maritime Safety Authority (AMSA), the Bureau of Meteorology, Telstra, and the Governments of the States and the Northern Territory in the preparation of this Handbook.

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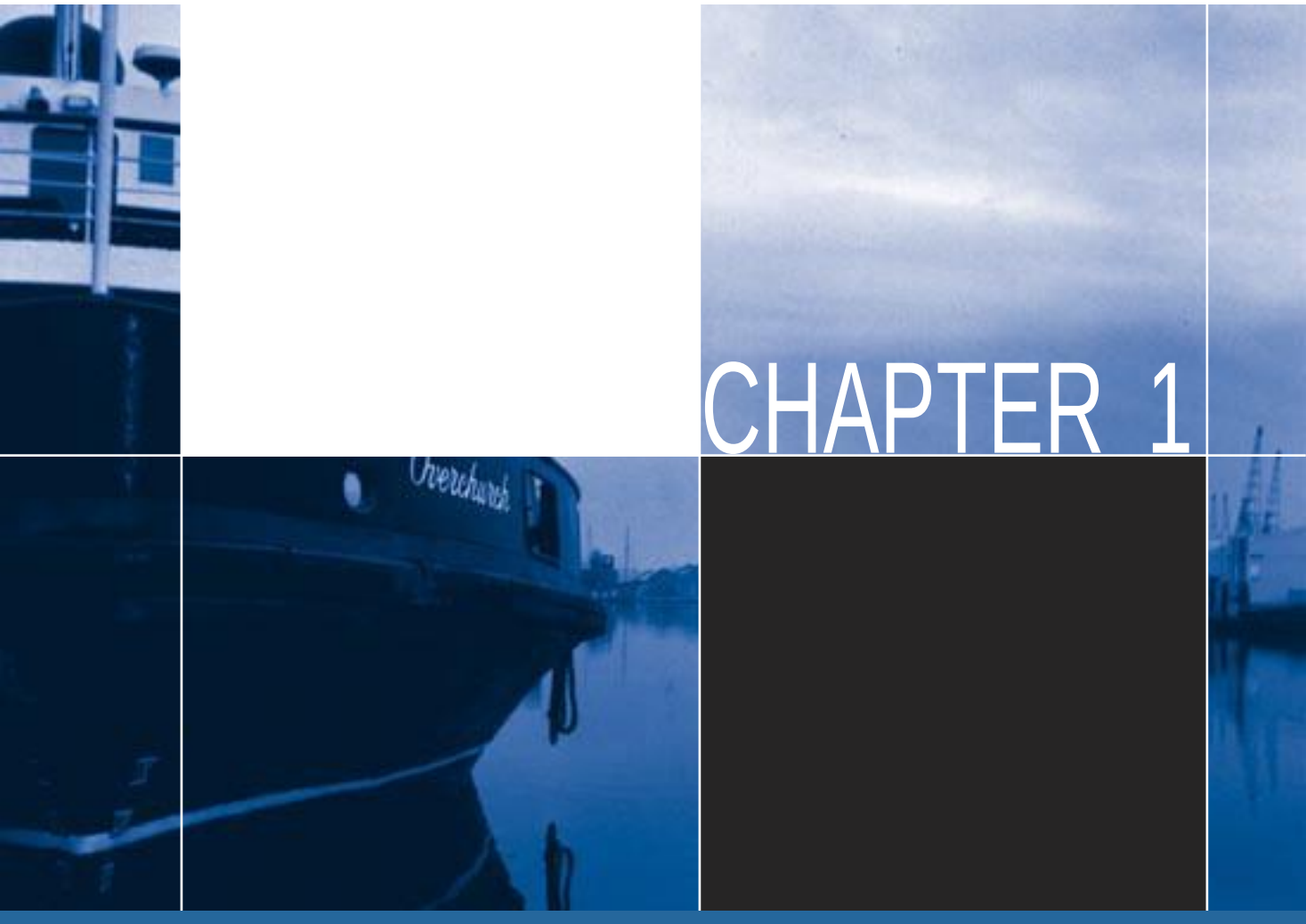
General



CHAPTER 1

SECTION 1 SHIP STATION OPERATORS

1. OPERATORS' QUALIFICATIONS

1.1 Australia is a member of the International Telecommunication Union (ITU). This body regulates radio frequency usage, and the operations and use of radiocommunications equipment on a world-wide basis.

1.2 Operators of ship stations other than those operating exclusively in the 27 MHz marine band, must possess a certificate of proficiency issued in accordance with ITU regulations and the *Australian Radiocommunications Act 1992*, or a certificate considered to be of an equivalent or higher standard.

1.3 Operators on vessels that are subject to State or Territory legislation should ensure that they are qualified under that legislation.

1.4 Provided the ship radio station is under the control of a person holding a relevant certificate, persons other than the holder of the certificate may operate the equipment.

1.5 Operators of ship radio stations using equipment operating exclusively in the 27 MHz marine band are exempt from operator qualification requirements. However, in the interests of safety, ACMA strongly recommends that these operators qualify themselves with at least the Marine Radio Operators VHF Operators Certificate of Proficiency.

1.6 Operators of limited coast stations using VHF and/or MF/HF marine bands are required to hold a certificate of proficiency. The minimum qualification is relevant to the equipment fitted at the station and is as shown in the table on page 3.

1.7 Holders of the Restricted Radiotelephone Operators Certificate of Proficiency (RROCP), and the earlier 3rd Class Commercial Operators Certificate of Proficiency will continue to be legally qualified even though their radiocommunications equipment may incorporate digital selective calling facilities. However, such persons will need to additionally qualify for the Marine Satellite Communications Endorsement if operating Inmarsat types A, B or C equipment.

1.8 Operators on small vessels which are compulsorily equipped with radio equipment under the provisions of the *Commonwealth Navigation Act 1912*, are required to hold a minimum of the Global Maritime Distress and Safety System General Operators Certificate of Proficiency, issued by the Australian Maritime Safety Authority (AMSA). Further details of this qualification may be obtained from any AMSA office.

The minimum requirements for operators on vessels other than those subject to the Commonwealth Navigation Act1912 are:

Equipment carried on vessel	Minimum operator qualifications
VHF marine radiotelephony ONLY (with or without digital selective calling facilities)	• Restricted Radiotelephone Operators Certificate of Proficiency OR • 3rd Class Commercial Operators Certificate of Proficiency OR • Marine Radio Operators Certificate of Proficiency OR • Marine Radio Operators VHF Certificate of Proficiency
VHF marine radiotelephony (with or without digital selective calling facilities) PLUS MF/HF marine radiotelephony (with or without digital selective calling facilities)	• Restricted Radiotelephone Operators Certificate of Proficiency OR • 3rd Class Commercial Operators Certificate of Proficiency OR • Marine Radio Operators Certificate of Proficiency
VHF marine radiotelephony (with or without digital selective calling facilities) PLUS Inmarsat A, B or C satellite equipment	• Restricted Radiotelephone Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • 3rd Class Commercial Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • Marine Radio Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • Marine Radio Operators VHF Certificate of Proficiency with Marine Satellite Communications Endorsement
VHF marine radiotelephony (with or without digital selective calling facilities) PLUS MF/HF marine radiotelephony (with or without digital selective calling facilities) PLUS Inmarsat B, C or Fleet 77 satellite equipment OR MF/HF marine radiotelephony (with or without digital selective calling facilities) PLUS Inmarsat B, C or Fleet 77 satellite equipment	• Restricted Radiotelephone Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • 3rd Class Commercial Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • Marine Radio Operators Certificate of Proficiency with Marine Satellite Communications Endorsement
Inmarsat B, C or Fleet 77 satellite equipment ONLY	• Restricted Radiotelephone Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • 3rd Class Commercial Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • Marine Radio Operators Certificate of Proficiency with Marine Satellite Communications Endorsement OR • Marine Radio Operators VHF Certificate of Proficiency with Marine Satellite Communications Endorsement

2. EXAMINATION FOR THE MARINE RADIO OPERATORS CERTIFICATE OF PROFICIENCY, THE MARINE RADIO OPERATORS VHF CERTIFICATE OF PROFICIENCY, AND THE MARINE SATELLITE COMMUNICATIONS ENDORSEMENT

2.1 Currently examination and certification services for the two certificates and the satellite endorsement are provided through the Office of Maritime Communications (OMC) at the Australian Maritime College on behalf of the Australian Communications and Media Authority. In this handbook, the Office of Maritime Communications will be referred to as the OMC, the Australian Maritime College the AMC, and the Australian Communications and Media Authority as ACMA.

2.2 Syllabi for the two certificates and the satellite endorsement are shown in Appendix 1 of this handbook. Examination questions will primarily be based on symbolised sections as follows:

a) Marine Radio Operators VHF Certificate of Proficiency (MROVCP) ♦

b) Marine Radio Operators Certificate of Proficiency (MROCP) ●

c) Marine Satellite Communications Endorsement (Satcom) ■

2.3 An examination will normally consist of a written exercise.

2.4 At the discretion of the OMC, candidates may undertake an oral rather than a written test.

2.5 The OMC will only issue the Marine Satellite Communications Endorsement to a successful candidate providing the following conditions are met:

a) that the candidate already holds one of the following certificates of proficiency:

- Restricted Radiotelephone Operators Certificate of Proficiency
- 3rd Class Commercial Operators Certificate of Proficiency
- Marine Radio Operators Certificate of Proficiency
- Marine Radio Operators VHF Certificate of Proficiency
- First Class Commercial Operators Certificate of Proficiency
- Second Class Commercial Operators Certificate of Proficiency
- Radiocommunications Operators General Certificate of Proficiency
- An overseas qualification considered by the ACMA to be an equivalent of one of the above;

b) that this certificate is submitted to the OMC with the candidate's examination papers; and

c) that the candidate is sixteen years of age or over.

Alternatively:

(i) that the candidate is successful at an examination for the Marine Radio Operators Certificate of Proficiency or the Marine Radio Operators VHF Certificate of Proficiency; and

(ii) that the candidate's examination papers from this examination are submitted to the OMC at the same time as the candidate's examination papers for the Marine Satellite Communications Endorsement; and

(iii) that the candidate is sixteen years of age or over.

2.6 Candidates for the Marine Satellite Communications Endorsement who have lost the certificate of proficiency, needing to be endorsed, may submit an application and fee for a replacement certificate at the same time as sitting for the Endorsement. The Endorsement will not be issued if no record can be found of the certificate to be replaced. Paragraphs 3.4 to 3.9 provide more information about replacement of certificates.

2.7 Persons wishing to upgrade their qualification must contest the entire examination relevant to the desired certificate. 'Conversion' examinations are not available.

3. CANDIDATE ELIGIBILITY AND REPLACEMENT OF OPERATORS CERTIFICATES

3.1 Candidates of all ages will be accepted for examination. Certificates of proficiency and endorsements will be issued to successful candidates.

3.2 As current legislation does not permit the issue of a certificate of proficiency to a candidate under the age of sixteen, successful candidates who have not reached this age at the time of examination will be issued with their certificate shortly after their sixteenth birthday. Under-age candidates who successfully contest the Marine Satellite Communications Endorsement will not be provided with the Endorsement until eligible to be issued with a relevant certificate of proficiency.

3.3 All candidates are required to produce proof of identity and age at the time of examination.

3.4 If an operator's certificate or endorsement is lost, mutilated or destroyed, or a change of name has occurred, the holder may obtain a replacement by making written application to the OMC.

3.5 In the case of loss or destruction, the application must be accompanied by a statutory declaration setting out the circumstances of the loss. The statutory declaration must also contain a statement that, if the original certificate or endorsement is subsequently found, it will be returned to the OMC.

3.6 Statutory declarations must be signed in the presence of, and witnessed by any person prescribed in the relevant Commonwealth legislation. In most circumstances, statutory declarations can be signed and witnessed at an ACMA regional office.

3.7 Where issue of a replacement certificate or endorsement is required because of damage or change of name, the original certificate or endorsement should accompany the application. In the case of change of name, documentary proof of the change should be included; for example, a marriage certificate or deed poll document.

3.8 A fee is charged for the replacement of a certificate or endorsement.

3.9 It is in the interests of candidates applying for a replacement for a lost certificate or endorsement to provide information regarding the place and approximate date of original issue.

4. APPLICATION FOR EXAMINATION

4.1 An application to be examined for a certificate or endorsement can be made to the OMC.

4.2 Examinations for the Marine Radio Operators Certificate of Proficiency and the Marine Radio Operators VHF Certificate of Proficiency are conducted by appointment and may be held at any location suitable for examination purposes. Many marine rescue organisations, boating clubs and colleges of technical and further education (TAFE) conduct examinations on behalf of the OMC. In special circumstances examinations may be held at ACMA offices.

4.3 Examinations for the Marine Satellite Communications Endorsement cannot be conducted at an ACMA office and are only available at organisations with suitable Inmarsat equipment available for training.

4.4 Examination fees are charged.

5. OPERATOR TRAINING

5.1 Many marine rescue organisations, boating and fishing clubs, maritime colleges and some colleges of technical and further education (TAFE) provide training courses leading to the Marine Radio Operators Certificate of Proficiency and the Marine Radio Operators VHF Certificate of Proficiency.

5.2 Some maritime and TAFE colleges provide training courses leading to the Marine Satellite Communications Endorsement.

5.3 The ACMA regional offices or the OMC may be able to provide information about local training organisations.

5.4 Persons using this handbook as a study guide should note that much of its content is non-examinable. Careful reference should be made to the detailed examination syllabi shown in Appendix 1.

SECTION 2 USE OF SHIP RADIO STATIONS

6. SHIP STATION LICENCES

6.1 Under the *Radiocommunications Act 1992*, the operation of marine radio equipment aboard any Australian vessel must be authorised by a licence.

6.2 In the case of shipboard radio equipment operating in the 27 MHz and VHF marine bands, this authorisation is provided to any person by means of a maritime ship station class licence. The class licence does not have to be applied for and is free of charge. The maritime ship station class licence also authorises the operation of ship's radar equipment and on-board UHF marine communications equipment.

6.3 Frequencies authorised for use, technical and general requirements for the operation of 27 MHz, VHF, radar and UHF on-board marine equipment are shown in the *Radiocommunications (Maritime Ship Station - 27 MHz and VHF) Class Licence 2001*. Operators of this equipment are legally obliged to observe the conditions set out in this document. ♦● Copies of the Class Licence may be obtained from ACMA's Internet site *(http://www.ACMA.gov.au)* or from any ACMA regional office.

6.4 The operation of shipboard Inmarsat satellite radio terminals is authorised by another class licence. The class licence is free of charge and does not need to be issued individually.

6.5 Technical and general requirements for the operation of shipboard Inmarsat terminals are shown in the *Radiocommunications (Communications with Space Object) Class Licence 1998*. Operators of this equipment are legally obliged to observe the conditions set out in this document. Copies of the Class Licence may be obtained from ACMA's Internet site *(http://www.ACMA.gov.au)* or from any ACMA regional office.

6.6 The operation of shipboard radio equipment operating in MF/HF marine bands is not authorised by a class licence. Individual apparatus licences that attract a fee are required.

6.7 Application for a MF/HF ship station (class B) licence may be made in person at any ACMA regional office. Alternatively, a completed application form together with the licence fee may be submitted by mail or through ACMA's on-line licensing service.

6.8 A MF/HF marine licence shows the station licensee, the name and the call sign of the vessel. Frequencies authorised for use, technical and general requirements are detailed in *ACMA's Radiocommunications Licence Conditions (Maritime Ship Licence) Determination*. The station licensee is legally obliged to observe licence conditions set out in this document. ● Copies of the Determination may be obtained from ACMA's Internet site (http://www.ACMA.gov.au) or from any ACMA regional office.

6.9 By mutual agreement, a MF/HF ship station (class B) licence may be transferred from one person or organisation to another person or organisation. However, restrictions may apply where the original licence holder is exempt from licence fees or pays a confessional licence fee. Further information and applications for transfer are available at any ACMA regional office. A fee for licence transfer applies.

6.10 A MF/HF ship station (class B) licensee should contact the ACMA if:

a) a new vessel with radiocommunications equipment is purchased; or

b) there is a change of the licensee's address.

6.11 Operators of shipboard radio equipment operating in the VHF and MF/HF marine bands, and operators of most Inmarsat satellite radio terminals are required to hold appropriate personal qualifications. Details of the minimum qualification requirements are shown in Page 3.

6.12 Neither class licences nor a MF/HF ship station (class B) licence authorises the operation of a "home base". Except in special cases, marine radio equipment in private residences will not be authorised by ACMA. ♦●

7. LICENSING OF OTHER SHIPBOARD RADIOCOMMUNICATIONS EQUIPMENT

7.1 The *Radiocommunications Act 1992* requires that the possession and operation of all radio transmitters are authorised by a licence. Licences are not required for the operation of satellite navigation receivers (GPS).

7.2 Amateur band transmitting equipment installed on a vessel must be licensed separately. Licences for Amateur band equipment will not be issued to any person who does not hold an appropriate Amateur operator's certificate of proficiency.

7.3 Emergency Position Indicating Radio Beacons (EPIRBs), mobile phones and Citizens Band (CB) transceivers aboard vessels are authorised by class licences issued under the *Radiocommunications Act 1992* and do not require individual licensing.

8. AUTHORITY OF THE MASTER

8.1 A ship radio station and the service it provides is placed under the authority of the master, skipper, or the person responsible for the safety of the vessel. ♦●

9. INSPECTION OF SHIP STATIONS

9.1 ACMA officers may ask that a ship radio station be made available for inspection to ascertain that licence conditions are being met.

9.2 Licensees of vessels travelling overseas should be aware that the competent authorities in any country where the vessel may visit, may ask to inspect the ship station licence and the radio qualification of the operator. Failure to produce these documents may result in an inspection by these authorities to satisfy themselves that the radio station conforms to the requirements of the International Radio Regulations. Licensees of vessels proceeding overseas carrying 27 MHz, VHF and Inmarsat marine radio equipment should carry copies of the relevant class licences.

10. SECRECY OF COMMUNICATIONS

10.1 Under the International Radio Regulations, an operator and any other person who becomes acquainted with the contents of a radiotelegram, radiotelephone call or radiotelex call is placed under an obligation to preserve the secrecy of such information. ♦●

10.2 Secrecy restrictions do not apply to distress, urgency or safety alerts or messages, or any message that is addressed to "all stations". ♦●

11. DISTRESS CALLS

11.1 The obligation to accept distress alerts, calls and messages is absolute and such messages must be accepted with priority over all other radiocommunications. ♦●

12. FALSE OR DECEPTIVE DISTRESS, URGENCY OR SAFETY SIGNALS

12.1 The transmission of false or deceptive distress, urgency or safety signals is strictly forbidden. Extremely severe penalties, including imprisonment, exist under the *Radiocommunications Act 1992* for any person found guilty of making such a transmission. ♦●

13. UNNECESSARY TRANSMISSIONS

13.1 Transmissions should be as brief as possible consistent with the legitimate requirement for which a station is licensed. Non essential remarks, bad language and unnecessary conversations should be avoided. ♦●

13.2 It is an offence under the *Radiocommunications Act 1992* to use a transmitter in a manner that is likely to cause a reasonable person to be seriously alarmed or affronted, or for the purpose of harassing a person. ♦●

14. AVOIDANCE OF INTERFERENCE

14.1 Operators should take every precaution to ensure that their transmissions will not cause harmful interference to other stations. It is important that all operators:

>> listen before transmitting to ensure the frequency is not already in use;

>> use the minimum transmitting power necessary for reliable communications;

>> strictly observe the purpose for which a frequency is assigned; and

>> keep test signals to a minimum. ♦●

15. DOCUMENTS TO BE HELD ON BOARD

15.1 In addition to the station licence and operator's certificate, a copy of this handbook and material suitable for use as a radio log book should be held aboard a vessel. ♦●

15.2 It is also recommended that information about the operating hours of, and frequencies monitored by, limited coast stations in the areas the vessel is travelling through should be available aboard to facilitate radio communications. This information should be available from the relevant State/ Territory authority or volunteer marine rescue organisation.

16. LOG KEEPING

16.1 Operators should keep a record of all distress alerts and messages transmitted or received. Particulars should include the station or stations with which the messages were exchanged, the frequencies used and the date and times of transmission and reception. ♦●

16.2 Log keeping requirements for vessels compulsorily fitted with radio equipment under Commonwealth or State legislation may be found in the relevant regulations.

16.3 A suggested format for a radio log book page is shown in Appendix 2.

17. SHIP STATION CALL SIGNS AND IDENTITIES

17.1 A MF/HF ship station (class B) licence issued by the ACMA will show the official international call sign allocated to the vessel.

17.2 Each call sign is unique and is formed in one of two ways:

>> three letters, followed by four numbers; or

>> four letters. ♦●

17.3 In conformity with Australia's international call sign allocation, the first two letters will always be AX, VZ, VH, or in the series VJ to VN.

17.4 Four letter call signs are allocated only to vessels subject to compulsory radio installation under the *Navigation Act 1912* (generally commercial vessels making interstate and overseas voyages).

17.5 On request a Maritime Mobile Service Identity (MMSI) will be issued by the Australian Maritime Safety Authority (AMSA) to a ship station licensee with an installation capable of digital selective calling techniques. See the AMSA website for more information. *(http://www.amsa.gov.au/AUSSAR/mmsi.html#form)*.

17.6 Transmissions from radio equipment aboard survival craft should be identified by the use of the parent vessel's call sign followed by two numbers (not 0 or 1). The numbers "22" are normally used. ♦●

17.7 Stations operating exclusively on VHF marine bands now operate under a 'class licence' and as such a radio call sign issued previously by ACMA is now not required (see paragraph 6.3). Operators should use the name of the vessel or other suitable means of identification. Vessels which were licensed prior to 1 July 2001 may continue to use the call sign issued by the then ACA or its predecessor, while licensee contact and vessel details remain unchanged. ♦●

18. SHIP STATION IDENTIFICATION

18.1 Transmissions without identification are forbidden. ♦●

18.2 A MF/HF ship station must be identified either by the use of the official international call sign allocated by ACMA or by the ship's name or, preferably, a combination of both. If using digital selective calling the vessel's MMSI will automatically be inserted into the transmission. ●

18.3 Ship stations operating exclusively on 27 MHz and/or VHF marine bands may use the vessel's name or other suitable identification. Vessels which were licensed prior to 1 July 2001 may continue to use the call sign issued by ACMA while the ownership of the vessel, licensee contact and vessel details remain unchanged.

18.4 If transmitting radiotelephony distress, urgency or safety messages, or if involved in search and rescue operations, the utmost care must be taken to avoid confusion between vessels of the same or similar names. ♦●

18.5 If transmitting radiotelephony distress, urgency or safety messages, or if involved in search and rescue operations, the use of an official call sign is necessary to avoid confusion between vessels of the same or similar names. If no call sign is available then the full name or registered number followed by port at which the name or registration is recorded can assist in positively identifying the vessel. If the vessel is not registered then other identification such as the trailer or parked vehicle registration number followed by the ramp location where the vehicle is can help to identify the owner in an emergency. ♦●

SECTION 3 MONITORING OF RADIOTELEPHONY FREQUENCIES (WATCHKEEPING)

19. MONITORING OF RADIOTELEPHONY DISTRESS AND CALLING FREQUENCIES

19.1 Ship stations are encouraged to keep maximum practicable watch on the radiotelephony distress and calling frequencies appropriate to their location and the type of marine radiocommunications equipment fitted, particularly during silence periods. ◆●

19.2 Watchkeeping requirements for vessels compulsorily fitted with radio equipment under State legislation may be found in the relevant regulations.

19.3 Aural watchkeeping has been replaced by digital selective calling watchkeeping by maritime communication stations.

20. RADIOTELEPHONY SILENCE PERIODS

20.1 International regulations no longer require silence periods to be observed on the distress and calling frequencies. ◆●

20.2 However, to increase the safety of life at sea in Australia, two three-minute periods of radiotelephony silence should be observed in each hour. ◆●

20.3 Radiotelephony silence periods start on the hour and continue to three minutes past the hour, and on the half hour until thirty-three minutes past the hour. ◆●

20.4 With the exception of distress calls and messages, all aural transmissions from all stations should cease during these periods. ◆●

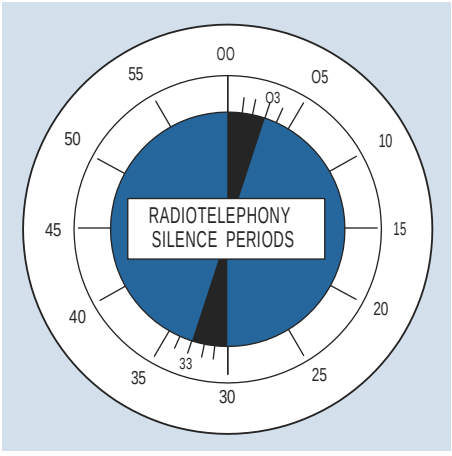
20.5 It is the practice in all Australian waters to observe silence periods on the radiotelephony distress frequencies of either 2182, 4125, 6215, 8291, 12 290, 16 420 kHz and VHF channel 16. ◆●

20.6 During periods of normal working, a weak distress signal may not be heard. Silence periods increase the chances of a distressed vessel's signals being heard by other stations.

20.7 It is important that ship station operators have access to an accurate clock or watch to ensure correct observance of silence periods. An accurate clock is also useful to record the time at which communication occurred, particularly in emergency situations.

20.8 In some locations in Australia silence periods are observed on 27 MHz marine frequencies.

20.9 Silence periods are not observed on the MF/HF DSC frequencies and VHF DSC channel.



SECTION 4 FREQUENCIES - GENERAL INFORMATION

21. USE OF FREQUENCIES

21.1 A ship station may use only the frequencies that are authorised for its particular activity (for example, pleasure, professional fishing, etc.). These frequencies are detailed in ACMA's Radiocommunications Licence Conditions (Maritime Ship Licence) Determination No.1 of 1997 and the *Radiocommunications (Maritime Ship Station - 27MHz and VHF) Class Licence 2001*. (See Appendix 3) Except in the case of distress, the use of any other frequency is not permitted. Offenders may be subject to penalties under the provisions of the *Radiocommunications Act 1992.*

◆●

21.2 It is important that frequencies are used only for the purpose for which they are assigned, for example, a frequency shown for communicating with maritime communication or limited coast stations must not be used for communicating with other vessels.

22. CONTROL OF COMMUNICATIONS

22.1 During routine communications between a ship station and a maritime communication or limited coast station, the maritime communication or limited coast station controls the working. In order that communications may be exchanged efficiently, all instructions given by maritime communication and limited coast stations should be obeyed without delay. However, this does not prevent a ship station making a suggestion concerning a working frequency or other on-air operations. ◆●

22.2 Ship stations must not interfere with maritime communication or limited coast station communications. ◆●

22.3 During routine communications between ship stations, the called ship station controls the subsequent exchange of communications. ◆●

23. TEST TRANSMISSIONS

23.1 When it is necessary for a ship station to transmit signals for testing or making technical adjustments which are likely to interfere with the working of a nearby maritime communication or limited coast station, the prior consent of that station should be obtained. ◆●

23.2 All testing signals should be kept to a minimum, particularly on frequencies used for distress, urgency and safety purposes. ◆●

23.3 The requirement to minimise testing does not prevent a ship station making a brief transmission to a local limited coast station to confirm correct equipment operation before the vessel puts to sea.

24. RADIOTELEPHONY CALLING AND WORKING FREQUENCIES

24.1 Radiotelephony frequencies assigned to ship, maritime communication and limited coast stations are categorised as either calling or working:

>> calling frequencies are used to establish communications with maritime communication, limited coast and other ship stations; and

>> working frequencies are used to exchange messages relating to the operation and movement of vessels and to conduct public correspondence communications. ◆●

24.2 All stations may establish communications with the desired station by using a radiotelephony calling frequency. Once communications have been established, communications should be transferred to a working frequency and the messages exchanged. At the conclusion of working, stations should resume monitoring of the appropriate calling frequency. ◆●

24.3 The majority of radiotelephony calling frequencies are also assigned for distress, urgency and safety call purposes. This enables ship stations to monitor a single frequency for routine calling from other stations and for safety of life at sea purposes. ◆●

24.4 Limited coast stations may monitor several of these dual-purpose frequencies. Maritime communication stations only monitor HF digital selective calling frequencies. ◆●

24.5 It is essential that calling frequencies are not used for the exchange of routine messages. ◆●

25. RADIOTELEPHONY CALLING FREQUENCIES

Please refer to important note at commencement of Section 6 (page 20)

25.1 The main radiotelephony frequencies for establishing routine communications with an Australian limited coast station or another ship are:

>> 2182, 12 359 and 16 537 kHz in the MF/HF marine bands; ●

>> Channels 16 and 67 in the VHF marine band; (VHF channels only) ◆● and

>> 27.88 and 27.86 MHz (channels 88 and 86) in the 27 MHz marine band.

25.2 Ship stations wishing to attract the attention of Australian Maritime Communication stations must use digital selective calling (DSC) equipment and dedicated HF DSC frequencies for distress, urgency and safety alerting: 4207.5, 6312, 8414.5, 12 577, and 16 804.5 kHz. ●

25.3 Certain other radiotelephony frequencies are monitored by some limited coast stations and may be used for establishing communications. Details of these frequencies are shown in Appendix 3. ◆●

25.4 In Australia, all radiotelephony distress and calling frequencies or channels are used in the SIMPLEX mode with transmission and reception taking place on the same frequency, enabling all stations to monitor a single frequency. ◆●

25.5 VHF channel 70 may be used for establishing routine communications using digital selective calling techniques. Further information may be found in paragraphs 86.1 - 86.4. ◆●

26. RADIOTELEPHONY WORKING FREQUENCIES

26.1 Details of radiotelephony frequencies to be used for working with Australian Maritime Communication Stations are shown in Appendix 3. ●

26.2 Details of radiotelephony frequencies to be used for working with limited coast stations and other vessels are shown in Appendix 3. ◆●

26.3 The frequencies used by the Bureau of Meteorology for transmission of Weather Forecasts and Warnings should no longer be used as working frequencies, even when weather broadcasts are not being made. The weather broadcasts are now on an automatic schedule. There will not be any announcement (on a calling frequency) that the broadcast will start. There is no provision for the Bureau of Meteorology to monitor the frequency prior to the commencement of the broadcast. ●

26.4 Many of the frequencies designated for working with maritime communication stations are allocated in pairs, with transmission and reception taking place on different frequencies; i.e. DUPLEX, see page 17. ◆●

26.5 All ship to shore and shore to ship working frequencies in the HF and VHF marine bands are allocated an international channel number. In the interests of brevity and accuracy, ship station operators are encouraged to refer to channel numbers rather than frequencies. Details of channel numbers may be found in the ITU radio regulations. ◆●

27. PHONETIC ALPHABET AND FIGURE CODE

27.1 In cases of doubtful reception or difficult conditions when passing any radiotelephony message, ship station operators should spell out words and figures using the International Phonetic Alphabet and figure code. Details may be found in Appendix 5. ◆● (Phonetic alphabet only)

27.2 Use of the phonetic alphabet is particularly important when handling radiotelephony messages concerning the safety of life at sea. ◆●

28. INFORMATION FOR MARITIME COMMUNICATION, COAST RADIO STATIONS AND LIMITED COAST STATIONS

28.1 Ship station operators are encouraged to provide departure, positional and arrival information to a maritime communication station, coast radio station or limited coast stations operated by marine rescue organisations. ◆●

28.2 If undertaking a lengthy voyage, a position report should be passed daily to a maritime communication station, coast radio station or limited coast station operated by a marine rescue organisation. ◆●

28.3 This information may provide valuable assistance to search and rescue authorities should an emergency situation occur.

28.4 The attention of small vessel operators is drawn to the Australian Ship Reporting System (AUSREP). More detailed information concerning this system is provided in paragraphs 118.1 - 118.9.

29. RESTRICTIONS TO THE USE OF RADIO EQUIPMENT ON SHIPS

29.1 Ship station licences authorise the use of radio equipment only aboard vessels at sea or on inland waters. ◆●

29.2 However, if a vessel is anchored or moored, the use of the ship's radio station to communicate with the nearest maritime communication, coast radio station or limited coast station is permitted providing the lowest practicable transmitting power is used. ◆●

29.3 Due to the risk of explosion, radio transmissions must not be made when a vessel is loading fuel, or when loading or discharging any flammable cargo. ◆●

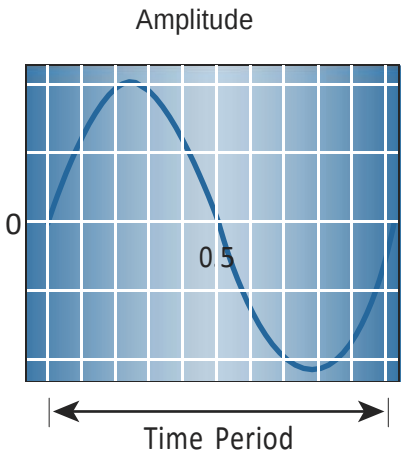
29.4 Some overseas communications authorities forbid the use of marine communications equipment whilst in 'port limits'. ◆●

Radio Propagation

CHAPTER 2

SECTION 5 FREQUENCY CHARACTERISTICS

FREQUENCY BANDS (SEE APPENDIX 3 TABLE 15)



One cycle of a sinusoidal waveform is shown. This occurs in one Time Period, measured in seconds.

The frequency of the waveform is measured in the number of cycles which occur in one second, known as a Hertz.

There are 1000 hertz to the kHz, (kiloHertz)

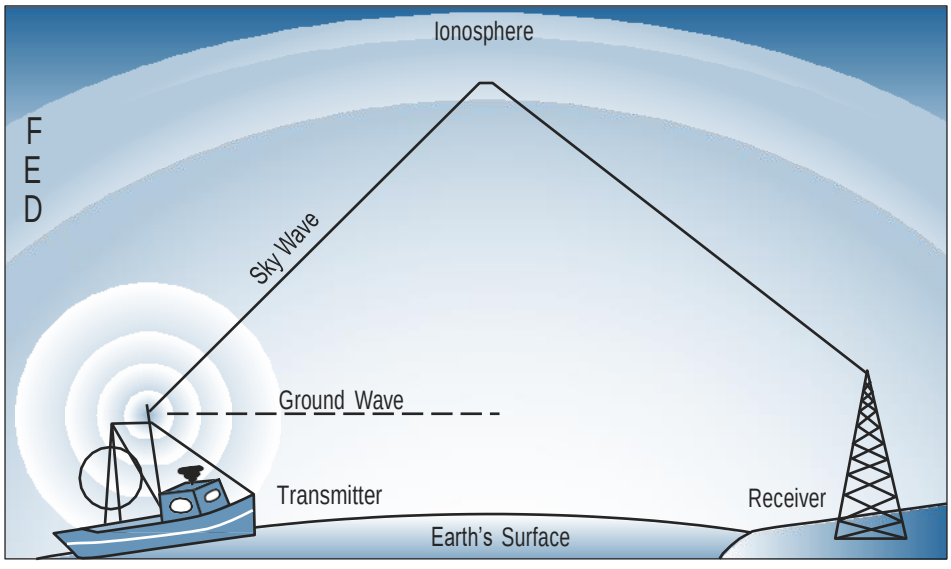
There are 1,000,000 hertz to the MHz (MegaHertz)

There are 1,000,000,000 hertz to the GHz (GigaHertz)

The radio spectrum has been divided into frequency bands. Marine radio equipment operates mostly in the Medium Frequency (MF), High Frequency (HF) and Very High Frequency (VHF) bands.

Medium Frequency	300 – 3000 kHz (or 3 MHz)
High Frequency	3 – 30 MHz and
Very High Frequency	30 – 300 MHz.

30. THE IONOSPHERE:



MF and HF Propagation

30.1 Lying between 80 to 350 km above the Earth's surface are a series of gaseous layers known as the Ionosphere. These gaseous layers become energised or ionised by the sun's rays, e.g. ultra-violet or x-rays. ♦ ●

30.2 There are many variables that effect this radiation, namely the time of day, the seasons and solar flares or sunspots. ♦ ●

30.3 There are three ionised layers in the ionosphere. These layers are designated by the letters D, E and F. During the daytime the ionosphere consists of the D, E, and F layers (the F layer being subdivided into the F1 and F2 layers). At night the important layers are the E and F (or F2) layers, as the D layer becomes de-ionised and less effective. ♦ ●

31. RADIO PROPAGATION

31.1 Electromagnetic energy emanating from a radio transmitter antenna radiates in an omni-directional manner. The radiated energy consists of sky waves and ground waves (or that energy that basically follows the curvature of the earth). The ground wave component, travelling across land is absorbed quicker than that travelling over the ocean. The length of the ground wave, or the distance to which the ground wave component travels, is determined by the frequency in use. ♦ ●

31.2 The higher the frequency the shorter the ground wave.

31.3 The sky wave component travels up at many different angles and depending on the frequency in use may be reflected back to earth by the ionosphere.

32. RADIO PROPAGATION AT MF (300 – 3000 KHZ)

32.1 During the daytime, at medium frequencies, the sky wave component is not reflected back to earth by the ionosphere. Marine radio communication equipment therefore makes use of the ground wave for communications purposes. Typical ranges are from 100 to 400 nautical miles. ●

32.2 At night time the sky wave component of the wave is reflected back to earth at a far greater distance than that covered by the ground wave, so that only the ground wave can be used for reliable communications. ●

33. RADIO PROPAGATION AT HF (3 – 30 MHZ)

33.1 During the daytime, at HF, the sky wave component of the transmitted frequency is reflected back to earth. The distance at which the reflected energy is received is determined by the frequency selected. In the HF band of frequencies marine communications equipment offers the operator a choice of frequencies in the 4, 6, 8, 12 and 16 MHz bands. ●

33.2 At night-time the HF sky wave is still reflected back to earth but at a greater distance than during the day time. A lower frequency would be required to cover the same range that a higher frequency was required for during the daytime. ●

33.3 Generally speaking the greater the range or distance required for communications, the higher the frequency that must be used. Long-range communications is therefore possible by using the higher frequencies in the HF bands. ●

33.4 MF/HF marine radio equipment offers the operator the choice of frequencies in the various bands. This allows the operator to select a frequency which will be suitable for the distance over which communication is required, at any time of day or season.

33.5 Less long range interference will be experienced on the lower frequencies, and in tropical waters high static levels may make communications difficult or impossible at times. The correct selection of frequency is the lowest frequency that will provide satisfactory communications with the desired station. However, this is often a matter of experience rather than "textbook" knowledge.

34. RADIO PROPAGATION AT 27 MHZ MARINE FREQUENCIES

34.1 The 27 MHz sky wave radio energy is not reliably reflected by the ionosphere back down to the earth's surface. Thus communications at 27 MHz basically makes use of the ground wave component over short distances. However, occasionally the sky wave component is reflected back to earth at considerable distances. Some operators refer this to making use of the 'skip'. That distance between where the energy departs the transmitting antenna and where it is received on the earth's surface.

35. RADIO PROPAGATION AT VHF: (30 – 300 MHZ)

35.1 During the daytime or night-time any sky wave radio energy transmitted at VHF is not reflected back to earth. Marine communications makes use of the so called 'ground wave' component at VHF or that energy that basically follows the curvature of the earth for a short distance. Under normal conditions range at VHF is said to be slightly greater than the visual line of sight, and determined by the combined height of the transmitting and receiving antenna over an all water path. Range at VHF is therefore said to be only effective for short distances.

During certain atmospheric conditions, particularly during the summer months, the 'ground wave', may be refracted round the earth's surface for a far greater range than would normally be expected at VHF. This phenomenon is known as 'ducting' and should not be regarded as normal. ♦ ●

35.2 Radio energy at VHF, condensed into a beam, may by used to communicate from the earth's surface to an orbiting satellite. ♦ ●

36. MODES OF COMMUNICATION

36.1 Radiotelephony is the most common mode of transmission for mariners. There are two main types, Amplitude Modulation (AM) and Frequency Modulation (FM). In both these systems the voice signal (audio) is combined with the radio frequency that is required for the transmission to produce the modulated signal. Amplitude modulation produces an upper and a lower sideband either side of a carrier frequency signal which contains identical audio information. This system, sometimes referred to as 'Double Sideband AM', is the form of modulation used by commercial broadcasting stations.

36.2 The Single Sideband Mode of Transmission and Reception:
Single Sideband (SSB) is mandatory on all MF/HF marine frequencies. Marine communications equipment uses the upper sideband (USB). The single sideband mode of communication has two variants, AM compatible and SSB. ●

36.3 AM Compatible (H3E):
The first of these two sideband modes consists of the USB plus a full strength carrier signal. This is known as the AM compatible mode, often referred to as simply AM. International regulations only require the use of AM (H3E) on 2182 kHz for distress, urgency or safety communications where H3E is known as the emission designator for this mode of transmission. Marine communications equipment with a dedicated 2182 kHz button will usually revert to the AM mode when selected. ●

36.4 SSB (J3E):
The second of these two sideband modes is known as SSB (J3E) where J3E is the emission designator for this mode of transmission. This mode is defined as radiotelephony using amplitude modulation single sideband with suppressed carrier. It is often referred to as SSB and is used on all MF/HF marine frequencies. The transceiver operating in the SSB mode will receive both SSB and AM signals. However, the AM signal will have a background tone. The transceiver operating in the AM mode will receive the SSB signal badly garbled and unintelligible. ●

36.5 Digital Selective Calling (DSC):
The Digital Selective Calling (DSC) mode is used on frequencies in the MF, HF and VHF bands. On the medium or high frequencies the transmission consists of a brief burst of data typically five to seven seconds duration by the Narrow Band Direct Printing (NBDP) or telex mode. F1B is the emission designator for this mode of transmission. At VHF the transmission is a short burst of data of approximately 0.5 or half a second duration. ♦ ●

37. SIMPLEX AND DUPLEX COMMUNICATION MODES OF OPERATION

37.1 SIMPLEX

Simplex operation makes use of a single frequency for both transmission and reception. The operator will press the talk button on the microphone in order to transmit, releasing the button enables the operator to receive incoming signals. This also permits all stations to listen on a common frequency (such as during distress traffic and All Station calls). ♦●

37.2 DUPLEX

Duplex operation is when transmission and reception take place simultaneously on two separate but paired frequencies, e.g. for radiotelephone calls taking place on the public network system. Operators usually select an internationally designated channel in the HF band of frequencies for telephone calls. The ship station transceiver is programmed for transmission on frequency A and reception on frequency B. The coast radio station transceiver operating on the same international channel would therefore be programmed to receive frequency A and to transmit on frequency B. ♦●

37.3 The different transmit and receive frequencies allow ship stations fitted with the necessary facilities to transmit and receive simultaneously. Because the transmitter and the receiver are both operating at the same time, radiotelephone calls can be conducted in a similar manner to a telephone call made over the land system, with each party being able to speak and hear at the same time. Ship stations can not communicate with each other using the Duplex mode of operation.

37.4 Most working channels in the MF/HF and VHF marine bands are duplex. The appropriate paired frequencies are pre-programmed into transceivers and selected automatically by use of the channel select control.

37.5 The duplex filter units allowing simultaneous transmission and reception are only usually found on expensive MF/HF and VHF equipment. The use of widely separated antennas, one for transmission and another for reception, may also be required.

37.6 MF/HF and VHF ship stations without the duplex facility must use the paired frequencies alternately, that is, for transmission or reception, but not at the same time. Use of the word "over" to prevent confusion and ensure efficient use of time on air is explained in paragraph 141.5 (See SIMPLEX 37.1).

NOTES

Maritime Communication, Coast Radio and Limited Coast Stations

CHAPTER 3

IMPORTANT NOTE - The Bureau of Meteorology now transmits a range of high seas and coastal weather warnings on a combination of previously used working frequencies and a set of new frequencies. These frequencies are listed in Appendix 3. The forecasts and warnings are automatically generated and broadcast. Vessels will not be able to communicate with these stations as they will only operate as broadcast stations.

Aural monitoring of other MF/HF radiotelephony distress and calling frequencies by limited coast stations continues, but the coverage provided by these limited coast stations may not be complete. Some weather information also continues to be available by radiotelephony from these stations.

Contact the relevant State/Territory authority or your local volunteer marine rescue organisation to find out information about limited coast stations in your area.

Note - Unless otherwise specified the term 'limited coast station' will be used to refer to both the coast radio stations operated by the State/Territory marine authorities and other limited coast stations.

SECTION 6 MARITIME COMMUNICATIONS STATIONS

38. MARITIME COMMUNICATION STATION SERVICES

38.1 Australian maritime communication stations are operated by Transmissions Holdings Limited (THL), previously TVNZ(A). The THL Network Control Centre is co-located with the Australian Rescue Co-ordination Centre (RCC) operated by Australian Search and Rescue (AusSAR) in Canberra. Search and Rescue (SAR) and safety of life at sea services are performed by the RCC on behalf of the Australian Maritime Safety Authority (AMSA). •

38.2 A maritime communication station is a station on land established for the purpose of communicating with vessels at sea. Australian maritime communication stations provide the following services to vessels:

>> search and rescue (SAR) operations in conjunction with the Rescue Co-ordination Centre (RCC) in Canberra (RCC Australia);

>> weather forecasts and warnings for coastal waters and high seas areas from the Bureau of Meteorology transmitted automatically; and

>> continuous automated watch of HF digital selective calling (DSC) frequencies for distress calls for the purpose of safety of life at sea. •

39. LOCATION OF MARITIME COMMUNICATION STATIONS

39.1 Under the current contract with THL radiocommunications to vessels at sea are provided by two maritime communication stations - Wiluna (WA) and Charleville (Qld). The network is designed to sense the power of a transmission and respond from the appropriate station. The two stations are centrally controlled from the Network Control Centre (NCC) in Canberra. •

40. IDENTIFICATION OF MARITIME COMMUNICATION STATIONS

40.1 Maritime communication stations can be contacted via a digital selective calling service which is identified by a nine digit code known as a Maritime Mobile Service Identity (MMSI). The MMSI for both Australian maritime communication stations is 005030001. •

40.2 After establishing contact by digital selective calling, Australian maritime communication stations will switch to a radiotelephone channel and respond with the call sign "RCC Australia". •

40.3 Maritime communication stations may also respond with the use of their official radiotelephony call sign, "RCC Australia, VIC (Victor India Charlie)". •

41. MONITORING OF FREQUENCIES BY MARITIME COMMUNICATION STATIONS (WATCHKEEPING)

41.1 Collectively the two maritime communication stations provide a continuous watch on the HF digital selective calling frequencies reserved for distress, urgency and safety. See paragraph 84.1. •

41.2 Maritime communication stations do not operate in the 27 MHz marine band. Potential users should check if limited coast stations in their local area are monitoring this frequency before relying on it for communication.

41.3 Maritime communication stations do not provide aural monitoring of the international radiotelephony distress and calling frequencies in the 2, 4, 6, 8, 12 and 16 MHz bands (2182, 4125, 6215, 8291, 12 290 and 16 420 kHz) or the VHF marine band (VHF channel 16). Potential users should read Section 7 for more information and check if limited coast stations in their local area are monitoring these frequencies before relying on them for communication. •

41.4 Maritime communication stations do not provide MF digital selective calling monitoring in the 2 MHz band (2187.5 kHz). Potential users should check if limited coast stations in their local area are monitoring this frequency before relying on it for communication. •

42. EMERGENCY MEDICAL ADVICE

42.1 In urgent medical cases, a digital selective calling (DSC) urgency alert may be used to establish communications with the maritime communication stations. •

42.2 Australian maritime communication stations have formal arrangements with health authorities and will relay medical advice to and from vessels at sea in an emergency. This service is free of charge. •

SECTION 7 STATE AND NORTHERN TERRITORY HF (COAST RADIO STATIONS) AND VHF STATIONS

IMPORTANT NOTE - Potential users should seek current advice from the relevant State/Territory authority about the operation of these services.

The nine HF stations listed in this section are licensed as limited coast stations. These stations may be referred to elsewhere in this Handbook as Coast Radio Stations.

The VHF only stations operated by (or for) the State and Northern Territory marine authorities are also licensed as Limited Coast Stations.

Both types of station as well as other limited coast stations are referred to collectively as Limited Coast Stations.

43. SERVICES PROVIDED BY THE STATE AND NORTHERN TERRITORY GOVERNMENTS

43.1 State and Northern Territory governments provide a range of maritime safety radio services. These services are provided on selected High Frequency (HF) frequencies along with Very High Frequency (VHF) Channel 16 and 67 services in certain coastal areas. ♦•

44. COAST RADIO STATIONS: HIGH FREQUENCY (HF) MARITIME DISTRESS AND SAFETY SERVICE

44.1 HF radio distress and safety services are provided to all coastal areas throughout Australia with coverage extending to within 200 nautical miles seaward. •

44.2 These services are provided through a network of nine HF stations located at Perth, Port Headland, Darwin, Cairns, Gladstone, Sydney, Melbourne, Adelaide and Hobart. These HF stations will operate using the following identities: •

>> COAST RADIO CAIRNS;

>> COAST RADIO GLADSTONE;

>> COAST RADIO SYDNEY;

>> COAST RADIO MELBOURNE;

>> COAST RADIO HOBART;

>> COAST RADIO ADELAIDE;

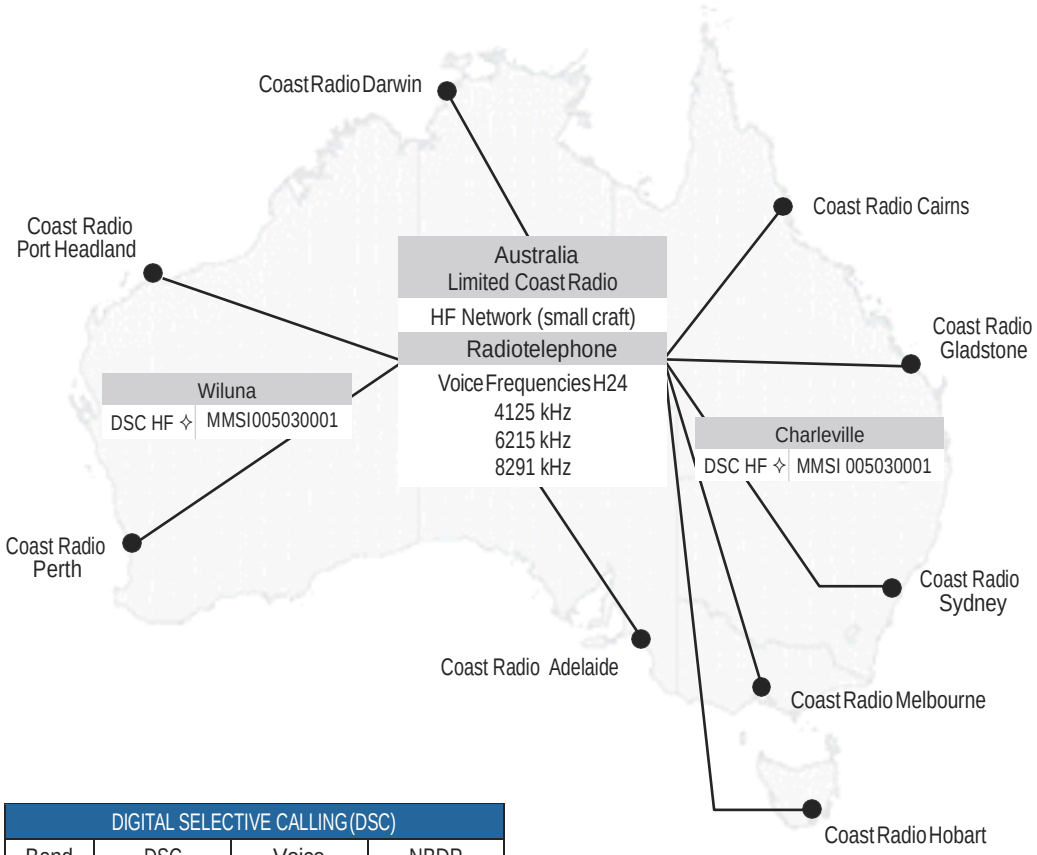
>> COAST RADIO PERTH;

>> COAST RADIO HEDLAND; and

>> COAST RADIO DARWIN.

Services provided by these stations include 24 hour listening watches on 4125 kHz, 6215 kHz and 8291 kHz for distress and safety situations and the broadcast of navigation warnings on 8176 kHz. •

Note: Coast Radio Stations are no longer required to constantly monitor 2182 kHz.



DIGITAL SELECTIVE CALLING (DSC)			
Band	DSC	Voice	NBDP
VHF	Ch70	Ch16	
MF	2187.5 kHz	2182 kHz	2174.5 kHz
HF4	4207.5 kHz	4125 kHz	4177.5 kHz
HF6	6312.0 kHz	6215 kHz	6268 kHz
HF8	8414.5 kHz	8291 kHz	8376.5 kHz
HF12	12577.0 kHz	12290 kHz	12520 kHz
HF16	16804.5 kHz	16420 kHz	16695 kHz

RCC AUSTRALIA	
DSC HF ✧	MMSI005030001
Charleville, Wiluna	
☎	+61 2 62306811
7	+61 2 62306868
Telex: + 71 62349 MRCCAUS	
Email: rcc@amsa.gov.au	

44.3 Vessel operators should note that the 4125 and 6215 kHz radiotelephony distress, urgency, safety and routine calling frequencies are supplementary to 2182 kHz. 8291 kHz is for distress and urgency communications. 8291 kHz is used for announcing safety traffic prior to transmitting the safety traffic on a working frequency. It is important to restrict radio traffic on these frequencies to distress, urgency and safety calls. This does not mean that the operator cannot use 4125 and 6215 kHz for general calling, but the operator should avoid using those frequencies for that purpose, where possible. The operator must not use 8291 kHz for routine or general calling. Radio checks or calls of a general nature should be directed to volunteer marine rescue groups or other service providers. ●

44.4 The HF distress and safety service is to be considered a 'national service' in that services provided from each State / NT facility will be identical and considered part of a national HF distress and safety network. The network approach ensures high levels of radio service availability thus providing confidence that a vessel in distress will be able to contact alternative HF stations during periods of atmospheric or solar disturbance that may limit HF communications from vessels at sea to any particular station.

44.5 Navigation warnings will be broadcast on 8176 kHz in accordance with a schedule commencing 3 minutes prior to the hour (UTC). Navigation warning broadcast schedules can be obtained from the State/NT marine authorities. ●

45. VERY HIGH FREQUENCY (VHF) MARITIME DISTRESS AND SAFETY SERVICE

45.1 VHF radio distress and safety services include 24 hour monitoring of VHF Channel 16 for distress, urgency and safety traffic and regular broadcast of weather information on VHF Channel 67. ◆●

45.2 VHF radio distress and safety services on Channels 16 and 67 are provided in the following coastal areas:

>> Queensland - Sea areas adjacent to Fraser Island with continuous coverage through to the Tweed Coast area, along with sea areas adjacent to Townsville;

>> New South Wales - Sea areas adjacent to Newcastle, with continuous coastal coverage through to the Nowra area;

>> Victoria - The Port Phillip Bay / Western Port Bay area and adjacent sea areas;

>> Tasmania – Sea areas surrounding Tasmania and adjacent to Victoria;

>> Western Australia - Sea areas adjacent to Perth; and

>> Northern Territory - Sea areas adjacent to Darwin

45.3 Vessel operators should note that VHF Channel 16 is primarily for distress, urgency, safety and routine calling. It is important to restrict radio traffic on VHF Channel 16 to distress, urgency and safety calls. This does not mean that operators cannot use VHF Channel 16 for routine calls, but where possible working or on demand channels should be used. ◆●

45.4 Vessel operators should note that VHF Channel 13 is used for ship to ship maritime safety information (Refer Appendix 4). ◆●

SECTION 8 LIMITED COAST STATIONS

46. SERVICES PROVIDED BY LIMITED COAST STATIONS

46.1 The service provided by limited coast stations is restricted to communications concerning the safety, movements and operations of vessels in their vicinity. This service may include communications relating to fishing or other commercial operations, club events, the broadcast of weather, navigational information, and Search and Rescue. Use of services other than distress may be limited to members of organisations linked to the limited coast station. ♦●

46.2 Generally, limited coast stations are not permitted to handle public correspondence to or from destinations ashore. ♦●

46.3 Limited coast stations offer a service to vessels in the MF/HF, 27 MHz and VHF marine bands. Details of frequencies assigned to ship radio stations to communicate with limited coast stations are shown in Appendix 3. ♦●

47. CATEGORIES OF LIMITED COAST STATION

47.1 Limited coast stations are stations on land established for the purpose of communicating with vessels at sea. Such stations generally fall into one of the following categories:

>> stations serving the professional fishing industry;

>> stations established by the operators of small commercial vessels such as charter vessels, tugs, etc;

>> stations established by boating and fishing clubs to provide a service for their members;

>> stations established by port or harbour management authorities to co-ordinate the movements of vessels within and near a port; or

>> stations established by recognised marine rescue organisations to supplement the safety of life at sea service offered by coast radio maritime communication stations. ♦●

48. HOURS OF OPERATION FOR LIMITED COAST STATIONS

48.1 There are no fixed hours for the radio service provided by limited coast stations and many do not offer a continuous service. Coast radio stations operate 24 hours a day. Hours of operation are determined by local requirements or, in some cases, by State government legislation ♦●

48.2 In the interests of safety, ship radio station operators are encouraged to familiarise themselves with local limited coast stations, in particular those offering a marine rescue service, regarding hours of operation and frequencies monitored.

49. IDENTIFICATION OF LIMITED COAST STATIONS

49.1 Limited coast stations operating in the MF and HF marine bands should identify themselves by use of their name and the official call sign allocated to them by ACMA. ●

49.2 Limited coast stations operating in the VHF marine bands may use their official call sign and/or other approved identification such as the organisation's name. Examples: Queensland Tug and Salvage, VKQ 445 Moreton Bay Boat Club, Sandringham Coast Guard, etc. ♦●

49.3 Limited coast stations offering a digital selective calling service are identified by a nine digit code known as a Maritime Mobile Service Identity (MMSI). ♦●

SECTION 9 VHF MARINE REPEATERS

50. PRINCIPLE OF OPERATION

50.1 VHF communications range depends mainly on the height of the antennas of the transmitting and receiving stations. By using VHF marine repeater stations, the range of ship to ship, ship to shore and shore to ship communications can be significantly increased. ♦●

50.2 VHF marine repeaters are unmanned shore installations usually located at geographically high points. They are designed to transmit and receive simultaneously and will retransmit or "repeat" all signals received. The retransmitted signals can be received by any station listening on the repeater channel.

50.3 Limited coast stations operated by marine rescue organisations routinely monitor VHF repeater channels operating in their area.

50.4 Not all coastal areas of Australia are served by VHF marine repeaters.

51. VHF MARINE REPEATER CHANNELS

51.1 VHF marine repeaters operate in the DUPLEX mode on channels 21, 22, 80, 81 or 82. ♦●

51.2 For their own safety, boat owners should ensure that they are familiar with the location and operating channel of their local repeater.

51.3 Digital selective calling alerts using VHF must be confined to channel 70 and will not operate through repeaters. ♦●

52. USE OF VHF MARINE REPEATERS

52.1 In most cases VHF marine repeaters are installed and maintained by marine rescue organisations as a service to mariners and are available for use by all licensed VHF ship stations. However, in order to minimise congestion, if direct ship to ship or ship to shore communications are possible on a non-repeater channel, this must be used in preference. ♦●

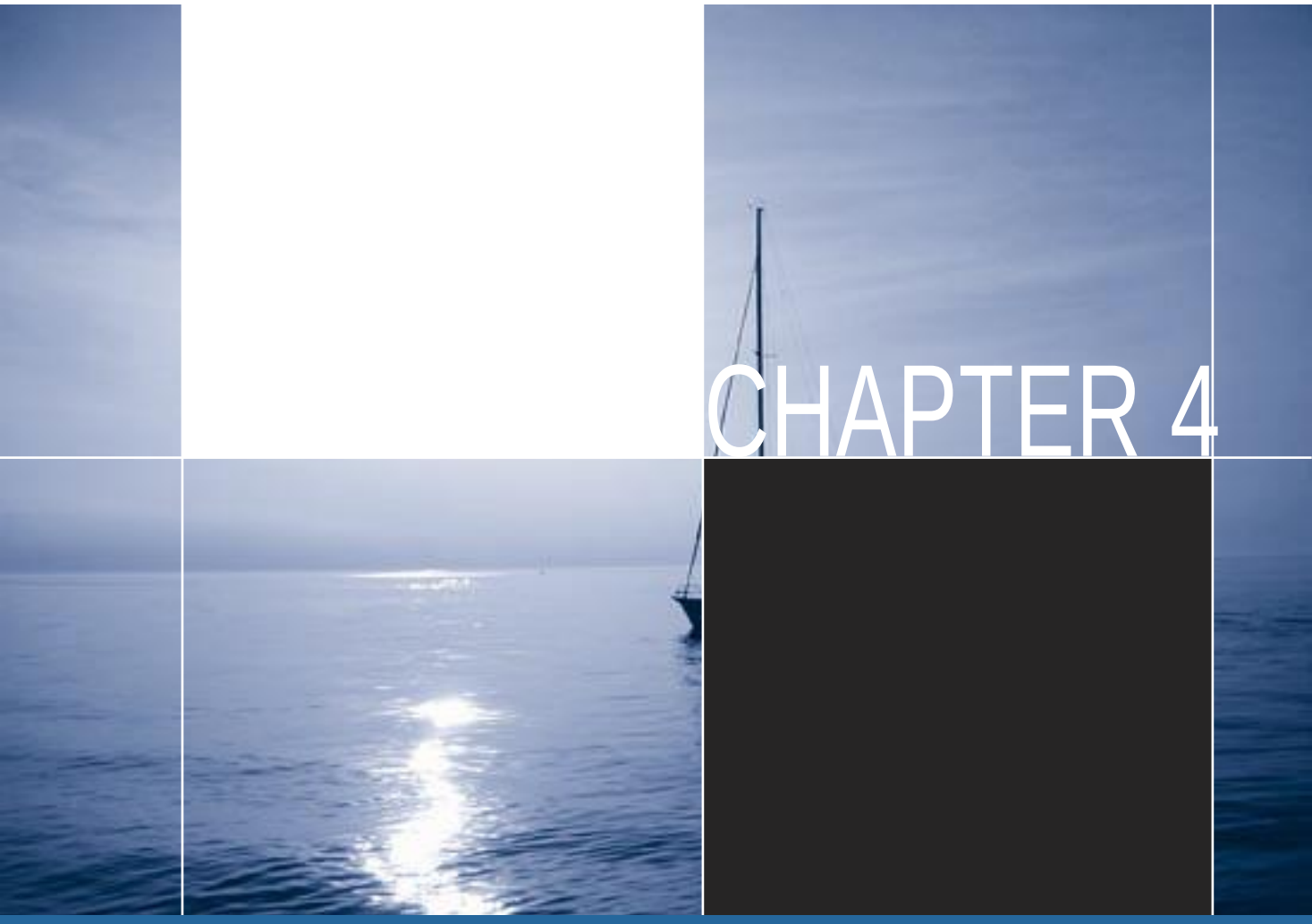
52.2 Repeater channels must not be used as "chatter channels". Communications must be restricted to those concerning the movements of vessels and safety of vessels and persons. To discourage lengthy conversations, repeaters will incorporate an automatic time restriction of approximately thirty seconds. ♦●

52.3 If not apparent by monitoring, a ship station can gain an indication of its ability to access a repeater by momentarily depressing the microphone button. If a brief (approximately one second) burst or "tail" of noise is heard from the loudspeaker when the button is released, then the vessel is activating the repeater. If a "tail" is not heard, it is probable that the vessel is out of range of the repeater.

52.4 Operators using VHF equipment equipped with an "International/Aus" or "USA" channel switch should note that it is essential that the switch be in the "International/Aus" position to access repeaters. (See paragraph 74.1)

NOTES

Power Supplies



CHAPTER 4

SECTION 10 CARE AND MAINTENANCE OF BATTERIES

53. LOCATION OF BATTERIES

53.1 The location of a battery supplying marine radio equipment should be chosen to ensure that, as far as practicable, the battery is:

>> protected from the elements;

>> readily accessible for routine maintenance;

>> located reasonably close to the transceiver;

>> located as high in the vessel as practicable;

>> well ventilated to dissipate the hydrogen gas produced (if located within a wheelhouse or other compartment, venting to the outside may be necessary);

>> not located with other items of equipment that could, in heavy weather, fall across the battery and cause short-circuiting; and

>> not located in the same compartment as a different type of battery, for example, alkaline cells. ◆●

54. CONSTRUCTION OF LEAD ACID CELLS

54.1 Lead acid cells have a voltage of 2 volts per cell, regardless of size. Larger size cells will supply higher current than smaller cells, or the same current for longer periods. The ability of a cell to produce current for a period of time is known as the cell's capacity and is usually measured in ampere-hours (Ah), or with batteries designed for motor vehicle use, as 'cold cranking amps' (CCA). ◆●

54.2 A chemical combination of lead and lead peroxide plates and the sulphuric acid in the electrolyte (the liquid solution within the cell), produces a voltage difference between the plates. This voltage difference allows a current to flow through any load, such as a radio, connected across the battery terminals and is called direct-current or 'dc'. ◆●

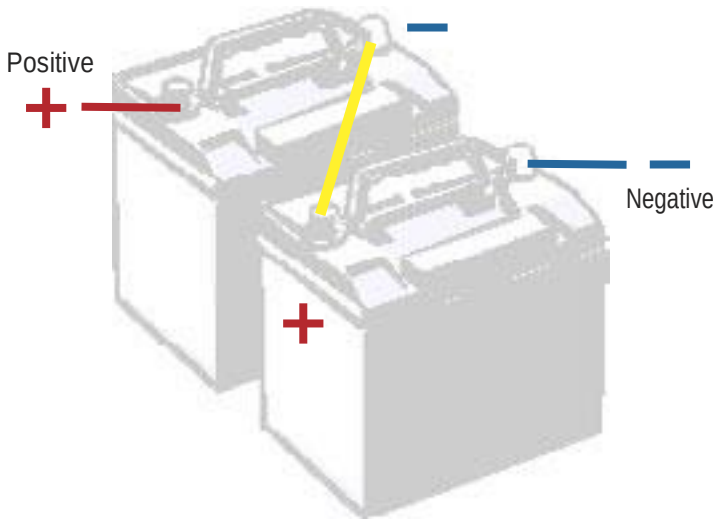
54.3 When the acid in the electrolyte or the material in the plates is used up, the voltage no longer exists and current cannot flow. At this point, the cell is said to be discharged or "flat". ◆●

54.5 This situation is reversible by passing a current in the opposite direction. This process reverses the chemical reactions in the cell and is known as charging. ◆●

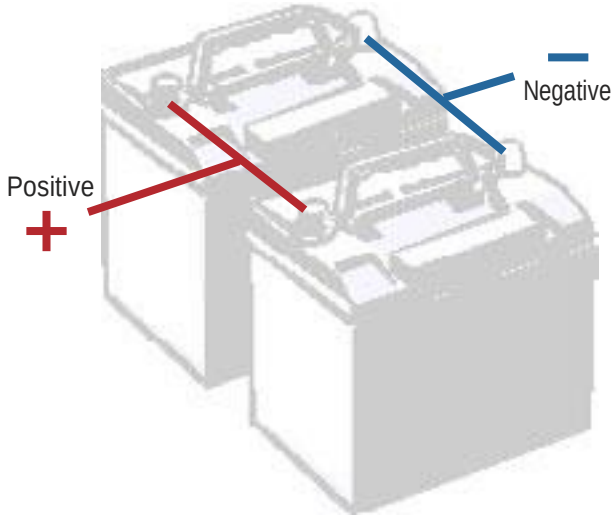
55. CONNECTION OF LEAD ACID CELLS

55.1 Cells may be connected in series, that is, the positive terminal of one cell to the negative terminal of another, to produce higher voltages. Three cells connected in series will give a battery of 3 x 2 volts = 6 volts; six cells connected in series will give a battery of 6 x 2 volts = 12 volts. ◆●

55.2 Most modern lead-acid batteries are supplied in 6 or 12 volt combinations and may themselves be connected in series to provide the required output voltage, for example, two 12 volt batteries connected in series will produce a voltage of 2 x 12 volts = 24 volts. ◆●



55.3 Connection of lead-acid batteries in parallel, that is positive terminal to positive terminal, negative terminal to negative terminal, will produce the same output voltage as a single battery, but the ability to supply current (capacity) will have been lengthened. For example, two batteries each supplying 12 volts with a capacity of 60 ampere-hours, when connected in parallel will provide a voltage output of 12 volts with a capacity of 120 ampere-hours. ♦●



56. ESSENTIAL BATTERY MAINTENANCE

56.1 The functioning of radio equipment is dependent on power supplied by the battery. If it is to provide adequate performance in the event of an emergency, regular and careful maintenance is required.

56.2 A battery's service life also depends on the manner in which it is treated.

56.3 To ensure the best performance from a battery it is important that a battery:

>> is kept clean, dry and free from terminal corrosion;

>> has the electrolyte kept at the correct level; and

>> is kept correctly charged. ♦●

57. BATTERY CLEANLINESS

57.1 A battery top should be kept clean. A dirty battery top may hold spilt electrolyte on its surface thereby providing a path for the electrical current to leak away. It is important to keep the outside surfaces of a battery dry and free of contamination. ◆●

57.2 Corrosion forming on terminal clamps may seriously affect, or even prevent, the ability of the battery to supply current. Corrosion will be evident by the formation of a white-green powder between the battery terminals and the terminal clamps. In this situation, the terminal clamp should be removed and both it and the terminal post cleaned. ◆●

57.3 To minimise the likelihood of corrosion, terminal posts and clamps should be lightly smeared with Vaseline™ or petroleum jelly. ◆●

58. ELECTROLYTE LEVEL

58.1 The level of electrolyte inside a battery is important. As a result of the chemical action inside a battery, water is lost. This should be replaced with distilled or demineralised water. ◆●

58.2 Seawater must not be used under any circumstances.

58.3 The level of the electrolyte should be maintained at approximately 10 mm above the plates unless otherwise specified by the manufacturer. ◆●

58.4 If the electrolyte level is too high, it may overflow during charging providing an unwanted discharge path. If the electrolyte is too low, the plates are exposed to the air and permanent damage and loss of capacity may result.

58.5 It may be noticed that a battery that is nearing the end of its useful life will require more frequent topping-up than has been previously necessary.

58.6 Low-maintenance batteries will require infrequent topping-up. Maintenance-free batteries may require none at all.

59. CORRECT CHARGING

59.1 To provide the best service, a battery must be correctly charged. Both overcharging and undercharging can seriously affect its performance. ◆●

59.2 On small vessels the usual means of charging the radio battery will be an alternator or generator attached to the vessel's engine. An associated regulator, which reduces the charging current as necessary, should prevent overcharging.

59.3 Vessels that are used frequently (say, several times each week) should have no problem maintaining a fully charged radio battery. However, on vessels that are used relatively infrequently (once every few weeks), it is likely that during storage even a battery that starts as fully charged, will self-discharge and go flat.

59.4 For safety reasons, it is important that the vessel owner is able to determine the general condition of a battery and its ability to supply current over a period of time (its capacity). An indication of the level of charge in a battery may be obtained by either:

>> measuring the specific gravity of the electrolyte; or

>> measuring the on-load terminal voltage. ◆●

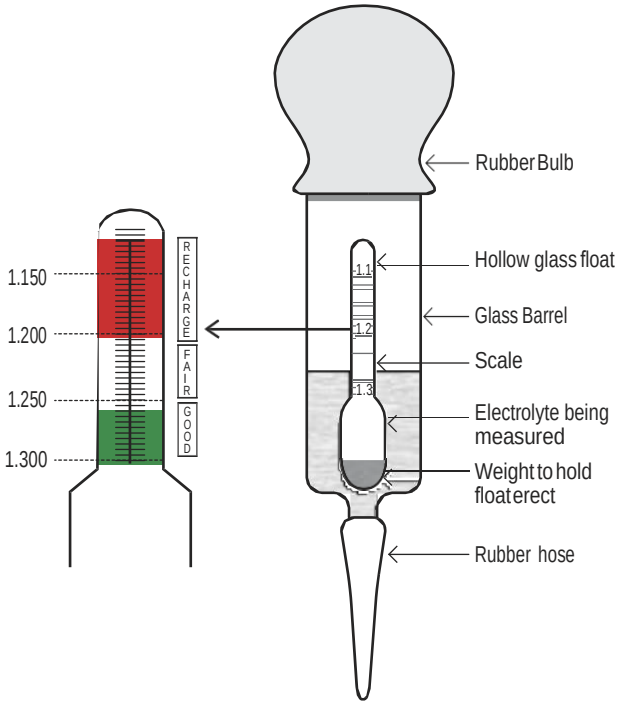
60. MEASURING THE SPECIFIC GRAVITY

60.1 The specific gravity, also called the relative density, of the electrolyte (the liquid inside the battery) varies proportionally with the amount of charge in the battery. It is highest when the battery is fully charged and lowest when the battery is fully discharged or flat. It follows that the amount of charge in a battery can be determined by measuring the specific gravity of the electrolyte. ◆●

60.2 A simple, inexpensive device called a hydrometer is used to measure specific gravity. ◆● (See diagram on Page 31).

60.3 In general, for a fully charged battery, the specific gravity should measure about 1.250. Half charge will be indicated by a reading of 1.200 and fully discharged by 1.150. All cells in a battery should indicate a similar specific gravity. A variation of more than about 0.025 will indicate a faulty cell and the battery should be replaced. ◆●

60.4 Specific gravity readings should not be taken immediately after topping-up a cell as the added water will float towards the top of the cell and give a false reading. Charging for thirty minutes or more after topping-up will mix the electrolyte and allow accurate readings.



60.5 Batteries which have cells where specific gravity readings fail to rise, or respond poorly to adequate charging, should be replaced.

61. MEASURING THE ON-LOAD TERMINAL VOLTAGE

61.1 Measurement of the terminal voltage when a battery is supplying current to a load, such as a radio, will also provide an indication of the amount of charge in a battery. This measurement is known as the on-load terminal voltage. ◆●

61.2 For a 12-volt battery, the on-load terminal voltage should not fall below approximately 11.4 volts while transmitting. If the voltage does fall significantly below this figure, the battery requires charging. If after charging, the on-load terminal voltage still falls significantly below 11.4 volts, it is an indication of a faulty cell and the battery should be replaced.

61.3 Measuring of the off-load (that is, when the battery is idle) terminal voltage of a battery is a poor indication of its condition. ◆●

62. LOSS OF CAPACITY

62.1 A battery will suffer a gradual loss of capacity during its life. This is inevitable and the battery should be replaced when the capacity loss becomes significant.

62.2 Many lead-acid batteries have a commercial life of only two to three years.

62.3 However, the useful life of a battery can be considerably shortened by:

>> operating a battery in a low state of charge for long periods;

>> allowing a battery to stand in a discharged state for long periods;

>> leaving a charged battery for long periods without periodic charging; and

>> overcharging. ◆●

63. BATTERY HAZARDS

63.1 There are two hazards associated with lead-acid batteries that ship station operators should be aware of:

>> the risk of explosion; and

>> the risk of chemical burns. ◆●

63.2 As a result of the chemical process occurring within the cells of a battery during charging, Hydrogen Gas is produced. When mixed with air, this can form a highly explosive mixture which can be ignited by a naked flame, a lighted cigarette, or a spark. The spark caused by breaking or making an electrical connection in the vicinity of the charging battery may be sufficient to ignite the hydrogen-air mixture. Batteries should be located close to the radio equipment and placed in a well ventilated container or locker ◆●

63.3 If usingmetaltoolstoworkonbatteryconnections, extreme care must be taken to ensure that terminals are not short-circuited. ◆●

63.4 The electrolyte in battery cells contains Sulphuric Acid. It is sufficiently concentrated, particularly just after charging, to damage eyes, skin or clothes if spilt or splashed. Immediate and prolonged application of running water is recommended to minimise its effect. ◆●

63.5 It is recommended that eye protection, gloves, etc. be worn when a person is carrying out maintenance on batteries. Batteries should not be topped-up whilst on charge. ◆●

64. MAINTENANCE FREE BATTERIES

64.1 Maintenance Free: Maintenance free Lead – Acid or Gel type batteries are becoming increasingly available to mariners. Users of these types of batteries are recommended to follow the manufacturer's guidelines in ascertaining the condition of the battery before replacement. On vessels where it is mandatory to carry an independent emergency means of electrical supply, for communications equipment, it may also be a requirement to replace 'maintenance free' batteries after a short operational period of 1 year.

Marine Radiocommunications Equipment

CHAPTER 5

SECTION 11 TYPES OF MARINE RADIO EQUIPMENT

65. CHOICE OF MARINE RADIO EQUIPMENT

65.1 Three different types of marine radiocommunications equipment are available in Australia. The type best suited to any vessel must depend on:

>> the level of communications service required by the owner; and, more importantly,

>> the ability of the equipment to provide an adequate level of safety communications in the vessel's area of operation.

66. TYPES OF MARINE RADIOCOMMUNICATIONS EQUIPMENT

66.1 The three types of marine radiocommunications equipment available in Australia are:

1. equipment operating in the international MF and HF marine bands; •
2. equipment operating in the 27 MHz marine band (usually referred to as "27 Meg marine"); and
3. equipment operating in the international VHF marine band. ◆ •

66.2 Each type has its own advantages and disadvantages. Due to the increasing usage of digital selective calling it is important that this feature is considered when choosing marine radiocommunications equipment. MF/HF and VHF marine radio equipment may have digital selective calling capability in addition to radiotelephony. 27 MHz marine equipment will be radiotelephony only. ◆ •

67. MF/HF MARINE RADIO EQUIPMENT

67.1 MF/HF marine equipment offers:

>> a safety service provided by limited coast stations;

>> the advantages of being able to change frequency bands to provide communications over the desired range, and to provide access to a radiotelephone service;

>> a communications range of many thousands of kilometres, and worldwide given the correct choice of frequency band; but

>> the disadvantages of high cost, complex installation, greater operator expertise, and of being subject to atmospheric and ignition interference noise. •

67.2 Because it does not suffer the range limitations of 27 MHz and VHF marine equipment, MF/HF marine equipment is the only system recommended for vessels undertaking lengthy coastal or overseas voyages. •

67.3 MF/HF marine radio equipment fitted with digital selective calling may offer a single-button distress facility and automated watchkeeping (see chapter 6). In particular, digital selective calling can allow the use of MF/HF marine radio equipment to communicate with a wide variety of stations and services including the foreign coast stations mentioned in Chapter 12 (paragraph 148).

68. 27 MHZ MARINE EQUIPMENT

68.1 27 MHz marine equipment offers:

>> a communications range, under favourable conditions, of between 10 and 50 km (5.4 and 27 nautical miles);

>> a safety service provided by limited coast stations operated by marine rescue organisations;

>> the advantages of being cheap and easy to install; but

>> the disadvantages of being subject to interference from atmospheric and ignition noise (and on occasions, from distant radio stations), and of not providing access to a radiotelephone service; and

>> not being compatible with large vessels communicating under the GMDSS system.

69. VHF MARINE RADIO EQUIPMENT

69.1 VHF marine equipment offers:

>> a communications range between vessels of up to 20 km (10.8 nautical miles) and between vessel and shore of 50 km (27 nautical miles), and occasionally significantly greater;

>> a safety service provided by limited coast stations operated by marine rescue and other organisations;

>> the advantages of being relatively inexpensive, of providing the highest quality signal, of suffering least from interference caused by atmospheric or ignition sources, and of providing access to a shore telephone service; but

>> the disadvantage of suffering blind spots behind cliffs, sand hills and heavy vegetation. ◆●

69.2 VHF marine equipment is suitable for small vessels remaining relatively close to the coast and within range of limited coast stations operating on VHF channels.

69.3 VHF marine radio equipment fitted with digital selective calling may offer a single-button distress facility and automated watchkeeping (see chapter 6).

SECTION 12 COMPONENT PARTS OF MARINE RADIO EQUIPMENT

70. THE MAJOR PARTS OF RADIO EQUIPMENT

70.1 Marine radio equipment, whether operating in the MF/HF, 27 MHz or VHF bands, is made up of three major parts:

>> the power supply;

>> the transmitter and the receiver (transceiver); and

>> the antenna or aerial. ◆●

70.2 Each part is dependent on the other. A fault in any one of the parts will not allow the equipment to function correctly. ◆●

71. THE POWER SUPPLY

71.1 The power supply has to provide electrical energy to the transmitter and the receiver to enable them to perform their functions.

71.2 The most convenient form of power supply for small vessels is the lead-acid battery.

71.3 Fuses located in the wiring between the battery and the transceiver protect the vessel and equipment against damage should a malfunction occur. ◆●

72. THE TRANSMITTER AND THE RECEIVER (TRANSCEIVER)

72.1 The function of the transmitter is to turn voice (audio) signals into radio signals where they can travel over very long distances. This is achieved by converting the voice signals spoken into the microphone into high powered radio frequency energy which is passed to the antenna and radiated into space.

72.2 The function of the receiver is to select only those radio frequency signals which are required by the operator, and to amplify them. These signals are then converted back into voice signals and reproduced by a loudspeaker.

72.3 It is usual with marine radio equipment for the transmitter and receiver to be combined in a single unit called a transceiver. ♦●

72.4 On MF/HF transceivers, to achieve effective communications, it is essential to provide a radio "earth" to the water surrounding the vessel. Usually, this is achieved by running a heavy wire or, preferably, a copper strip from the radio earth terminal of the transceiver to either a metal plate on the underside of the hull or, in the case of a vessel constructed from metal, directly to part of the metallic superstructure. On fibre-glass vessels, a satisfactory radio earth may be achieved by connecting the transceiver to a metallic plate within the layers of the hull.

73. THE ANTENNA

73.1 The antenna has two functions:

>> during transmission, to radiate into space the radio frequency energy generated by the transmitter;

>> during reception, to gather radio frequency energy from space and pass it to the receiver. ♦●

73.2 The antenna, therefore, will be connected to either the transmitter or the receiver, depending whether transmission or reception is taking place.

73.3 The changeover is affected by the press-to-talk button on the microphone or handset. When pressed the transmitter is connected to the antenna. When released the antenna is reconnected to the receiver.

SECTION 13 TRANSCEIVER CONTROLS

74. TRANSCEIVER CONTROLS

74.1 This section details the functions of important operator controls which may be found on marine radio equipment. Not all will be found on each type of equipment.

Transceiver controls may be identified differently by individual manufacturers but will have the same purpose:

MARINE VHF:

On/Off and Volume Control. Often these functions are combined into a single control. It is used to turn the equipment on or off, and to adjust the level of signals coming from the loudspeaker. ♦●

Squelch Control. This control allows the operator to stop the constant and annoying internally generated background roar from the receiver in the absence of an incoming signal. On VHF marine equipment it is usually an adjustable control. The correct setting is such that the roar just cannot be heard. Further operation of the control is undesirable as this will progressively desensitise the receiver and may prevent reception of weak signals. ♦●

Channel Selector. This control is used to select the channel on which transmission or reception is required. ♦●

Dual Watch (DW). This control will be found on the majority of VHF equipment. On operation it will permit the operator to keep listening watch on a working channel *and* *Channel 16*. This is NOT to be confused with scanning VHF channels. ♦●

Power Selector. This control varies the power of the transmitted signal. International regulations restrict the output power of Marine VHF to 25 watt maximum. On VHF marine equipment it may be marked "25W/1W" (25 watts or 1 watt) or "high/low". The use of more power than is required to communicate satisfactorily is a breach of the International Radio Regulations, may cause unnecessary interference and drains the battery supplying the equipment at a faster rate. ♦ ●

International/USA Control. This control may be found on some VHF marine equipment. It is provided by the manufacturer to permit communications with stations in the USA which do not conform to the international VHF channel plan. It is important that this control is kept in the 'international' position at all times unless in the coastal waters of the USA. Some manufacturers of marine VHF supplied to Australian operators may have 'International' substituted by 'Aus'. ♦ ●

MARINE MF/HF:

Transceiver On/Off Control. Generally speaking the on/off control enables power to both the transmitter and receiver. Some transceivers may also have a separate transmitter on/off control enabling receiver operation and the transmitter to be in a standby condition. ●

RF Gain Control. This control will only be found on some MF/HF and 27 MHz transceivers. It is used to vary the strength of received radio signals and has an effect similar to the volume control. However, except when receiving unusually strong signals, it should be kept close to maximum and the volume control used to adjust the audio signal to a comfortable level. ●

AM/SSB Emission Control. (on some MF/HF equipment, this control may be marked H3E/J3E). This control will be found on most MF/HF transceivers and on those 27 MHz transceivers with single sideband option. It controls the mode of transmission and reception. See paragraphs 36.1 to 36.4 for further information. ●

Clarifier. This control will be found on some MF/HF transceivers and those 27 MHz transceivers which are fitted with a single sideband option. It provides a means of fine-tuning incoming single sideband signals that sound distorted or 'off station'. It has no effect on transmitted signals. On SSB transceivers not fitted with a clarifier control, another method of fine-tuning incoming signals will be provided. ●

Mute Control. This allows the operator to switch off annoying background atmospheric or radio interference, but permitting the operator to hear a close by wanted radio station. The level of muting is pre-set and is switched either on or off. ●

Noise Limiter. (noise blanker). The control may be switched on to minimise the effect of loud static or ignition interference on received signals. It should be used with care as it may also desensitise the receiver to wanted signals. ●

Antenna or Aerial Tuning Unit (ATU). This unit will be found only with MF/HF equipment and may be separate or incorporated with the transceiver. An ATU is necessary to adjust the "electrical" length of the antenna to ensure that maximum transfer of power from the transmitter can take place on different frequency bands. ATUs may tune automatically or require manual adjustment. Operators should ensure the equipment is tuned whenever the transmitter frequency is changed. ●

Radiotelephony Alarm Signal Generating Device (ASGD). This control is found only on some MF/HF transceivers. Operation causes the radiotelephony alarm signal to be transmitted. A test function may also be provided to permit the function to be tested without transmission. ●

Microphone Press-to-Talk Control. This spring-loaded control is located on the microphone or handset. When pressed, it allows the transmission of signals. When released, the equipment is returned to the receive mode. ♦ ●

74.2 It is likely that marine equipment manufacturers will offer controls other than those detailed here. It is important that operators familiarise themselves with the function and effect of all controls. This is particularly important with equipment capable of digital selective calling (DSC).

SECTION 14 GENERAL CARE AND MAINTENANCE OF MARINE RADIO EQUIPMENT

75. CARE OF TRANSCEIVERS

75.1 Radio equipment manufactured for marine use is designed for harsh environmental conditions. However, transceivers should always be protected from rain and spray by being positioned inside a deckhouse or cabin. They should be securely fastened to the vessel to prevent damage in heavy weather.

75.2 After use, a microphone associated with a transceiver should always be replaced in its holder or bracket. For a variety of reasons, failure to do this can result in the transmitter being activated through inadvertent pressure on the microphone press-to-talk switch and without the knowledge of the operator. As a consequence, all background noises, including conversations made in the vicinity of the transceiver, are transmitted. Use of the frequency by other nearby stations cannot take place until the station responsible has been located and the problem corrected. ◆●

75.3 It is normal practice to locate fuses in the leads connecting the transceiver to the battery supplying the power. The purpose of these fuses is to "blow" should the transceiver malfunction and start to draw a current in excess of the fuse rating. By doing this, the fuses protect the equipment from serious damage and the possibility of fire. ◆●

75.4 Vessel owners should be aware that, on occasions, a power supply fuse will blow when the transceiver is not malfunctioning and for no apparent reason. It is recommended that a supply of fuses of the manufacturer's recommended value be carried on board for such circumstances. However, if the replacement fuse also blows, this is a warning of a serious problem. At this stage, a vessel operator should consider whether to continue the voyage or trip. Use of higher rating fuses, silver paper or pieces of wire may result in expensive damage and possibly, fire. ◆●

76. CARE OF ANTENNAS

76.1 Antennas used in conjunction with MF/HF equipment may be of the long wire or vertical whip type. ●

76.2 Antennas used with 27 MHz and VHF marine equipment are normally short vertical whip types which are usually mounted as high up as possible, at the top of a mast for example. ◆●

76.3 Whip antennas are manufactured specifically for the 27 MHz, VHF or MF/HF marine bands and are not interchangeable. ◆●

76.4 Insulators used with antennas should be periodically inspected for cracking or deterioration and replaced if necessary. Salt build-up on insulators will reduce their efficiency and should be regularly cleaned off with fresh water (Taking care to ensure that the equipment is turned off and fuses removed beforehand). Insulators should never be painted.

76.5 Ultra-violet radiation will cause fibre-glassed whip antennas to deteriorate after many years of service to a point where moisture can penetrate the layers. This will seriously affect radiation efficiency and replacement or re-fibre-glassing will be necessary. ◆●

76.6 On yachts, the practice of insulating a backstay will provide a reasonably efficient long-wire antenna. However, it must be considered that should the yacht be dismasted, the antenna will also be lost. Where a backstay is used, it is recommended that yachts carry a spare whip antenna, which can be quickly mounted and connected. ●

SECTION 15 FAULTS IN MARINE RADIO EQUIPMENT

77. GENERAL

77.1 Regular inspection and maintenance of the antenna, transceiver and battery power supply will minimise the likelihood of faults occurring at sea.

77.2 However, the owners of small vessels should be prepared to deal with minor faults on their marine radio equipment.

77.3 Faults can be usually divided into three categories:

>> faults occurring on the antenna system;

>> faults occurring in the transceiver; and

>> faults occurring with the battery power supply.

78. ANTENNA SYSTEM FAULTS

78.1 Antenna system faults may include:

>> poor or broken connections in the antenna or radio earth system;

>> the antenna broken or shorted, or a fracture inside a whip antenna; and

>> broken, deteriorated or contaminated insulators. ◆●

78.2 A poor or loose connection between the transceiver and the antenna will affect both transmitted and received signals. Received signals will be intermittent and the loudspeaker will "crackle". Other stations may report broken transmitted signals. With MF/HF equipment, normal tuning positions on the antenna tuning unit (ATU) may vary. ◆●

78.3 A completely broken connection between transceiver and antenna will result in receiver hiss, but few or no signals. Transmission will not be possible. ◆●

78.4 An antenna which is shorted to a vessel's metal hull or superstructure is likely to produce similar results. ◆●

78.5 On vessels equipped with MF/HF equipment, faults occurring on the radio earthing system, although relatively uncommon may cause transmitting problems. The most likely faults are breaks in the metallic connections at the transceiver, antenna tuning unit (ATU) or at the radio earth plate itself. On rare occasions a radio earth plate may become detached from the hull.

78.6 Radio earthing problems will usually be evident by abnormal or changing ATU tuning positions. Often a faulty (or non-existent) radio earth may cause the metallic parts of the transceiver and ATU to become "live" during transmission. A sharp, burning sensation may be felt when in direct contact with these parts, which should be avoided. ●

79. TRANSCEIVER FAULTS

79.1 A transceiver fault is usually obvious and probably will require specialist attention. A faulty microphone cord may prevent transmission, but not affect reception. ◆●

80. POWER SUPPLY FAULTS

80.1 Power supply faults may include:

>> Loose or corroded battery terminals;

>> A discharged or defective battery;

>> Blown fuses; and

>> Loose or frayed connecting cables. ◆●

80.2 Loose battery connections will be evident by intermittent operation of the receiver and transmitter, and flickering dial lights or channel display. ◆●

80.3 A battery which is defective or close to discharged may be able to supply sufficient current to operate the receiver, but not the transmitter. Should the transmitter fail to operate and dial lights or channel display dim significantly when the transmit button is operated, the battery should be suspected. Corrosion at the battery terminals may cause similar symptoms. ◆●

80.4 Blown fuses will mean that the equipment will fail to operate in any way. Frayed power supply cables touching together, or two metal parts of the vessel are a frequent cause of blown fuses. ◆●

NOTES

Digital Selective Calling

CHAPTER 6

SECTION 16 DSC - GENERAL INFORMATION

81. INTRODUCTION

81.1 The Global Maritime Distress and Safety System (GMDSS) has meant the introduction of a variety of automated radiocommunications technologies. One of these is known as digital selective calling or DSC. This technique has been used for several years by large trading vessels. It is expected that its use will gradually become commonplace by small vessels and eventually may replace radiotelephony techniques for initial distress, urgency and safety calls on the MF/HF marine and VHF bands. With time, traditional labour-intensive aural watchkeeping by ship and limited coast stations may change to automated DSC electronic watchkeeping as the maritime communication stations have done.

81.2 Although maritime communication stations provide a service in the HF marine band, the use of MF/HF DSC by small vessels in Australia is still in its infancy. Many limited coast stations do not support this form of communications for small vessels. DSC on VHF is becoming more popular. However, normal radiotelephony procedures are likely to be the primary means of initiating priority calls to and from small vessels for some years.

81.3 Maritime communication stations no longer monitor the MF and VHF radiotelephony bands. Therefore HF radiotelephony equipment fitted with DSC is recommended above other options.

81.4 While the main use of DSC by small vessels will be for distress, urgency and safety purposes, the technique may also be used for routine calling. ◆●

81.5 DSC is a semi-automated means of establishing initial contact between stations. Once this contact has been established, standard radiotelephony procedures are used for subsequent communications (refer Appendix 6). DSC can be used to initiate ship to ship, ship to shore, and shore to ship communications. Information transmitted by DSC is generally known as a DSC Alert. ◆●

81.6 A DSC Alert is a brief burst (typically seven seconds on MF/HF, and 0.5 second on VHF) of digitised information transmitted from one station to alert another station or stations, and to provide some basic information. ◆●

81.7 DSC Alerts are transmitted on MF/HF and VHF marine frequencies specifically reserved for this type of transmission. The DSC Alert indicates the identity of the calling station and the purpose of the call. ◆●

81.8 The way in which the transmitted DSC Alert is encoded by the initiating station selects which station or stations will decode the information. Whilst all stations listening on the DSC frequency will receive the Alert, only the station(s) selected by the transmitting station will actually decode and have the message available. This will be signalled by an audible and/or visual alarm to alert the operator. ◆●

81.9 DSC Alerts bearing the distress priority will be decoded by all stations receiving the Alert. ◆●

81.10 Programming of a DSC message prior to transmission is performed manually by an operator using DSC receiver controller front panel controls. Received information is decoded and made available in alphanumeric form on a liquid crystal or fluorescent display incorporated in the equipment. ◆●

81.11 The greatest advantage of DSC is the automation of the transmission and reception of initial distress, urgency and safety alerts. A single dedicated button push by an operator could initiate such a distress alert, whilst the necessity for ship and shore operators to manually maintain a listening watch on distress and calling frequencies is removed.

81.12 Importantly, DSC used in small vessels will enable communications compatibility between large and small vessels. The International Maritime Organisation (IMO) has strongly recommended that recreational and other small vessels equip with GMDSS compatible equipment.

DSC communications fulfils this requirement and will permit direct ship to ship alerting regardless of the size of the ship. However, in recognition that DSC will take some years to fully penetrate the small vessel market, the IMO has extended compulsory VHF channel 16 radiotelephony watchkeeping on the bridge of large trading vessels indefinitely. Compulsory watchkeeping on 2182 kHz on such vessels was discontinued in early 1999. ◆●

81.13 Vessels proceeding overseas should note that DSC facilities are well developed in many parts of the world and listening watches on radiotelephony distress and calling frequencies may have been discontinued by some countries.

81.14 With the gradual change to DSC, the problem of hoax distress calls is likely to be eliminated. It is impossible to transmit a DSC alert without electronically identifying the initiating vessel. ◆●

82. DSC-CAPABLE EQUIPMENT

82.1 Small vessel MF/HF transceivers with DSC capability and VHF transceivers with DSC facilities meeting Australian standards are available, but may be of more limited use. Eventually it is expected that DSC will be common in all small vessel marine MF/HF and VHF transceivers. Some manufacturers may provide kits for adding DSC capability to existing MF/HF and VHF radiotelephony-only transceivers.

82.2 Whilst DSC controllers for large vessels are capable of a full range of DSC services, those intended for the recreational and small vessel market generally have fewer options. However, all contain the ability to use DSC for distress alerting, distress and routine call acknowledgment, and all stations and single station alerting. The ability to transmit position information, either from a GPS receiver interface or from manual entry, is also available.

◆●

82.3 Search and rescue authorities strongly recommend connection of a ship station DSC controller to a GPS receiver to ensure that accurate and current position information is automatically transmitted in the case of a Distress Alert. ◆●

82.4 Some MF/HF controllers may offer the option of sequentially scanning all MF/HF DSC frequencies for alerts.

82.5 Whilst DSC operational procedures are not difficult, and in most cases simply parallel standard radiotelephony procedures, operators of DSC-capable equipment must ensure that they are entirely familiar with the manufacturer's instructions concerning controls and programming, particularly those concerning transmission and reception of priority calls.

82.6 Radiotelephony only MF/HF and VHF transceivers are not capable of encoding or decoding DSC Alerts.

82.7 DSC should not be confused with the proprietary selective calling systems (selcal) presently available on some MF/HF marine transceivers. These systems are not compatible with international DSC signalling standards.

83. DSC IDENTIFICATION

83.1 To use DSC techniques, a MF/HF or VHF DSC controller must be permanently programmed with a unique nine digit identification number known as a Maritime Mobile Service Identity (MMSI). This can be regarded as the electronic equivalent of a radiotelephony call sign and uniquely identifies that maritime communication, limited coast, or ship station. ◆●

83.2 The MMSI is automatically included in all DSC transmissions from a station and electronically identifies that station to the receiving station(s). The MMSI also acts as an "electronic filter" whilst the DSC is operating in the watchkeeping mode to ensure that only routine DSC Alerts intended for that station are actually decoded and displayed. The filter is deactivated when any DSC Alert carrying a distress priority indicator is received as these messages are implicitly addressed to all stations. ◆●

Similarly, DSC urgency and safety alerts which are not specifically addressed to a particular station will be received by all stations within radio range and keeping a DSC watch. ◆●

83.3 Three of the nine digits of a MMSI identify country of origin. In the case of a maritime communication station or limited coast station these digits indicate the country of location, and in the case of a ship station, the country of registration. The remaining six digits uniquely identify the station itself. The three digits identifying the country of origin are known as Maritime Identification Digits or MIDs. Australia's MID is 503 with these figures forming the first three digits for ship stations, and third to fifth digits for maritime communication station or limited coast stations. ♦●

83.4 An Australian Ship Station MMSI will be formed 503xxxxxx where x is any figure from 0 to 9. ♦●

83.5 An Australian coast station MMSI will be of the form 00503xxxx where the first two figures are zeros and x is any figure from 0 to 9. The MMSI for both Australian maritime communication stations is 005030001. ♦●

83.6 At present, any person purchasing a MF/HF or VHF transceiver with DSC capability and wishing to use the option must obtain a MMSI which is issued by AMSA. This must then be programmed into the transceiver. See the AMSA website for more information (http://www.amsa.gov.au/AuSSAR/AMSA89.pdf). ♦●

83.7 A full international list of MIDs appears in Appendix 43 of the Radio Regulations published by the International Telecommunication Union.

84. FREQUENCIES FOR DSC DISTRESS, URGENCY AND SAFETY ALERTS

84.1 Frequencies have been internationally allocated in the MF/HF and VHF marine bands for DSC distress, urgency and safety alerts. In each case there is a radiotelephony frequency directly associated with the DSC frequency for communications subsequent to the DSC alert. Only the HF DSC frequencies, indicated with an asterisk (*), are monitored by Australian maritime communication stations Wiluna and Charleville. The other DSC frequencies may not be monitored in your area. The DSC and associated radiotelephony frequencies are:

DSC frequency & associated radiotelephony frequency: ♦●	
DSC	Radiotelephony
2187.5 kHz	2182 kHz
4207.5 kHz*	4125 kHz
6312.0 kHz*	6215 kHz
8414.5 kHz*	8291 kHz
12577.0 kHz*	12290 kHz
16804.5 kHz*	16420 kHz
VHF Ch 70	VHF Ch 16

84.2 The MF/HF DSC frequencies indicated above are reserved exclusively for DSC alerts associated with distress, urgency and safety messages. ●

84.3 Marine VHF channel 70 may additionally be used for routine station-to-station DSC alerts. ♦●

84.4 DSC is not used in the 27 MHz marine band, and Australian maritime communication stations no longer monitor the MF and VHF bands.

84.5 Unless the frequency/channel is specifically indicated in the DSC alert then radiotelephony communications should follow on the associated radiotelephony distress and calling frequency. For example, on 2182 kHz after a DSC alert on 2187.5 kHz, or on VHF channel 16 after a DSC alert on VHF channel 70. ♦●

84.6 Some DSC equipment will automatically change frequency/channel on reception of an alert. Automatic switching will occur to the associated frequency/channel, or if data is included in the alert, that may be indicated.

84.7 Radiotelephony transmissions are prohibited on the MF/HF DSC frequencies and the VHF channel allocated for DSC. ♦●

85. FREQUENCIES FOR ROUTINE DSC ALERTS

85.1 DSC techniques may also be used by ship stations for the purposes of setting up commercial (public correspondence) communications. Frequencies have been internationally allocated for these purposes.

85.2 DSC equipment allows a ship station to select a particular shore station (by its MMSI) by programming in a desired telephone number. The burst of data transmitted enables fully automated contact between the vessel and the shore subscriber.

85.3 DSC facilities for public correspondence are not currently provided in Australia.

85.4 Routine ship to ship DSC alerts can be made only on VHF channel 70 and will require the sender to know and programme in the MMSI of the vessel to be called. ♦●

86. WATCHKEEPING ON DSC DISTRESS, URGENCY AND SAFETY FREQUENCIES

86.1 Australian maritime communication stations maintain a continuous watch only on the HF DSC frequencies identified in 84.1 for distress, urgency and safety alerts. ●

86.2 Maritime communication stations do not provide watchkeeping on MF (2187.5 kHz) or on VHF channel 70. ♦●

86.3 As DSC-capable equipment penetrates the small vessel market it is expected that limited coast stations operated by volunteer marine organisations may provide some DSC watchkeeping on MF/HF and VHF for distress, urgency and safety alerts. This is likely to be in addition to traditional loudspeaker watchkeeping on radiotelephony frequencies and channels.

86.4 Large trading vessels maintain a continuous watch on VHF channel 70, 2187.5 kHz, 8414.5 kHz and one other HF DSC frequency appropriate to the time of day and position of the ship. Compulsory watchkeeping by these vessels on 2182 kHz has been discontinued but watchkeeping on VHF channel 16 has been extended.

86.5 Small vessels with DSC capability may scan the DSC frequencies/channel appropriate to the type of radio equipment carried and their area of operation. However, it must be kept in mind that it will be many years before DSC capability is universal in small vessel equipment.

86.6 Because of the large distances that radio signals can travel, distress alerts from all over the world may be received by stations scanning the higher HF DSC frequencies. Once such an alert is received a station has an obligation to continue its involvement until it can be assured that it has no part to play. Ship and limited coast stations may therefore wish to limit their DSC scanning to, for example, 8 MHz during the day, and 2 and 4 MHz during hours of darkness.

86.7 There is a high probability that a distress alert received on VHF channel 70 or on 2187.5 kHz will be local and it is recommended that these are monitored if a DSC facility is fitted. ♦●

87. INFORMATION CONTAINED IN A DSC ALERT

87.1 A DSC Alert may contain all or some of the following information as digitised data:

>> the identity of the calling station (MMSI);

>> the station being called (a specific station or all stations);

>> the priority of the alert - distress, urgency, safety or routine; and

>> the position of the calling station and an indication of when the position was last updated. ♦●

87.2 The alert may also contain data indicating the frequency or channel on which subsequent communications are to be conducted. Normally, but not necessarily, this is the associated radiotelephony frequency/channel (see paragraph 84.1). However, if frequency/channel information is not contained in the alert, it is always the associated radiotelephony frequency or channel. ♦●

87.3 Position information can be inserted automatically by a connection between the DSC equipment and a GPS receiver, or by manual entry. If no automatic input or manual update is available the distress co-ordinates and time of update information will default to 9999999999 and 8888 respectively. ♦●

87.4 The use of priority DSC alerts (distress, urgency and safety) is subject to exactly the same requirements as outlined in Chapter 10 of this handbook.

88. DSC ALERT FORMATS

88.1 The international DSC system provides for the following types of alerts:

>> distress alert - these calls are implicitly addressed to all stations. The alert contains the vessel's MMSI, position information, its validity, and possibly an indication of the nature of the distress;

>> distress alert acknowledgment - normally only sent by maritime communication stations and limited coast stations in response to a distress alert. May be used by ship stations only under certain circumstances;

>> distress alert relay - normally only sent by maritime communication stations and limited coast stations. May be used by ship stations only under certain circumstances;

>> all station (all ship) - used to alert all stations that an urgency or safety broadcast will follow and;

>> selective (single station) - used to alert a particular station to an urgency or safety message to follow. Some small vessel equipment may not permit the inclusion of the urgency or safety priority. This call is also used to alert another station to a routine call. The MMSI of the desired station must always be known and manually entered into the transceiver. The format of the MMSI indicates the type of station being called. ♦●

88.2 It is essential that operators of DSC-capable equipment are familiar with the particular alert options provided on the transceiver in use. It should be noted that the "all station" format includes maritime communication stations and limited coast stations. Similarly the "selective" format is used to address a particular maritime communication station, limited coast station or a ship station. ♦●

88.3 Some small vessel DSC-capable transceivers may not provide a distress alert relay format.

89. DSC DISTRESS ALERT PROCEDURES

89.1 A distress alert from a vessel may be transmitted only on the authority of the master, skipper, or the person responsible for the safety of that vessel. It has absolute priority over all other transmissions and indicates that the vessel or person using it is threatened by grave and imminent danger and requests immediate assistance. All stations which receive a distress alert must immediately cease all transmissions capable of interfering with distress communications. ♦●

89.2 The distress alert should include the vessel's last known position and an indication of when it was last updated. ♦●

89.3 Distress position information will normally be included automatically from an interface with satellite positioning equipment such as GPS. Some DSCs may permit position information to be inserted manually. Some DSCs may also offer the option of selecting from a menu and transmitting the nature of distress, for example, "on fire", "collision". ♦●

89.4 Once selected and initiated, a DSC distress alert will continue to be automatically repeated until terminated by the operator, or when a DSC distress alert acknowledgment generated by another station is received and decoded by the distressed vessel. ♦●

89.5 The DSC distress alert from a vessel is transmitted as follows:

>> select the appropriate MF/HF or VHF DSC controller;

>> select the appropriate distress option; - i.e. hold down the distress button or;

>> if time permits 'edit' the distress by keying in:

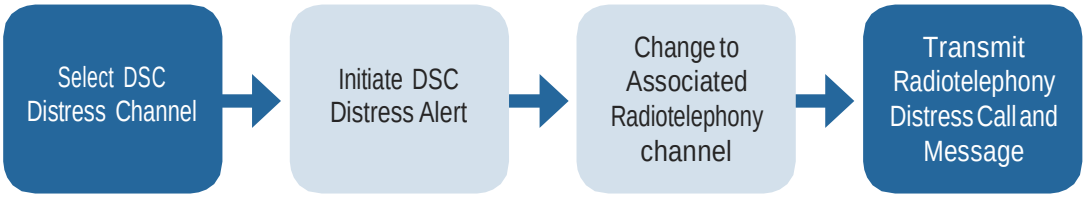
- position information (not necessary with a GPS interface)
- nature of distress (from standard menu if provided)
- mode for subsequent communications; Radiotelephone or Telex etc.

- select whether alert to be transmitted on a single distress frequency or all the distress frequencies. The VHF DSC distress alert is transmitted on channel 70 only.
- press the distress button to transmit the Alert.
- at the MF/HF or VHF transceiver ensure the appropriate radiotelephony, telex distress frequency or that VHF channel 16 is selected.;
- timepermittingthetwotoneradiotelephony alarm signal should be transmitted on the appropriate MF/HF radiotelephony distress frequencies;
- transmit the distress call and message as described in paragraphs 127 - 128 of this handbook. ◆●

89.6 Whilst these procedures may appear time-consuming, it is possible that all the vital information for the distress alert can be transmitted by a single button push. In a worst-case scenario where any further radio transmissions are not possible, the distressed vessel can be reasonably assured on having broadcast a distress alert containing its identity and its position. ◆●

89.7 All of the information transmitted in a DSC distress alert is decoded and displayed on other DSC-capable receivers scanning the frequency/channel and is accompanied by an audible alarm to alert the operator. The broadcast of the radiotelephony distress call and message on a radiotelephony frequency/channel further alerts and advises stations of the distress situation. ◆●

Steps to transmit a DSC distress alert and subsequent distress call and message.



90. ACKNOWLEDGMENT OF RECEIPT OF A DSC DISTRESS ALERT ON 2187.5 KHZ OR VHF CHANNEL 70

90.1 Ship stations receiving a distress alert from another vessel should take note of the contents and immediately listen on 2182 kHz or VHF Channel 16 for the MAYDAY message that should follow. ◆●

90.2 If the MAYDAY message is received and the receiving ship is able to provide assistance, then a radiotelephony acknowledgment (RECEIVED MAYDAY) should be sent to the distressed vessel on 2182 kHz or VHF channel 16, and an appropriate maritime communication station or limited coast station advised. ◆●

90.3 If the receiving ship is not able to provide assistance, and other stations are heard indicating involvement in the distress situation, then no acknowledgment should be sent. ◆●

90.4 In situations where a ship station has received a DSC distress alert and

a) no MAYDAY message has been heard on 2182 kHz or VHF channel 16 within 5 minutes;

b) no other station is heard communicating with the distressed vessel; and

c) the DSC distress alert continues to be received; ◆●

then the ship which received the DSC distress alert should transmit a radiotelephony acknowledgment substituting the distressed vessel's MMSI for its name and call sign, if necessary. Immediately following this, the receiving ship must contact an appropriate maritime communication station or limited coast station and fully advise it of the situation. ◆●

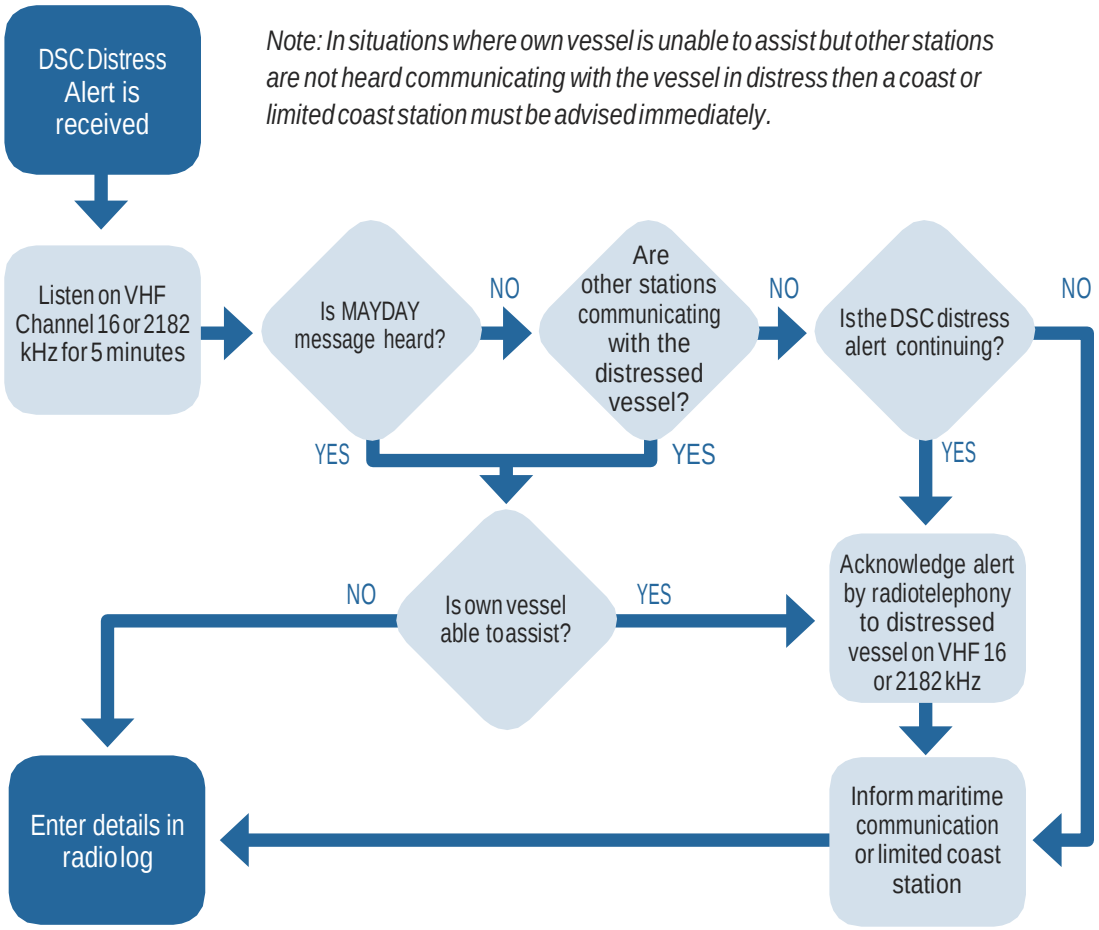
90.5 In situations where a ship station has received a DSC distress alert and no MAYDAY message has been heard on 2182 kHz or VHF channel 16 within 5 minutes; and

a) no other station is heard communicating with the distressed vessel; and

b) the DSC distress alert is not continuing

then no acknowledgment should be sent. The receiving ship should immediately contact an appropriate maritime communication station or limited coast station and fully advise it of the situation. ◆●

Actions by ships upon reception of DSC Distress Alert on VHF channel 70 or 2187.5 kHz.



91. ACKNOWLEDGMENT OF RECEIPT OF A DSC DISTRESS ALERT ON 4207.5, 6312, 8414.5, 12577 OR 16804.5 KHZ

91.1 Ship stations receiving a DSC distress alert from another vessel should take note of the contents and immediately listen on the associated radiotelephony frequency for the MAYDAY message that should follow. •

91.2 If the MAYDAY message is received and the receiving ship is able to provide assistance, then an appropriate maritime communication station or limited coast station should be contacted with an offer to provide that assistance. •

91.3 If the receiving ship is not able to provide assistance, and other stations are heard indicating involvement in the distress situation, then no further action need be taken. •

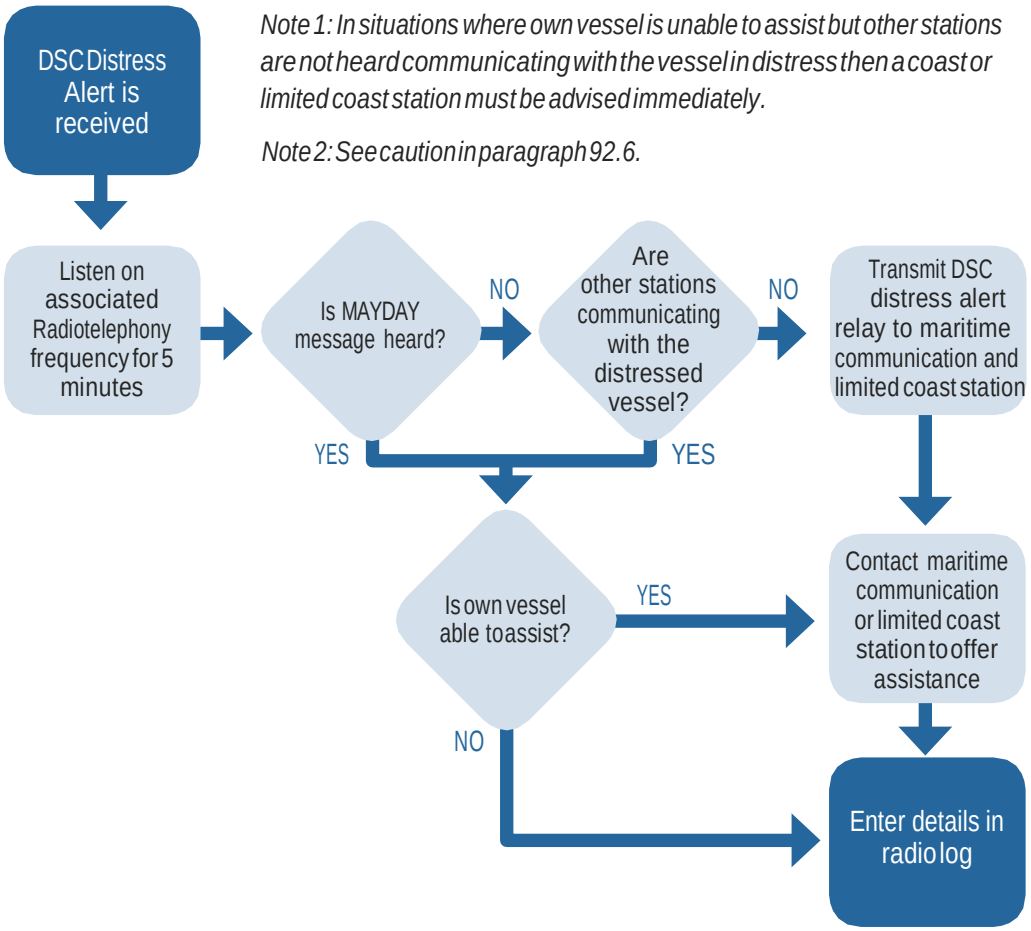
91.4 In situations where a ship station has received a DSC distress alert and

a) no MAYDAY message has been heard on the associated radiotelephony channel within 5 minutes; and

b) no other station is heard communicating with the distressed vessel;

then the receiving ship should transmit a DSC distress alert relay to an appropriate maritime communication station or limited coast station. •

Actions by ships upon reception of DSC distress alert on 4207.5, 6312, 8414.5, 12577 or 16804.5 kHz



Note 1: In situations where own vessel is unable to assist but other stations are not heard communicating with the vessel in distress then a coast or limited coast station must be advised immediately.

Note 2: See caution in paragraph 92.6.

91.5 It should be noted that some large trading vessels have the capability, and may elect, to conduct communications subsequent to a DSC distress alert by telex over radio (also known as narrowband direct printing or NBDP) on a frequency dedicated to this use. This will usually be apparent to a ship or limited coast station by reference to the final piece of DSC information received and displayed. If this reads J3E then the vessel will be using radiotelephony for subsequent traffic. If it reads F1B then the vessel will be using telex over radio. •

92. TRANSMISSION OF A DISTRESS ALERT RELAY

92.1 Maritime Communication Stations after having received and acknowledged a DSC distress alert, will normally retransmit the information as a DSC distress alert relay. ●

92.2 Ship stations should normally consider transmitting a distress alert relay only when a distress alert has been received on 4207.5, 6312, 8414.5, 12577 or 16804.5 kHz and no other station is heard communicating with the distressed vessel on the associated radiotelephony channel. The distress alert relay must be addressed to an appropriate maritime communication or limited coast station. The distress alert relay must not be addressed to "all ships". ●

92.3 Ship stations receiving a DSC distress alert on either 2187.5 kHz or VHF Channel 70 should not transmit a distress alert relay. Instead, a radiotelephony acknowledgment should be made to the distressed vessel on 2182 kHz or VHF channel 16, and the nearest maritime communication station or limited coast station should be informed. ♦●

92.4 Ship stations may transmit a DSC distress alert relay in situations where a distress alert has not been received. However, this is restricted to situations where it is learnt that another vessel in distress is not able to transmit the distress alert and the Master of the ship not in distress considers that further help is necessary. In this case the DSC distress alert relay should be in the "all ship" format or, preferably, addressed to an appropriate maritime communication station or limited coast station. ♦●

92.5 Some small vessel DSCs may not provide a DSC distress alert relay facility. In these situations a MAYDAY RELAY message on the associated radiotelephony frequency may be substituted and every endeavour made to inform a maritime communication station or limited coast station. In the situation detailed in paragraph 92.3, the MAYDAY RELAY message should be transmitted on a radiotelephony frequency or channel considered appropriate to the situation. A MMSI may be used in cases where a vessel's name and call sign are not known. ♦●

92.6 Operators should exercise careful judgement in relaying DSC distress alerts received on the higher frequencies as these could be received from and by vessels at distances of thousands of miles. Indiscriminate relaying will merely increase the area that stations are alerted without performing any useful function. ●

93. ACKNOWLEDGMENT OF A DSC DISTRESS ALERT RELAY

93.1 Where considered appropriate, ship stations receiving a DSC distress alert relay from another station should acknowledge receipt by radiotelephony on the associated radiotelephony frequency/channel using the procedures detailed in paragraph 132 of this handbook. ♦●

94. CANCELLATION OF AN INADVERTENT DSC DISTRESS ALERT

94.1 Unlike radiotelephony procedures, it is possible to inadvertently initiate a DSC distress alert. Should this occur then it is essential that the initiating station carry out the following procedures:

>> immediately switch off the DSC unit and transceiver in question (this will cancel any automatic repeats of the DSC distress alert transmission which would normally continue until a DSC acknowledgment is received); then

>> switch the transceiver back on and select the radiotelephony frequency/channel associated with the DSC frequency/channel on which the inadvertent alert was transmitted; then

>> broadcast an "all stations" radiotelephony message giving the vessel's name, call sign and MMSI, and cancel the distress alert, giving an approximate time of the inadvertent transmission.

If the inadvertent DSC distress alert was transmitted on several frequencies, it is necessary to broadcast cancellations on all associated radiotelephony frequencies. ♦●

94.2 If for some reason these procedures cannot be carried out then the station must use other means to advise authorities that the alert was accidental. ♦●

94.3 Failure to appropriately advise authorities may result in the distress alert being treated as genuine and lead to a waste of valuable search and rescue resources. A ship station operator will not be penalised for reporting an inadvertent distress alert.

95. TRANSMISSION OF A DSC URGENCY ALERT

95.1 A DSC urgency alert may be transmitted only with the authority of the master or skipper, or the person responsible for the safety of the vessel. It indicates that the station has a very urgent message to transmit concerning the safety of a vessel or aircraft, or the safety of a person. ♦●

95.2 The transmission of a DSC urgency alert by maritime communication, limited coast and ship stations is carried out in the following manner:

>> the announcement of the urgency message by DSC alert on a DSC frequency/channel; followed by

>> the transmission of the urgency call and message on the indicated working radiotelephony frequency/channel using radiotelephony procedures. ♦●

95.3 The announcement is carried out by:

>> selecting the appropriate MF/HF or VHF DSC controller;

>> selecting the "all ship" or "selective" call format;

>> selecting the urgency priority;

>> setting the MH/HF DSC controller to the working frequency for subsequent communications;

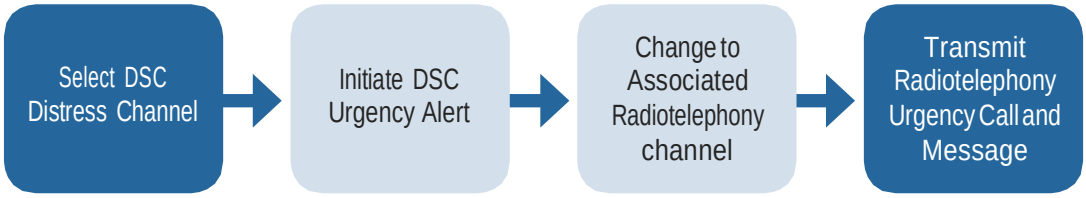
>> setting the MF/HF DSC controller to the appropriate DSC distress, urgency or safety frequency (i.e.) 2187.5 kHz. The VHF DSC alert is transmitted on channel 70; and

>> transmitting the DSC urgency alert. ♦●

95.4 The transmission of the urgency call and message should follow immediately on the associated radiotelephony frequency/channel using the radiotelephony procedures detailed in paragraph 137 of this handbook. ♦●

95.5 Stations receiving a DSC urgency alert should not acknowledge receipt but simply tune their transceiver to the associated radiotelephony frequency/channel and await the radiotelephony transmission. ♦●

Steps to transmit a DSC urgency alert and subsequent urgency call and message.



96. TRANSMISSION OF A DSC SAFETY ALERT

96.1 The transmission of a DSC safety alert indicates that the station has a message to transmit concerning an important navigational or weather warning. ♦●

96.2 The transmission of a DSC safety alert by maritime communication, limited coast and ship stations is carried out in the following manner:

>> the DSC announcement of the safety message by DSC alert on a DSC distress or safety frequency/channel; followed by

>> the working frequency/channel may be indicated in the safety alert

>> the radiotelephony announcement on the associated radiotelephony frequency/channel that a safety message will follow on a working frequency/channel; followed by

>> the transmission of the safety call and message on a radiotelephony working frequency/channel. ♦●

96.3 The DSC announcement is carried out by selecting the appropriate DSC unit:

>> selecting the appropriate MF/HF or VHF DSC controller;

>> selecting the "all ship" or "selective" call format;

>> selecting the safety priority;

>> setting the MH/HF DSC controller to the working frequency for subsequent communications;

>> setting the MF/HF DSC controller to the appropriate DSC distress, urgency or safety frequency (i.e.) 2187.5 kHz. The VHF DSC alert is transmitted on channel 70; and

>> transmitting the DSC safety alert. ♦●

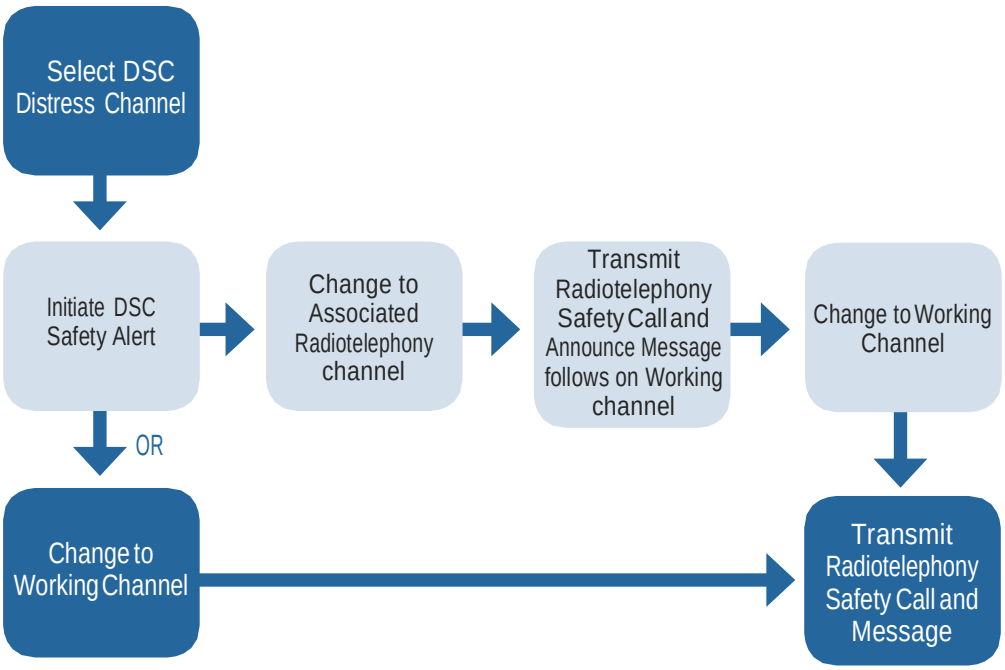
96.4 The radiotelephony announcement that a safety message will follow on a working frequency may follow immediately on the associated radiotelephony distress or safety frequency/channel using the procedures detailed in paragraph 140 of this handbook. The radiotelephony working frequency/channel may be indicated in the safety alert. ♦●

96.5 The transmission of the safety call and message should follow immediately on the chosen radiotelephony working frequency/channel using the procedures detailed in paragraph 140 of this handbook. ♦●

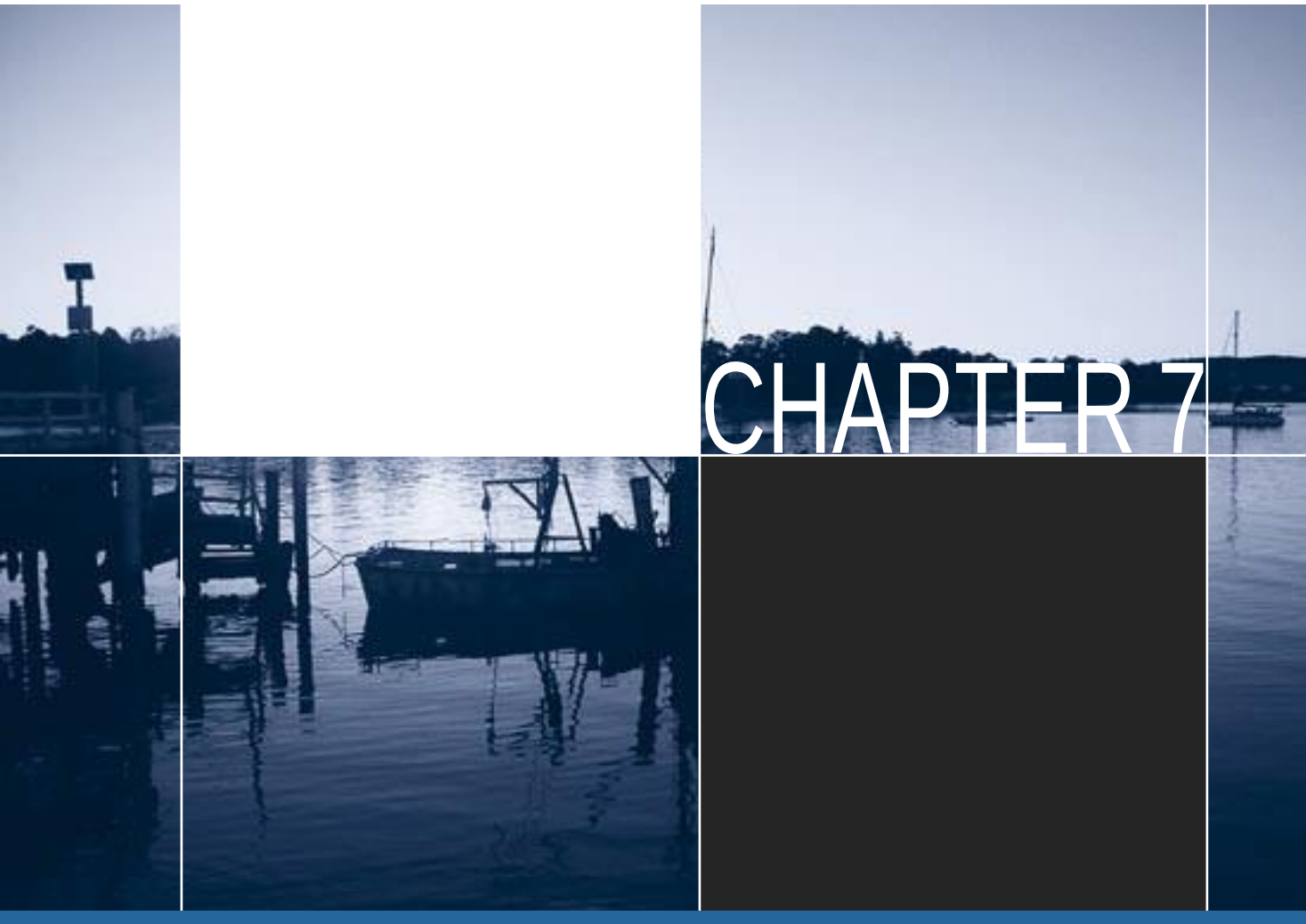
96.6 Stations receiving a DSC safety alert should not acknowledge receipt but simply tune their transceiver to the associated radiotelephony frequency/channel and await the radiotelephony announcement. ♦●

96.7 Should the initiating station wish that the safety alert is received only by a particular station, then the "single station" call format should be selected. In this case the MMSI of the station must be known and programmed into the transceiver.

Steps to transmit a DSC safety alert and subsequent safety call and message.



Emergency Position Indicating Radio Beacons (EPIRB's)



CHAPTER 7

SECTION 17 EMERGENCY POSITION INDICATING RADIO BEACONS (EPIRBS)

IMPORTANT NOTE

Users and prospective purchasers of 121.5/243 MHz EPIRBs should be aware that there are international moves to phase-out satellite-aided alerting and location of this type of beacon on 1st Feb. 2009. EPIRBs operating on 406 MHz will be unaffected.

97. GENERAL INFORMATION

97.1 An EPIRB is a small, self-contained, battery-operated radio transmitter which is both watertight and buoyant. Radio Regulations state that the EPIRB battery should be capable of supplying power to the EPIRB for a minimum of 48 hours. ◆●

97.2 The essential purpose of an EPIRB is to assist in determining the position of survivors in search and rescue operations. ◆●

97.3 An EPIRB should not be carried as an alternative to an approved marine radio transceiver. It should be considered as a supplement rather than a replacement.

97.4 Commonwealth and State legislation compel many vessels to carry EPIRBs. However, the importance of carrying a suitable EPIRB aboard every vessel proceeding more than a few miles offshore, or making a coastal or overseas voyage cannot be too highly emphasised. ◆●

97.5 Activation of most EPIRBs is a simple two step action. However, owners should familiarise themselves with the manufacturers instructions.

97.6 Once activated the EPIRB should be capable of operating for a minimum of 48 hours, and should not be switched off until told to do so by a rescue authority, or until rescue is completed. ◆●

97.7 Individual radiocommunications licences are not required for EPIRBs: they are authorised under a class licence. However, in respect of 406 MHz type beacons, it is essential that they are registered with the Co-ordination Centre in Canberra (RCC Australia). RCC Australia is operated by the Australian Maritime Safety Authority and registration is free. See paragraphs 109.1 to 109.4. ◆●

97.8 Emergency locator transmitters (ELTs), designed for aircraft use, are neither suitable nor recommended for shipboard use.

97.9 Personal EPIRBs are available which are designed to be attached to a lifejacket, carried in a pocket, or around the neck. Due to lack of ballast, this type of EPIRB will not float upright and for proper operation, must be kept in an upright position by the user. Personal EPIRBs should not be confused with Personal Locator Beacons (PLBs) which are designed for land use and may not be suitable for use in a marine environment.

98. TYPES OF EPIRB

98.1 There are two types of approved EPIRB available in Australia which are suitable for small vessel use:

>> a small, inexpensive type which operates on the aircraft VHF frequencies of 121.5 and 243 MHz and which may be designed either for carriage on a vessel or for attachment to a lifejacket; and

>> the more expensive and sophisticated type which operates on the frequency of 406.025 MHz or 406.028 MHz with the addition of 121.5 MHz transmitted for aircraft homing (usually referred to as a 406 MHz EPIRB). ◆●

98.2 Once activated, both types are capable of being detected and located by aircraft and a specialised satellite-aided system known as COSPAS-SARSAT.

◆●

99. THE COSPAS-SARSAT INTERNATIONAL SATELLITE SYSTEM

99.1 The COSPAS-SARSAT system is a satellite-aided search and rescue system designed to locate activated EPIRBs transmitting on 121.5 and 406.025 MHz. ♦●

99.2 Some satellites used by the COSPAS-SARSAT system can also detect EPIRBs operating on 243 MHz. Military search aircraft and some civil search aircraft are capable of homing on 243 MHz.

99.3 The system is intended to serve all organisations in the world with a responsibility for search and rescue operations, wherever a distress situation may occur.

100. GEOSTATIONARY EARTH ORBITING SATELLITES (GEOS)

100.1 Under the COSPAS-SARSAT System there are five satellites in fixed stationary orbit some 36,000 km above the equator. These satellites provide near world coverage approx. 70° North to 70° South. Signals from an activated EPIRB are relayed from the GEOS to its relevant Local User Terminal. ♦●

101. LOW EARTH ORBITING SATELLITES (LEOS)

101.1 The LEO satellites are located some 1000 km above the earth's surface, taking approx. 100 minutes to complete a polar orbit. The viewing range or 'footprint' of the orbiting satellite is 2000 km either side of its track over the earth's surface. ♦●

101.2 The Cospas-Sarsat System design constellation is four satellites which provide a typical waiting time of less than one hour at mid-latitudes. At least one of these satellites is within "line-of-sight" of any point on the Earth's surface at a maximum interval of approximately three hours. The average interval is considerably less. ♦●

101.3 Many countries have ground receiving facilities, known as Local User Terminals or LUTs to receive information relayed by the satellites from activated EPIRBs. ♦●

101.4 Australia has established LUTs at Bundaberg, Qld and Albany, WA. These terminals are linked directly by landline to the COSPAS-SARSAT Mission Control Centre at RCC Australia in Canberra. ♦●

101.5 Another LUT for the southwest Pacific region is situated at Wellington, New Zealand. This terminal is operated by the NZ Civil Aviation Authority, and is also directly linked to the RCC Australia in Canberra. ♦●

SECTION 18 121.5/243 MHZ EPIRBS

102. METHODS OF DETECTION AND LOCATION

102.1 A 121.5/243 MHz EPIRB, once activated, simultaneously radiates a continuous series of distinctive descending tones on the aeronautical distress frequencies of 121.5 and 243 MHz. The signal can be detected and located by:

>> aircraft within range which are listening on either the civil aeronautical distress frequency of 121.5 MHz or the military aeronautical distress frequency of 243 MHz; and

>> the COSPAS-SARSAT satellite system. ♦●

103. DETECTION AND LOCATION BY AIRCRAFT

103.1 Military, civil international and some domestic aircraft on major air routes maintain a listening watch on one of the aeronautical distress frequencies of 121.5 and 243 MHz. The distance that such an aircraft is likely to detect an activated EPIRB depends entirely on the height of the aircraft. A high flying passenger jet aircraft would probably hear the signal at a radius of about 330 km (180 nautical miles), while a smaller aircraft flying at medium altitudes would hear the signal within about 185 km (100 nautical miles). ♦●

103.2 An aircraft hearing an activated EPIRB will immediately make a report to aviation authorities who, in turn, will pass this information to the RCC. An approximate position estimate of the activated EPIRB can be made by plotting the "first heard" and "last heard" positions.

103.3 Once a general search area has been established, military or civilian aircraft with specialised direction-finding equipment will be used for the task of localising the EPIRB. Survivors should use all appropriate visual signals to attract the attention of searching aircraft during the final stages.

104. DETECTION AND LOCATION BY SATELLITE

104.1 Signals radiated from a satellite-compatible 121.5/243 MHz EPIRB can also be detected by the COSPAS-SARSAT system's satellites. These signals are relayed by a satellite directly back towards the Earth. If the activated EPIRB and the ground receiving facilities of a local user terminal (LUT) are simultaneously within view of the satellite, the EPIRB signals are received by the LUT. ♦●

104.2 This information is processed by the LUT to provide position information and then is passed directly to RCC Australia in Canberra. Successive satellite passes are used to refine this information.

104.3 A 121.5/243 MHz EPIRB can generally be located by the COSPAS-SARSAT system to within 20 km (11 nautical miles). Aircraft can be used for the final location of the distress position as described in paragraph 103.3. ♦●

104.4 Because of the requirement that an orbiting satellite must simultaneously "see" both the activated EPIRB and a LUT, detection and location of 121.5/243 MHz EPIRBs is limited to particular geographical areas surrounding a LUT.

104.5 The diagram shows the approximate geographical limits and median detection time for 121.5/243 MHz EPIRBs using the combined resources of the LUTs in Queensland, Western Australia and New Zealand.

COSPAS-SARSAT system coverage for 121.5/243 MHz EPIRBs using local user terminals located in Queensland, Western Australia and New Zealand. Median time to detect and locate an activated beacon is also shown. (The darker shading indicates Australia's area of responsibility for search and rescue).

104.6 It can be seen from the diagram that the 121.5/243 MHz EPIRB can provide significant support to search and rescue operations in all Australian and New Zealand coastal waters. Parts of the Indian, Southern and Pacific Oceans, the Timor Sea and waters around Papua New Guinea also fall into the service area of the three LUTs.

104.7 Although LUTs established in other countries provide a service for 121.5/243 MHz EPIRBs in other areas, major parts of the Indian, South Atlantic and Pacific Oceans remain uncovered.

104.8 Vessels making voyages outside 121.5/243 MHz service areas should carry a 406 MHz EPIRB. It is recommended that vessels proceeding more than 30 nautical miles offshore carry a 406 MHz EPIRB.

105. SATELLITE DETECTION AND LOCATION OF OLDER 121.5/243 EPIRBS

105.1 Because of the sophisticated technology used in the COSPAS-SARSAT satellite detection and location system, ACMA (and its predecessors) has enforced stringent technical standards for 121.5/243 MHz EPIRBs manufactured and sold after March 1990.

105.2 All EPIRBs manufactured to this standard, the Radiocommunications Standard (121.5 MHz and 243.0 MHz Emergency Position Indicating Radio Beacons) No.1 of 1996, are capable of being detected and located by satellites in the manner described in paragraphs 104.1 - 104.4. This standard may also be known as Australian/ New Zealand standard AS/NZS 4330:1995, and was previously known as Ministerial Standard 241 (MS241).

105.3 Tests carried out by search and rescue authorities on earlier models of 121.5/243 MHz EPIRBs, which are likely to bear a label certifying compliance with specification DOC 241A or 241B, show that very few of them are likely to be detected by the satellite system. Of those beacons that were detected, the calculated positions were inaccurate and misleading.

105.4 The Australian Maritime Safety Authority (AMSA) has stated that an owner of a 121.5/243 MHz EPIRB manufactured prior to 1990 should assume that this beacon is incompatible with the satellite system. The Authority strongly recommends that boat owners replace older EPIRBs with a type that meets AS/NZS 4330:1995, or the earlier MS 241 standard.

SECTION 19 406 MHZ EPIRBS

106. METHODS OF DETECTION AND LOCATION

106.1 The 406 MHz EPIRB radiates signals on the frequency of 406.025 MHz or 406.028 MHz. Those 406 MHz EPIRBs manufactured to Australian specifications will additionally radiate signals on 121.5 MHz for aircraft homing purposes. Australian 406 MHz EPIRBs can be detected and located by two methods:

>> by aircraft within range listening on the civil aeronautical distress frequency of 121.5 MHz; and

>> by the COSPAS-SARSAT satellite system. ♦●

107. DETECTION AND LOCATION BY AIRCRAFT

107.1 The method of detection and location of the 121.5 MHz signal component of a 406 MHz EPIRB by aircraft is the same as that described in paragraphs 103.1 - 103.3 for 121.5/243 MHz EPIRBs. ♦●

108. DETECTION AND LOCATION BY SATELLITE

108.1 Signals radiating from an activated 406 MHz EPIRB will be detected by satellites of the COSPAS-SARSAT system and relayed back towards the Earth. The 406MHz beacon transmits a 5 watt burst of data of approximately 0.5 seconds duration every 50 seconds. This data indicates the identity of the beacon. (See paragraph 109.1)

♦●

108.2 Because signals from a 406 MHz EPIRB are in a digitised form, they can also be stored in the satellite's memory. As the satellite's path brings it into view of a LUT, information, including time of first detection, is retrieved from the satellite's memory and relayed down to the LUT. This information is processed and passed to a rescue co-ordination centre, providing both an alert and a position. ♦●

108.3 A 406.025 MHz EPIRB can generally be located by the satellite system to a radius of better than 5 km (2.7 nautical miles). 406.028 MHz with frequent GPS position updating can give a position accuracy to within 30 metres of a beacon. Final location of the distress scene can be carried out by aircraft "homing" on the 121.5 MHz component of the EPIRB signal. ♦●

108.4 Because of the satellite's ability to memorise signals from a 406 MHz EPIRB, detection and location of this type of beacon does not suffer the geographical limitations of the 121.5/243 MHz model. An activated 406 MHz EPIRB can be detected and located at any place on the Earth's surface. ♦●

108.5 It is strongly recommended that all vessels making a voyage from Australia to any destination outside the limits of 121.5/243 MHz beacon coverage carry a 406 MHz EPIRB.

108.6 406 MHz EPIRBs have numerous advantages over the 121.5/243 MHz types. These advantages include:

>> the ability to be located more accurately;

>> identification of the owner/operator enables search and rescue authorities to obtain more intelligence before initiating a response;

>> the latest generation of beacons have the capability of detection by geostationary satellites enabling near instantaneous detection; and

>> newer generation beacons already have the capability of transmitting position data memorised from an interface with satellite navigation receivers (GPS).

109. IDENTIFICATION OF 406 MHZ EPIRBS

109.1 Every 406 MHz EPIRB has a unique identity code which is transmitted as part of its signal and which also indicates the country of registration. This code is programmed into the beacon by the supplier before it is offered for purchase. ♦●

109.2 As a result, local user terminals anywhere in the world receiving a distress alert and location from an activated 406 MHz EPIRB, can also identify the vessel in distress and the beacon's country of registration. ♦●

109.3 If this system is to work successfully, and for their own safety, it is essential that purchasers of 406 MHz EPIRBs complete the registration form provided by the supplier and mail it to RCC Australia in Canberra. The completion of this registration process will ensure that the RCC is equipped with information vital to a successful rescue mission. ♦●

109.4 It is just as important that purchasers of second-hand 406 MHz EPIRBs also provide their details to the RCC.

110. ACTIVATION OF 406 MHZ EPIRBS

110.1 406 MHz beacons are available in two types:

>> those that require manual activation; and

>> those that can be activated manually or will float-free and activate automatically should a vessel sink. ♦●

110.2 The manual activation type may offer an electronic menu of distress situations. Selection by an operator prior to activation will provide the rescue co-ordination centre with an identification of the vessel's type of distress, as well as its identity and country of origin. ♦●

110.3 Vessels compulsorily fitted with 406 MHz EPIRBs under Commonwealth legislation must carry the float-free type. ♦●

111. 406.028 MHZ EPIRB

Space reserved for future updating

SECTION 20 CARE AND MAINTENANCE OF EPIRBS

112. SERVICING

112.1 Vessels fitted with 121.5/243 and 406 MHz EPIRBs under Commonwealth and State legislation should refer to the relevant regulations concerning performance verification tests and battery replacement.

112.2 Boat owners voluntarily carrying EPIRBs of either type should refer to the owner's manual concerning recommended servicing and battery replacement.

112.3 An EPIRB must not be tested except strictly in accordance with the manufacturer's instructions for self-testing. ◆●

113. STOWAGE OF EPIRBs

113.1 Many EPIRBs are supplied with a bulkhead mounting bracket. It is recommended that this be used to stow an EPIRB in a place where it is both readily visible and accessible for use in an emergency.

113.2 If an inflatable life raft is carried on board, consideration should be given to stowage of an EPIRB inside the raft.

113.3 The float-free type of 406 MHz EPIRB should be carefully located and mounted to ensure that it is not fouled by the vessel's superstructure should the vessel sink and the beacon be released.

114. INAPPROPRIATE ACTIVATION OF EPIRBs

114.1 Every year valuable government and search and rescue resources are wasted in locating EPIRBs which have been activated inadvertently or maliciously. Most cases of accidental transmission result from unsuitable storage, or failure to totally disable an old model EPIRB before disposal. Theft and subsequent malicious activation of EPIRBs is an increasing problem and owners should take every care to minimise opportunities for beacons to be stolen. The need to treat EPIRBs responsibly cannot be too highly emphasised. ◆●

114.2 To minimise the possibilities of accidental activation, EPIRB owners are urged to pay careful attention to:

>> the need to avoid the stowage of EPIRBs in lockers with other equipment or objects that may subject the beacon activation switch to pressure (vessel movement should be considered);

>> the need to avoid the stowage of EPIRBs in places where they may lie in water or be subject to occasional high water pressure such as from a hose (the entry of water into the circuitry through deteriorating watertight seals may activate the beacon);

>> the complete removal of batteries or destruction of an EPIRB before disposal into the public garbage system;

>> the need to ensure that an EPIRB will not be activated through physical movement or shock during any form of transport away from a vessel;

>> the need to educate other persons aboard a boat regarding the consequences of activation;

>> the need to prevent interference with the beacon by children; and

>> the fact that a float-free EPIRB which has been "armed" will activate immediately on removal from its cradle (transportation away from the cradle should be made in the "safe" or "off" condition). ◆●

114.3 Should an EPIRB owner suspect that it has been activated inadvertently, this information MUST immediately be passed to RCC Australia in Canberra on telephone 1800 641 792 (24 hour number).

If accidental activation is discovered whilst at sea, this information should immediately be passed to a maritime communication station, another vessel, or to a limited coast station for on-forwarding to the RCC Australia.

In the case of a genuinely accidental activation of an EPIRB, an owner or operator need have no fear of being penalised by search and rescue authorities. ◆●

NOTES

Search and Rescue Transponders (SARTs)

CHAPTER 8

SECTION 21 SEARCH AND RESCUE TRANSPONDERS

115. SEARCH AND RESCUE TRANSPONDERS (SARTS) - GENERAL

115.1 A Search and Rescue Transponder or SART is a battery-powered portable device, which may be used by a survival craft to indicate its position to searching aircraft and vessels.

The SART operates in the 9.3 to 9.5 GHz band and will respond only to radar equipment operating on those frequencies (X Band, 3 Centimetre radar). The SART will not respond to 3 GHz (S band) radar.

The SART should operate in the standby mode for a minimum of 96 hours with a further eight hours of transmission. ♦●

115.2 Positioning of the SART

Under no circumstances should the SART be placed in the water. The SART should be mounted at least one metre above the water line. When in the survival craft survivors should position the SART as high as possible with the aid of an oar or the lifeboat mast. Some manufacturers will supply the SART with a short telescopic type mast of approximately one metre in length. ♦●

115.3 SART Operation

Once switched on the SART will scan the X Band of radar frequencies. When a "seeking radar" is detected the SART will lock onto that particular radar frequency and commence to transmit on the entire X Band thus enabling all vessels in the vicinity to receive an indication of the SART transmission.

On detecting signals from distant radar equipment, an activated SART will generate a series of response signals of twelve blips which will be displayed on the receiving radar screen, extending in a line, approx 5 to 8 nautical miles outward from the SART's position, along its line of bearing. This unique radar signal is easily recognised and the rescue vessel or aircraft can locate the survivors.

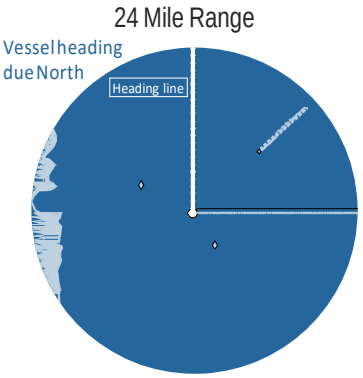
An interrogated SART will provide proof to survivors of operations by means of an audible and/or visible flashing light. ♦●

115.4 Location distances

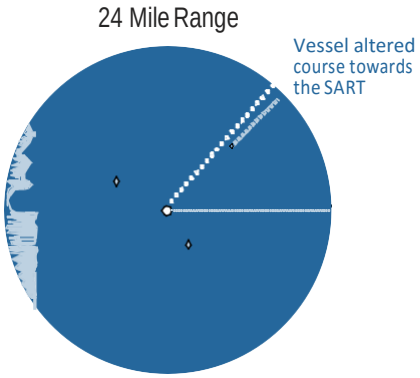
A SART should respond to a ship's radar with a scanner height of 15 metres at a distance of at least 5 nautical miles. ♦●

115.5 Location errors

Once locked on to a "seeking radar" there will be a slight delay in the changeover from the SARTs standby or receive mode to transmit mode. This slight delay may cause a small position error up to 150 metres on the radar screen of the blip associated with the position of the SART. Subsequent radar sweeps will confirm the actual location of the SART. ♦●



SART indication as seen on a marine radar on a bearing of 045°T. (Radar Display set to North Up)



SART Image on a marine radar once the vessel has altered course to head towards the SART position

Search and Rescue in Australia

CHAPTER 9

SECTION 22 SEARCH AND RESCUE: GENERAL INFORMATION

IMPORTANT NOTE

Small vessels interested in using the Australian Ship Reporting System 'AUSREP' require High Frequency digital selective calling or Inmarsat equipment. In particular it is expected that vessels participating in AUSREP would primarily be using Inmarsat-C with some limited reporting functions on High Frequency digital selective calling. See paragraph 120 or contact the Australian Maritime Safety Authority for more details.

116. RESPONSIBILITY

116.1 As a signatory to the *International Convention on Maritime Search and Rescue*, Australia has undertaken responsibility for search and rescue operations of a vast area of the Indian, Pacific and Southern Oceans, representing one-ninth of the world's oceans. The region stretches from longitude 75E to 163E, northwards to the border of Papua New Guinea and Indonesia and south to Antarctica. This area is similar to and may be referred to as AVAREA "X". ♦●

116.2 Australian maritime and aviation search and rescue (SAR) services are the responsibility of an organisation called AusSAR (Australian Search and Rescue).

116.3 AusSAR is a division of the Australian Maritime Safety Authority (AMSA) in Canberra and is the operating authority for the Australian Rescue Co-ordination Centre, RCC Australia. RCC Australia has responsibility for co-ordination of SAR operations in the area mentioned in paragraph 116.1. ♦●

116.4 A National Plan, involving both Commonwealth and State/Territory authorities, delegates the responsibility for the co-ordination of search and rescue operations for small vessels such as pleasure vessels and fishing vessels to State and Territory police forces. ♦●

116.5 State and Territory police forces, using the resources of recognised marine rescue organisations such as the Australian Volunteer Coast Guard, the Royal Volunteer Coastal Patrol and Volunteer Marine Rescue, as well as their own Water Police, co-ordinate most inshore boating emergencies. ♦●

117. CENTRALISED RECORDING OF SMALL VESSEL PARTICULARS

117.1 The owners of small vessels making regular offshore or coastal voyages are encouraged to lodge particulars of their vessel with RCC Australia. There may be other centralised recording of small vessel particulars. Contact your State/Territory authority or local volunteer marine rescue organisation for more information.

117.2 Information that is required and will be recorded includes type and description of the vessel, communications and safety equipment carried, owner's details and next of kin, and the vessel's general operating pattern and area. A recent photograph of the vessel would be helpful.

117.3 In an emergency, this information may prove vital to the success of rescue operations.

117.4 Small craft particulars forms are available from police stations in coastal areas, harbour authorities, marine rescue groups, yacht and boating clubs, any office of AMSA and the AMSA web site (www.amsa.gov.au/AUSSAR/amsa80.pdf).

117.5 Particulars should be updated at least every three years or whenever a significant feature of the vessel is altered, for example, the colour scheme.

118. THE AUSTRALIAN SHIP REPORTING SYSTEM (AUSREP)

118.1 Participation in the AUSREP system is compulsory for the majority of vessels subject to the Navigation Act 1912.

118.2 Small vessels may participate on a voluntary basis if they have access to the required equipment - including HF digital selective calling and / or Inmarsat and meet certain voyage requirements (see paragraph 118.7). However the AUSREP system is designed for larger vessels mentioned in paragraph 118.1 and may not suit the needs of some small vessels.

118.3 The AUSREP system is a ship reporting system which monitors the movements of vessels undertaking voyages anywhere within Australia's SAR area (see paragraph 116.1).

118.4 Before departure, or on entry to the AUSREP area, a sailing plan is lodged with RCC Australia in Canberra. Position reports are then sent every twenty-four hours or when changes are made to the initial sailing plan; and on arrival, or departing the AUSREP area, a final report is made. This information is used to track the vessel along its entire route. ◆●

118.5 Small vessel operators using AUSREP should be aware that it is a positive reporting system. Once a sailing plan is lodged, failure to make daily reports or a final arrival report will result in RCC Australia making preliminary checks to ascertain the vessel's safety. If, after these checks are completed, the vessel is still unreported or overdue, a further assessment will be made to determine the next course of action. Broadcasts to shipping to keep a lookout are made and search action is initiated. ◆●

118.6 Vessels suffering radio equipment failure should endeavour to report their position and intended movement to RCC Australia through another vessel by whatever means is available.

118.7 All small vessels suitably equipped, including pleasure vessels and fishing vessels, may participate in AUSREP. No charges are made. However, certain conditions must be met, including:

>> the voyage must be more than twenty-four hours between different ports, or greater than 200 nautical miles;

>> a satellite-compatible Emergency Position Indicating Radio Beacon (EPIRB) must be carried;

>> a current small craft particulars form must have been lodged with the authorities in Canberra (see paragraphs 117.1 - 117.5); and

>> approved marine GMDSS equipment must be carried which will enable the vessel to report to the Australian Maritime Safety Authority throughout the voyage. It is expected that vessels participating in AUSREP would primarily be using Inmarsat-C with some limited reporting functions on High Frequency digital selective calling.

118.8 AUSREP reports may be made by contacting RCC Australia on telephone 02 6230 6880 (reverse charges), free call 1800 641 792, free fax 1800 643 586 or by transmitting location information through HF digital selective calling or via Inmarsat to RCC Australia via an Australian maritime communication station.

118.9 A brochure, entitled "Reporting Systems for Small Craft", fully detailing the reporting procedures may be obtained by contacting any AMSA office. Information about reporting procedures may also be found in the Annual Australian Notices to Mariners which is obtainable from Hydrographic Offices and retail outlets specialising in the sale of navigational charts.

119. AUTOMATIC IDENTIFICATION SYSTEM (AIS)

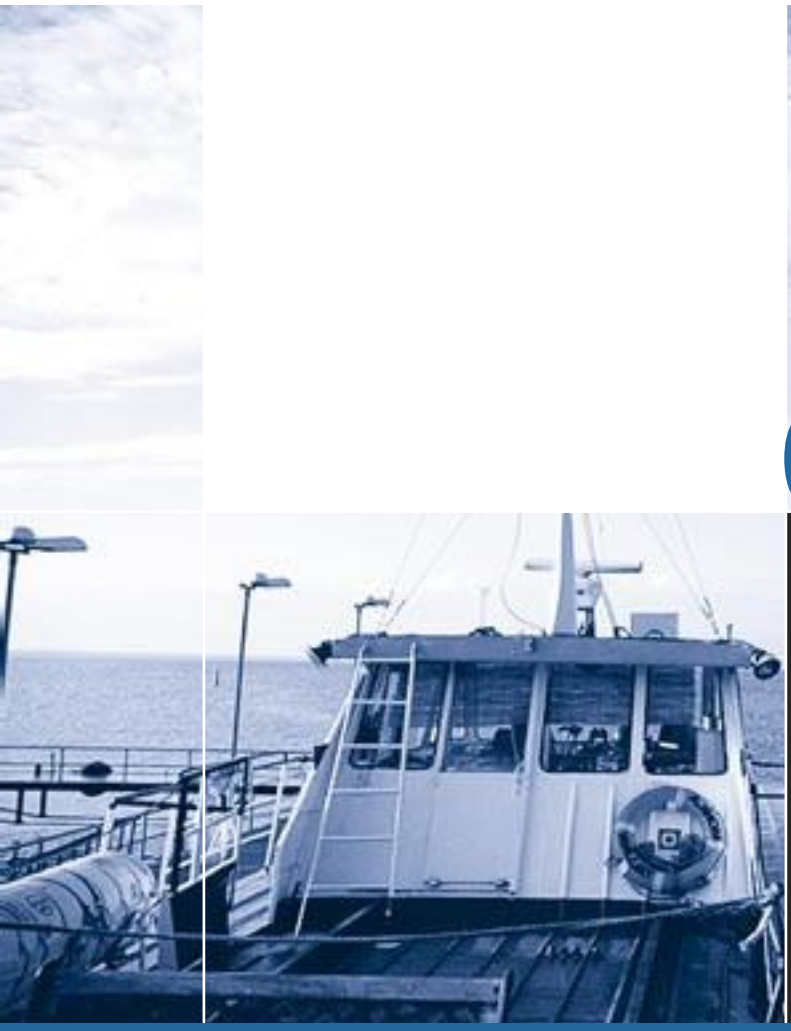
119.1 AIS is a shipboard transponder system that makes it possible to monitor ships from other ships and from shore based stations. Ships equipped with AIS will continuously transmit their position, course, speed and other relevant data via dedicated VHF channels. Other equipped AIS ships will receive the vessel's information which can be displayed on Radar (ARPA) or Electronic Charts (ECDIS).

119.2 AIS transponders operate on a VHF Channel 87B (AIS 1) and 88B (AIS2) ◆●

119.3 Currently the focus for this system is on larger vessels subject to the Navigation Act 1912. In the longer term this system might be useful for small vessels. It may be used to support or enhance reporting systems like REEFREP - which tracks vessels in the region of the Great Barrier Reef.

NOTES

Distress Urgency and Safety Communications using Radiotelephony



CHAPTER 10

SECTION 23 PRIORITY CALLS: GENERAL INFORMATION

120. GENERAL INFORMATION

120.1 National and international systems exist to provide prompt and effective search and rescue assistance to ships in distress. By complying with procedures in this chapter, ship station operators can ensure that these systems continue to work effectively for the benefit of all mariners. ♦ ●

120.2 All radiotelephony distress, urgency and safety calls and messages should be spoken slowly and clearly. The phonetic alphabet and figure code should be used if necessary. Use of the standard marine vocabulary is recommended in the case of language difficulties. Details may be found in Appendices 5 and 6. ♦ ●

120.3 In order that signals may be received by the maximum number of stations, the compatible transmit mode of AM (marked as H3E on some transmitters) must be selected for the broadcast of distress, urgency or safety messages on 2182 kHz. Vessels operating in the GMDSS System will select J3E for radiotelephony distress communications after reception of a distress alert by DSC. ●

120.4 Ship stations with single sideband capability on 27 MHz equipment, should also select the AM mode for the broadcast of distress, urgency or safety messages on 27.88 MHz.

120.5 The transmission of false or deceptive distress, urgency or safety messages is strictly forbidden. Extremely severe penalties, including imprisonment, exist under the Radiocommunications Act 1992, for any person found guilty of making such a transmission. ♦ ●

SECTION 24 ALARM SIGNALS

NOTE

As a consequence of the complete introduction of the GMDSS in 1999, the radiotelephone alarm signal was replaced by digital selective calling techniques, and large trading vessels no longer carry transmission and reception facilities for it. However MF/HF transceivers with a radiotelephony alarm signal generator are still in use on many small vessels. In view of this and the signal's readily recognisable characteristic, the signal will continue to be a useful procedure for small vessels for a number of years.

121. THE RADIOTELEPHONY ALARM SIGNAL

121.1 The radiotelephony alarm signal consists of two audio frequency tones, one high, one low, transmitted alternately. This produces a distinctive warbling sound easily distinguished, even in poor reception conditions. ●

121.2 The purpose of the signal is to attract the attention of operators to the message which is to follow. ●

121.3 Operators of MF/HF ship station radio equipment with the facility to transmit the radiotelephony alarm signal should, if time permits, use it to precede a distress call and message. ●

121.4 The radiotelephony alarm signal may also be used by ship stations to precede an urgency message concerning the loss of a person or persons overboard, or when grave and imminent danger is threatening a person or persons. Its use under these circumstances must be restricted to circumstances when the assistance of other vessels is required and cannot be obtained by use of the urgency signal alone. ●

121.5 In order to attract the attention of the maximum number of ship stations, limited coast and maritime communication stations may use the radiotelephony alarm signal to precede distress relay calls and messages. ●

121.6 Limited coast and maritime communication stations may also use the radiotelephony alarm signal to precede a safety message concerning an urgent cyclone warning. ●

121.7 The radiotelephony alarm signal transmitted by a maritime communication station will be followed by a single low tone lasting for ten seconds. This identifies the transmission as that from a maritime communication station. ●

122. THE NAVIGATIONAL WARNING SIGNAL

122.1 The navigational warning signal consists of a single audio tone of 2200 Hertz interrupted to give a sequence of alternate tone dashes and spaces each of duration one quarter of a second. The signal may be transmitted continuously by a coast station for a period of fifteen seconds to attract the attention of stations to a vital navigational warning which will follow.

122.2 The navigational warning signal is not generally used by Australian maritime communication or limited coast stations.

SECTION 25 DISTRESS COMMUNICATIONS

123. DEFINITION AND PRIORITY OF DISTRESS

123.1 A distress call has absolute priority over all other transmissions and indicates that the vessel or person using it is threatened by grave and imminent danger and requests immediate assistance. All stations which hear a distress call must immediately cease all transmissions capable of interfering with distress communications, and must continue to listen on the frequency on which the distress call was received. A distress call is broadcast to all stations. ♦●

123.2 The obligation to accept distress calls and messages is absolute and must be accepted with priority over all other radiocommunications. ♦●

124. AUTHORITY TO TRANSMIT DISTRESS CALLS AND MESSAGES

124.1 A radiotelephony alarm signal, a distress call and a distress message from a vessel may be transmitted only on the authority of the master or skipper, or the person responsible for the safety of that vessel. ♦●

125. FREQUENCIES FOR DISTRESS

125.1 International frequencies for distress calls by radiotelephony are:

>> 2182, 4125, 6215, 8291, 12 290, 16 420 kHz in the MF/HF marine bands; and Channel 16 in the VHF marine band. See Appendix 3. ♦●

125.2 In Australian waters the following additional radiotelephony distress frequencies have been allocated:

>> Channel 67 in the VHF band (supplementary to Channel 16); ♦●

>> 27.88 MHz (channel 88) in the 27 MHz marine band; and

>> 27.86 MHz (channel 86) in the 27 MHz marine band (supplementary to channel 88).

125.3 The distress frequencies in the 27 MHz marine band are monitored by the majority of limited coast stations operated by marine rescue groups.

125.4 In the interests of safety, boat owners should ensure that their equipment has the distress frequencies necessary to communicate with limited coast stations in their area of operation. Contact the relevant State/Territory authority or your local volunteer marine rescue organisation to find out information about limited coast stations in your area.

125.5 The distress frequencies listed in paragraphs 125.1 and 125.2 are not monitored by maritime communication stations. Maritime communication stations only provide a continuous watch of the HF digital selective calling frequencies reserved for distress, urgency and safety. International DSC frequencies for distress are: 4207.5; 6312; 8414.5; 12 577; and 16 804.5 kHz. See paragraph 84.1 for more information. ●

125.6 The frequencies used by the Bureau of Meteorology to provide automatically generated radiotelephony broadcasts of routine weather forecasts and weather warnings through the maritime communication stations are not monitored.

126. THE DISTRESS SIGNAL

126.1 The radiotelephony distress signal consists of the word "MAYDAY". ♦●

126.2 This signal indicates that the vessel or person using it is threatened by grave and imminent danger and requests immediate assistance. It does not extend to situations where immediate assistance is sought on behalf of a person, for example, a medical emergency. The urgency signal should be used in these situations. ♦●

126.3 The distress signal must not be used under any other circumstances. ♦●

126.4 Misuse of the distress signal could result in attention being diverted away from a situation which really requires immediate assistance. ♦●

127. THE DISTRESS CALL

127.1 The radiotelephony distress call consists of:

>> the distress signal MAYDAY, spoken three times;

>> the words THIS IS (or DE spoken as Delta Echo in case of language difficulties);

>> the name and call sign of the vessel in distress, spoken three times. ♦●

128. THE DISTRESS MESSAGE

128.1 The distress message consists of:

>> the distress signal MAYDAY;

>> the name and call sign of the vessel in distress;

>> particulars of its position;

>> the nature of the distress and the kind of assistance desired;

>> any other information which may facilitate rescue. ♦●

128.2 The distress call and message may be repeated as often as necessary, especially during silence periods, until an answer is received. ♦●

128.3 If no answer is received on distress frequencies, the message should be repeated on any other available frequency where attention might be attracted. ♦●

EXAMPLE OF A COMPLETE DISTRESS CALL AND MESSAGE:

The radiotelephony alarm signal	If facility fitted, then the following spoken message:
Distress call	
Distress signal (x3)	MAYDAY, MAYDAY, MAYDAY
Words "this is"	THIS IS
Station calling (x3)	SCAMP VLF2345, SCAMP VLF2345, SCAMP VLF2345
Distress message	
Distress signal	MAYDAY
Name/call sign	SCAMP VLF2345
Position	50 NAUTICAL MILES DUE EAST FROM POINT DANGER
Nature of distress	SINKING RAPIDLY AFTER STRIKING SUBMERGED OBJECT. ESTIMATE FURTHER 15 MINUTES AFLOAT
Other information (If time permits)	TWENTY METRE MOTOR CRUISER RED HULL WHITE SUPERSTRUCTURE FOUR PERSONS ON BOARD EPIRB ACTIVATED OVER. ♦●

129. DISTRESS POSITION INFORMATION

129.1 Position information in a distress message should normally be stated in one of three ways:

>> latitude and longitude (degrees and minutes and decimal points of a minute if necessary, North or South, East or West); or

>> true bearing and distance (the unit of distance should always be specified, for example, nautical miles or kilometres) from a known geographical point (for example 045 degrees true from Point Danger, 24 nautical miles); or

>> a precise geographical location (for example, in the case of a vessel running aground). ♦●

129.2 Where latitude and longitude are not used, care must be taken to ensure that the position given cannot be confused with any other place or geographical point. ♦●

129.3 If afloat and drifting, the rate and direction of drift could be stated in the distress message. ♦●

130. DISTRESS TRAFFIC

130.1 Distress traffic consists of all communications relating to the immediate assistance required by the vessel in distress, including search and rescue and on-scene communications. The distress signal MAYDAY should be used to precede each call and message. ♦●

131. OBLIGATION TO ACKNOWLEDGE RECEIPT OF A DISTRESS MESSAGE

131.1 Ship stations that receive a distress message from another vessel which is, beyond any possible doubt, in their vicinity, should immediately acknowledge receipt. ♦●

131.2 However, in areas where reliable communications with a limited coast or maritime communication station is practicable, ship stations should defer this acknowledgment for a short interval to allow the limited coast or maritime communication station to acknowledge receipt. ♦●

131.3 Ship stations which receive a distress message from another vessel which, beyond any possible doubt, is not in their vicinity should defer their acknowledgment to allow vessels nearer to the distressed vessel to acknowledge without interference. ♦●

131.4 Ship stations which receive a distress message from another vessel which, beyond any possible doubt, is a long distance away, need not acknowledge receipt unless this distress message has not been acknowledged by any other station. ♦●

131.5 When a ship station hears a distress message which has not been acknowledged by other stations, but is not itself in a position to provide assistance, it should acknowledge the call and then take steps to attract the attention of a maritime communication station, limited coast station or vessels which might be able to assist. ♦● Details of how this should be done may be found in paragraphs 136.1 - 136.6 (transmission of a distress message by a station not itself in distress).

132. ACKNOWLEDGMENT OF RECEIPT OF A DISTRESS MESSAGE

132.1 Acknowledgment of receipt of a distress message by a vessel, limited coast or maritime communication station is made in the following way:

>> the distress signal MAYDAY;

>> the name and call sign of the station sending the distress message, spoken three times;

>> the words THIS IS (or DE spoken as Delta Echo in case of language difficulties);

>> the name and call sign of the station acknowledging receipt, spoken three times;

>> the word RECEIVED (or ROMEO ROMEO ROMEO in the case of language difficulties);

>> the distress signal MAYDAY. ♦●

132.2 As soon as possible after this acknowledgment a ship station should transmit the following information:

>> its position;

>> the speed at which it is proceeding and the approximate time it will take to reach the distress scene. ♦●

EXAMPLE OF ACKNOWLEDGMENT OF RECEIPT OF A DISTRESS MESSAGE BY A SHIP STATION (TRANSMITTED IN RESPONSE TO THE DISTRESS CALL AND MESSAGE IN THE EXAMPLE GIVEN IN PARAGRAPH 128.1):

Distress traffic	MAYDAY
Distress vessel (x3)	SCAMP VLF2345, SCAMP VLF2345, SCAMP VLF2345
The words "this is"	THIS IS
Station calling (x3)	PRONTO VZN6789, PRONTO VZN6789, PRONTO VZN6789
The acknowledgement	RECEIVED MAYDAY IN POSITION 35 NAUTICAL MILES EAST FROM POINT DANGER PROCEEDING AT 15 KNOTS ESTIMATE AT YOUR POSITION IN ONE HOUR OVER. ♦●

133. CONTROL OF DISTRESS TRAFFIC

133.1 Control of distress traffic is the responsibility of the vessel in distress. However, this station may delegate the control of distress traffic to another vessel, a maritime communication station or limited coast station. ♦●

133.2 The vessel in control of distress traffic may impose silence on any or all stations interfering with distress traffic by sending the instruction SEELONCE MAYDAY. ♦●

133.3 This instruction must not be used by any station other than the vessel in distress, or the station controlling distress traffic. ♦●

133.4 If another station near the distressed vessel believes that silence is necessary it should use the instruction SEELONCE DISTRESS followed by its own name and/or call sign. ♦●

133.5 Any station which has knowledge of distress traffic and cannot provide assistance should continue to monitor the traffic until such time that it is obvious assistance is being provided. ♦●

133.6 Any station which is aware of distress traffic, and is not taking part in it, is forbidden to transmit on any frequency which is being used for that traffic. ♦●

133.7 Ship stations not involved in the exchange of distress traffic may, while continuing to monitor the situation, resume normal radio service when distress traffic is well established and on the condition that distress traffic frequencies are not used and no interference is caused to distress traffic. ♦●

134. RESUMPTION OF RESTRICTED WORKING

134.1 Should the station controlling distress traffic consider that complete silence is no longer required on the distress frequency, the station should transmit on that frequency a message addressed to all stations indicating that restricted working may be resumed. Ship stations may then resume use of the distress frequency for normal purposes, but in a cautious manner and having regard that the frequency may still be required for distress traffic. ♦●

134.2 The message to announce resumption of restricted working should take the following form:

>> the distress signal MAYDAY;

>> the call HELLO ALL STATIONS (or CQ spoken as Charlie Quebec), spoken three times;

>> the words THIS IS (or DE spoken as DELTA ECHO in the case of language difficulties);

>> the name and call sign of the station sending the message;

>> the time the message originated;

>> the name and call sign of the vessel in distress;

>> the word PRU-DONCE. ♦●

135. RESUMPTION OF NORMAL WORKING

135.1 When distress traffic has ceased on a frequency that has been used for distress traffic, the station that has been controlling that traffic should transmit a message addressed to all stations indicating that normal working may be resumed. ♦●

135.2 The message to announce resumption of normal working should take the following form:

>> the distress signal MAYDAY;

>> the call HELLO ALL STATIONS (or CQ spoken as Charlie Quebec), spoken three times;

>> the words THIS IS (or DE spoken as DELTA ECHO in the case of language difficulties);

>> the name and call sign of the station sending the message;

>> the time the message originated;

>> the name and call sign of the vessel which was in distress;

>> the words SEELONCE FEENEE. ♦●

136. TRANSMISSION OF A DISTRESS MESSAGE BY A STATION NOT ITSELF IN DISTRESS

136.1 A ship station, a maritime communication station or a limited coast station which learns that a vessel is in distress may transmit a distress message on behalf of that vessel when:

(a) the vessel in distress cannot itself transmit a distress message; or

(b) the master or skipper of the vessel not in distress, or the person responsible for a maritime communication station, or limited coast station, considers that further help is necessary; or

(c) although not in a position to provide assistance, it has heard a distress message which has not been acknowledged (see paragraph 131.5). ♦●

136.2 When a distress message is transmitted by a station not in distress, it is essential that this fact be made clear. Failure to follow the correct radio procedures could cause confusion and delays or, in the worst case, assistance to be directed to the wrong vessel. ♦●

136.3 A distress message transmitted by a vessel, maritime communication station or limited coast station not itself in distress should take the following form:

>>the signal MAYDAY RELAY, spoken three times;

>>the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

>>the name and call sign of the station making the transmission, spoken three times. ♦●

136.4 In the circumstances outlined in (a) and (b) of paragraph 136.1, this transmission should be immediately followed by a suitable message in which the position and circumstances of the distressed vessel are provided. ♦●

136.5 If the transmission is made by a vessel arriving at a distress scene to find rescue is beyond its resources then the transmission should be followed by a message outlining these circumstances and providing the relay vessel's own position. In the circumstance outlined in paragraph 136.1(c), the transmission should be followed by a repeat of the original distress message. ♦●

136.6 If facilities are available, the radiotelephony alarm signal should precede the transmission.

EXAMPLE OF A MESSAGE TRANSMITTED BY A SHIP STATION UNDER CIRCUMSTANCE 136.1 (C) ON BEHALF OF VESSEL "SEADOG" VNW6789:

Radiotelephony alarm signal (if facility fitted)

Mayday relay signal (x 3)	MAYDAY RELAY, MAYDAY RELAY, MAYDAY RELAY
The words "this is"	THIS IS
Station calling (x 3)	MISTY VLW3456, MISTY VLW3456, MISTY VLW3456
The Mayday message	MAYDAY SEADOG VNW6789 POSITION 50 NAUTICAL MILES NORTHWEST FROM CAPE INSCRIPTION ON FIRE AND ABANDONING INTO LIFERAFT 2 PERSONS ON BOARD OVER. ♦●

EXAMPLE OF MESSAGE TRANSMITTED BY A SHIP RADIO STATION UNDER CIRCUMSTANCE 136.1 (A,B):

Radiotelephony alarm signal

Mayday relay signal (x 3)	MAYDAY RELAY, MAYDAY RELAY, MAYDAY RELAY
The words "this is"	THIS IS
Station calling (x 3)	MISTY VLW3456, MISTY VLW3456, MISTY VLW3456
The Mayday relay message	MAYDAY RELAY UNIDENTIFIED DISTRESS MESSAGE HAS BEEN RECEIVED AND RED FLARES HAVE BEEN SIGHTED TO SEAWARD OF BEECROFT HEAD ALL VESSELS IN THE AREA INVESTIGATE AND REPORT OVER. ♦●

SECTION 26 URGENCY AND SAFETY SIGNALS

137. THE URGENCY SIGNAL

137.1 The urgency signal consists of the words PAN PAN It has priority over all other communications except those concerned with distress. ◆●

137.2 Use of the urgency signal indicates that the station sending it has a very urgent message to transmit concerning the safety of a vessel, aircraft, or person. ◆●

137.3 The urgency signal may only be sent on the authority of the master or skipper, or person responsible for the safety of a vessel. ◆●

137.4 All stations that hear an urgency signal must take care not to interfere with the message that follows. ◆●

137.5 The urgency signal and message are normally sent on one or more of the distress frequencies. However, transmission of the message following the urgency signal should be transferred to a working frequency or channel if:

>> it is lengthy or it concerns an urgent medical case; or

>> after the initial broadcast on the distress frequency(s) it needs to be frequently repeated (this generally applies only to maritime communication stations). ◆●

137.6 Urgency messages may be addressed to all stations or to a particular station. If addressed to all stations, the originating station must cancel the message when action is no longer necessary. ◆●

EXAMPLE OF AN URGENCY CALL AND MESSAGE SENT BY A LIMITED COAST STATION:

Urgency call

Urgency signal (x3)	PAN PAN, PAN PAN, PAN PAN
Station called (x3)	ALL STATIONS, ALL STATIONS, ALL STATIONS
Words "this is"	THIS IS
Station calling (x3)	OCEAN RESCUE LAKES ENTRANCE OCEAN RESCUE LAKES ENTRANCE OCEAN RESCUE LAKES ENTRANCE
Urgency message	YACHT STANDFAST REPORTED OVERDUE ON VOYAGE FROM PORT MACQUARIE TO HOBART LAST RADIO CONTACT 4 JUNE IN POSITION 30 NAUTICAL MILES TO SEAWARD FROM CAPE HOWE FIFTEEN METRE DESCRIPTION WHITE HULL BLUE SAILS THREE PERSONS ON BOARD ALL VESSELS KEEP SHARP LOOKOUT AND REPORT ANY SIGHTING OUT.

EXAMPLE OF AN URGENCY CALL AND MESSAGE SENT BY A SHIP STATION:

Urgency call

Urgency signal (x3)	PAN PAN, PAN PAN, PAN PAN
Station called (x3)	ALL STATIONS, ALL STATIONS, ALL STATIONS
Words "this is"	THIS IS
Station calling (x3)	HAWK VL2345, HAWK VL2345, HAWK VL2345
Urgency message	30 NAUTICAL MILES DUE WEST FROM CAPE DORA LOST PROPELLER ESTIMATE DRIFTING SOUTHWEST AT 3 KNOTS REQUIRE TOW URGENTLY OVER. ◆●

138. THE SAFETY SIGNAL

138.1 The safety signal consists of the word SECURITE (pronounced SAY-CURE-E-TAY). ♦●

138.2 It indicates that the station using it is about to transmit a message concerning an important navigational or weather warning. It should not be used to precede routine weather forecasts. ♦●

138.3 Ship stations hearing the safety signal should continue to listen until they are satisfied that it does not concern them. They must not make any transmission that is likely to interfere with the message. ♦●

139. SAFETY COMMUNICATIONS

139.1 The safety signal and a call to all stations should normally be made on a distress frequency. However, the safety message that follows should be made on a working frequency or channel. ♦●

139.2 A limited coast station wishing to attract the attention of all ship stations prior to the radiotelephony broadcast of a weather forecast or navigational warning, or a list of ships for which it has messages (known as a traffic list) will make the following call on a calling frequency.

140. BROADCASTS OF WEATHER INFORMATION OR NAVIGATIONAL WARNINGS FROM STATIONS OTHER THAN BUREAU OF METEOROLOGY OPERATED MARINE RADIO STATIONS

NOTE: The broadcast of weather bulletins via maritime communication stations is now done automatically. There is no provision for the Bureau of Meteorology to monitor the frequencies prior to the broadcasts of weather information. The information regarding the Bureau of Meteorology weather transmissions is noted in the Introduction to Chapter 3 and the transmission frequencies are listed in Appendix 3.

140.1 A maritime communication station may make a similar announcement prior to the broadcast of navigational or weather information.

EXAMPLE OF A SAFETY CALL AND MESSAGE TRANSMITTED BY A COAST RADIO STATION:

Safety call	
Safety signal (x3)	SAY-CURE-E-TAY, SAY-CURE-E-TAY, SAY-CURE-E-TAY
Station called (x3)	ALL STATIONS, ALL STATIONS, ALL STATIONS
Words "this is"	THIS IS
Station calling (x3)	COAST RADIO DARWIN, COAST RADIO DARWIN, COAST RADIO DARWIN
Change of frequency	GALE WARNING - LISTEN ON 2201
Repeat safety call	(Coast Station changes to 2201 & calls again)
Safety signal (x3)	SAY-CURE-E-TAY, SAY-CURE-E-TAY, SAY-CURE-E-TAY
Station called (x1)	ALL STATIONS
Words "this is"	THIS IS
Station calling (x1)	COAST RADIO DARWIN
Safety Message	DALY RIVER TO TORRES STRAIT NORTHEASTERLY WINDS IN EXCESS OF 30 KNOTS ARE EXPECTED TO PERSIST FOR NEXT TWENTY FOUR HOURS OUT.

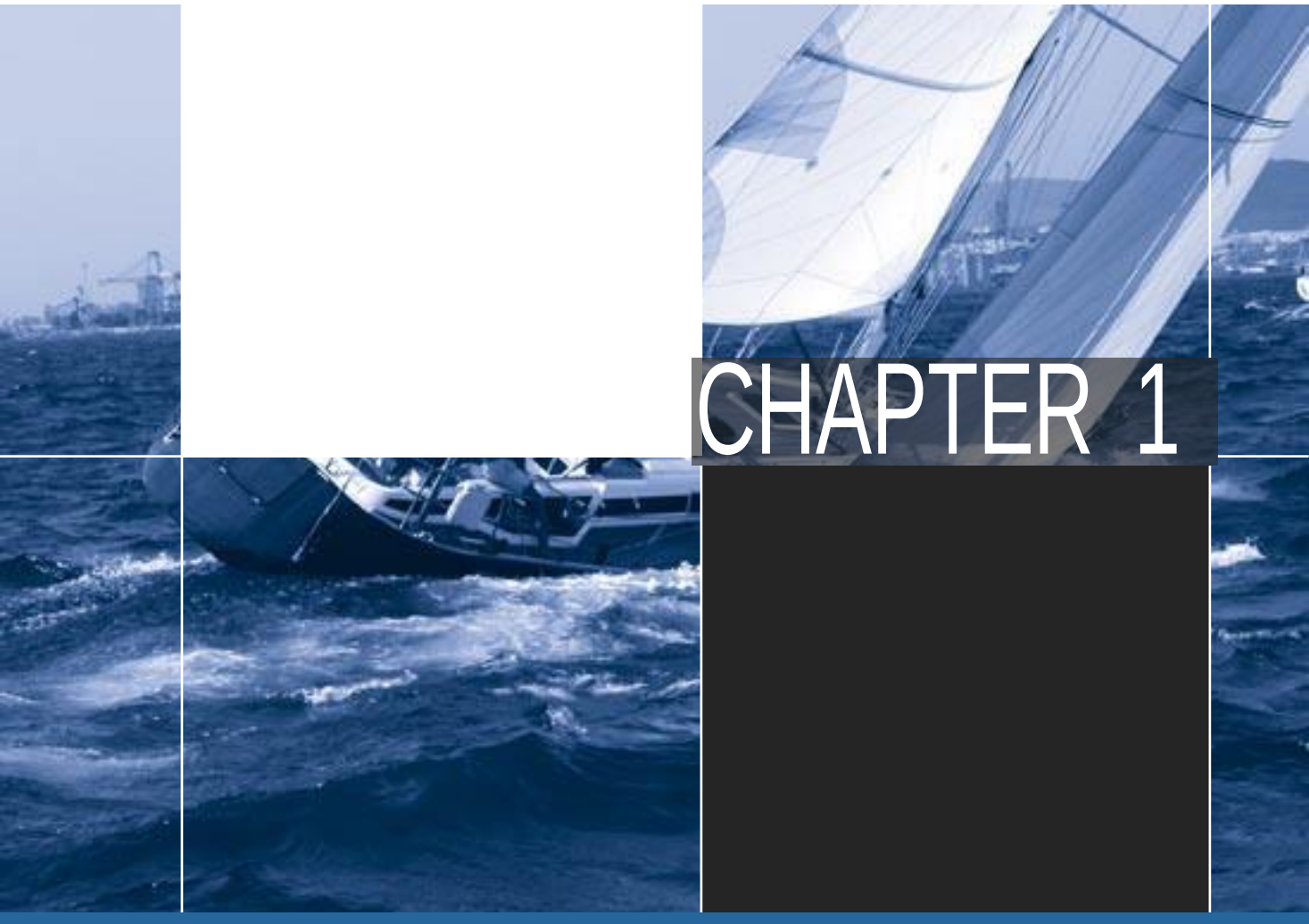
EXAMPLE OF SAFETY CALL AND MESSAGE TRANSMITTED BY A SHIP STATION:

Safety call	
Safety signal (x3)	SAY-CURE-E-TAY, SAY-CURE-E-TAY, SAY-CURE-E-TAY
Station called (x3)	ALL STATIONS, ALL STATIONS, ALL STATIONS
Words "this is"	THIS IS
Station calling (x3)	SEAFOX VLX9876, SEAFOX VLX9876, SEAFOX VLX9876
Change of frequency	NAVIGATIONAL WARNING - LISTEN ON 2524 (Ship station changes to 2524 kHz and calls again)
Safety signal (x3)	SAY-CURE-E-TAY, SAY-CURE-E-TAY, SAY-CURE-E-TAY
Station called (x1)	ALL STATIONS
Words "this is"	THIS IS
Station calling (x1)	SEAFOX VLX9876
Safety Message	POSITION 030 DEGREES 12 NAUTICAL MILES FROM CAPE ARNHEM SHIPPING CONTAINER FLOATING JUST BELOW SURFACE DANGER TO NAVIGATION OUT. ♦●

EXAMPLE OF A BROADCAST TO ALL SHIPS ANNOUNCING THE WEATHER FORECAST OR TRAFFIC LIST TRANSMITTED BY A COAST RADIO STATION:

Traffic or Weather call	ALL SHIPS (or CQ spoken as Charlie Quebec), spoken not more than three times;
Words "this is"	THIS IS
Station calling (x3)	the name & call sign of the station, spoken not more than Three times;
Call details	Listen for..... (weather forecast, traffic list etc) on 2201 (working frequency).

Operating Procedures for Routine Communications and Public Correspondence



CHAPTER 1

SECTION 27 ROUTINE CALLING AND REPLYING PROCEDURES FOR RADIOTELEPHONY

141. CALLING PROCEDURES

141.1 As a general rule, it rests with the ship station to call and establish communications with a maritime communication or limited coast station. However, a maritime communication or limited coast station wishing to communicate with a ship station may call that vessel if it believes that it is within range and is keeping watch. ♦ ●

141.2 A ship station wishing to contact another station must first select a frequency or channel being monitored by that station. ♦ ●

141.3 Before transmitting, the operator should listen for a period long enough to be satisfied that harmful interference will not be caused to communications already in progress. ♦ ●

141.4 When establishing communications by MF/HF radiotelephony, the initial call should be made in the following manner:

>> the name and /or call sign or other identification of the station being called, spoken not more than three times;

>> the words THIS IS (or DE spoken as Delta Echo in case of language difficulties);

>> and the name and/or call sign or other identification of the station calling, spoken not more than three times. ●

141.5 This call should immediately be followed with the purpose of the call, the working frequency that is suggested for the exchange of messages and the word "OVER" (an invitation for the other station to respond). ●

EXAMPLE:

FREMANTLE SEA RESCUE, FREMANTLE SEA RESCUE, FREMANTLE SEA RESCUE

This is

SPINDRIFT VLW1234, SPINDRIFT VLW1234, SPINDRIFT VLW1234
POSITION REPORT SUGGEST CHANGE TO 2524
OVER.

141.6 When using radiotelephony channels in the VHF marine band and communications conditions are good, the first part of a call may be abbreviated to:

>> the name and/or call sign etc. of station being called, spoken once;

>> the words THIS IS;

>> the name and/or call sign etc. of station calling, spoken twice. ♦ ●

EXAMPLE:

SANDRINGHAM COAST GUARD

This is

SAUCY SUE VLV4567, SAUCY SUE VLV4567
POSITION REPORT SUGGEST CHANGE TO CHANNEL 73
OVER.

141.7 On all bands, once contact is established, station names and/or call signs should be spoken once only. ♦● For example:

"THIS IS SAUCY SUE"

141.8 Reverse calling, for example:

"TEMPEST VLS5678 CALLING FREMANTLE SEA RESCUE", should not be used. ♦●

142. REPLYING TO CALLS

142.1 A station replying to a radiotelephony call should use the following procedure:

>> the identification of the station which called, spoken not more than three times;

>> the words THIS IS (or DE spoken as Delta Echo in the case of language difficulties); and

>> the name and/or radiotelephony call sign of the station replying, spoken not more than three times. ♦●

142.2 Procedures for replying to radiotelephony calls made on VHF marine bands may be abbreviated in a similar manner to those described in the calling procedures. ♦●

142.3 The reply should be immediately followed by an indication that the replying station will also change to the working frequency suggested by the calling station. ♦●

142.4 At this point both stations should adjust their radio equipment to transmit and receive on the agreed working frequency (or frequencies) and, after making sure that the frequency (or frequencies) is not occupied by other stations, re-establish communications.

EXAMPLE:

SPINDRIFT, SPINDRIFT, SPINDRIFT VLW1234

This is

FREMANTLE SEA RESCUE, FREMANTLE SEA RESCUE, FREMANTLE SEA RESCUE
ROMEO CHANGE TO 2524.

142.5 It is normal practice for the station which made the initial call on the calling frequency to also make the initial call on the working frequency. Once communications have been re-established, the exchange of messages may proceed.

143. SIGNAL FOR END OF WORK

143.1 The end of the exchange of radiotelephony messages on the working frequency should be indicated by both stations by adding the word "OUT". ♦●

143.2 Both stations should then resume monitoring of the appropriate distress and calling frequency.

144. DIFFICULTIES IN ESTABLISHING COMMUNICATIONS BY RADIOTELEPHONY

144.1 If a vessel, maritime communication or limited coast station is unable to communicate with a calling station immediately, it should reply to a call followed by "wait…… minutes". ♦●

144.2 Maritime communication stations or limited coast stations which are busy with other ship stations may respond to a call from a vessel with "your turn is number …..". ♦●

144.3 When a station receives a call without being certain that the call is intended for it, it should not reply until that call has been repeated and understood. ♦●

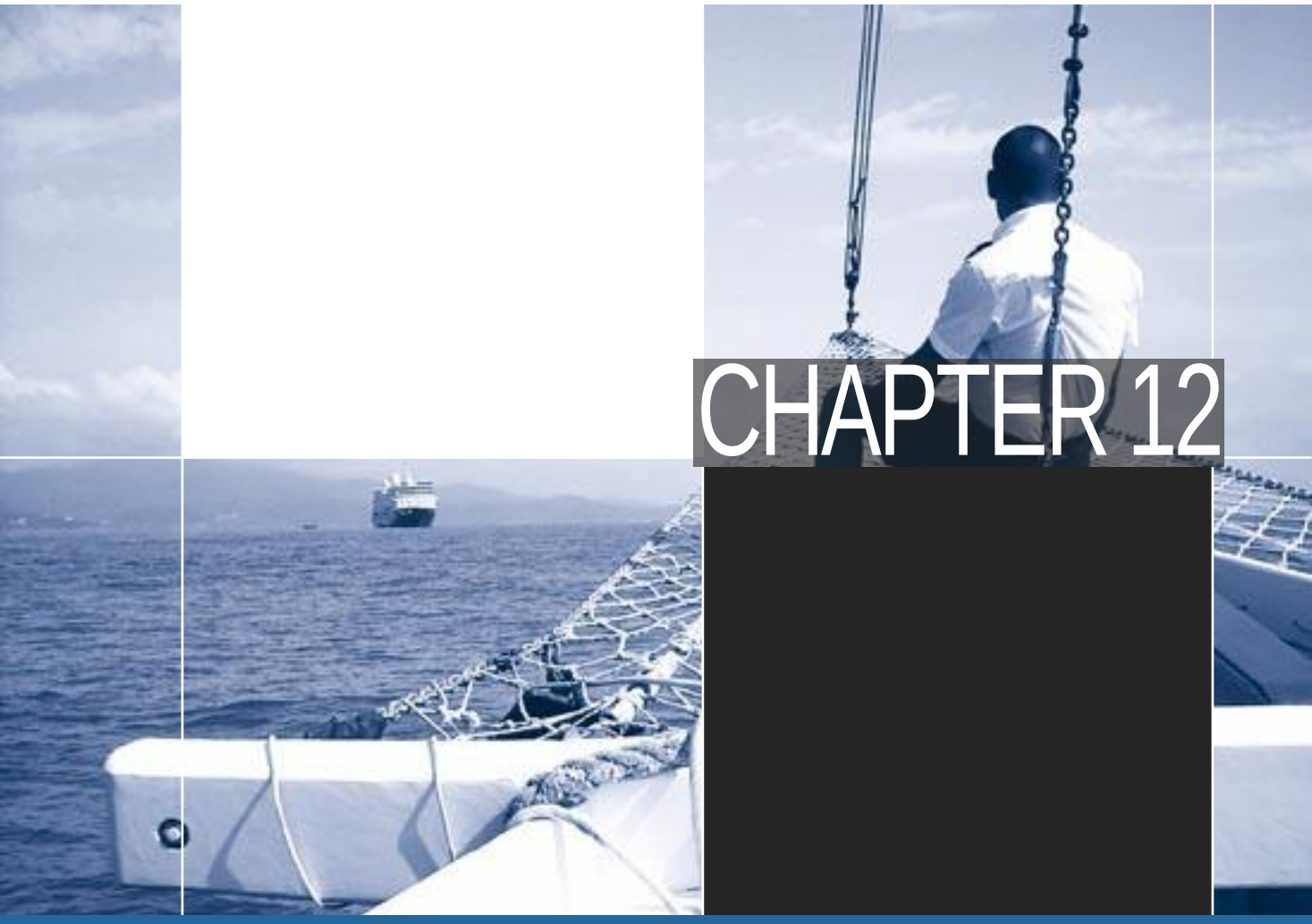
144.4 When a station receives a call which is intended for it, but is uncertain of the identification of the calling station, it should reply immediately asking for a repetition of the call sign or other identification of the calling station. ♦●

145. REPEATING CALLS

145.1 If no immediate reply is received to the initial call, wait two minutes and repeat the call. After two calls wait a further three minutes before calling again. At this point it may be necessary to call another station or to consider whether the station called is in range. Restrictions with regard to repetition of calls do not apply to distress or urgency calls. ♦●

NOTES

Information for Vessels Proceeding Overseas



CHAPTER 12

SECTION 28 GENERAL INFORMATION

146. INSPECTION OF RADIO STATIONS

146.1 The owners and operators of vessels proceeding overseas need to be aware that the International Radio Regulations give a signatory nation the right to inspect a ship station visiting any of that nation's ports.

146.2 Authorities in such countries may require the person responsible for the station to produce a valid radio station licence issued by the country in which the vessel is registered. Relevant operators certificates of proficiency must also be produced if required.

146.3 The operators of Australian vessels undertaking overseas voyages must ensure they are able to meet these requirements. Copies of class licences should be carried if relevant. If equipment operating on Amateur radio bands is carried on board, a valid Amateur station licence and an appropriate Amateur certificate of proficiency must be available for inspection.

146.4 Failure to produce these documents may result in authorities carrying out an inspection of the radio station. If irregularities are found, further action may be taken, including an advice to the Australian Government.

146.5 Owners of vessels considering an overseas voyage are reminded of the need to register their vessel with the Australian Register of Ships before leaving. Registration provides owners with official proof of ownership and a nationality for their vessel. A registration certificate is required by law when dealing with overseas authorities and it is mandatory to complete Australian Customs formalities on leaving and re-entering the country.

146.6 Any office of the Australian Maritime Safety Authority will provide details of vessel registration.

147. ACCOUNTING AUTHORITY IDENTIFICATION CODE (AAIC)

147.1 International Radio Regulations give foreign administrations the right to collect charges for public correspondence radiocommunications from the licensee of the ship station.

147.2 A vessel using a foreign coast station for passing public correspondence (written) or making radiotelephone calls to any destination, must be registered with an AAIC. This is an internationally recognised way of providing the coast station with:

>> a reasonable assurance that payment will be made; and

>> the name and address of the organisation which will make payment.

147.3 Ship stations wishing to pass paid radiocommunications through any foreign coast station should be prepared to quote an AAIC. Failure to do so is likely to result in the coast station refusing to accept the call or message.

147.4 AAICs have been issued by the ACMA to a number of private enterprises concerned with marine communications. Details of these organisations have been provided by the ACMA to the International Telecommunications Union (ITU), who, in turn, advise all member nations.

147.5 A full list of organisations holding an Australian AAIC may be found in the List of Ship Stations published by the ITU.

147.6 The licensees of vessels wishing to pass paid traffic through foreign coast stations must make the necessary financial arrangements with one of these organisations to ensure prompt payment of accounts arriving from overseas administrations. On completion of these arrangements, the organisation will authorise the ship station licensee to use its AAIC. ACMA offices can provide details of Australian organisations offering this service.

148. DETAILS OF FOREIGN COAST STATIONS

148.1 Details of foreign coast and land stations providing services to ship radio stations may be found in volumes published by the ITU or the British Admiralty.

148.2 ITU publications of interest to ship station operators include:

>> the List of Coast Stations which contains particulars of coast stations and Inmarsat Land Earth Stations throughout the world; and

>> the List of Special Service and Radiodetermination Stations which contains particulars of coast and land stations broadcasting weather forecasts, navigational warnings and time signals, radio beacons and other specialised services.

148.3 ITU publications are updated at regular intervals by supplements and are available from the International Telecommunications Union, General Secretariat, Sales Service, Place des Nations, CH-1211 Geneva 20, and Switzerland. Telephone + 41 22 730 6141. Email: sales@ITU.int. Website: *www.itu.int*.

148.4 The British Admiralty List of Radio Signals is also published in a number of volumes. Those of likely interest to small vessels proceeding overseas are:

>> Volume 1, parts 1 and 2, which contains particulars of coast stations and Inmarsat Land Earth Stations throughout the world, radio quarantine reporting, ship reporting systems, pollution reports etc;

>> Volume 2 which contains particulars of radio beacons throughout the world which are suitable for navigation by vessels carrying direction finding equipment, radar beacons, time signals and electronic navigation systems;

>> Volume 3 which contains particulars of foreign coast and land stations providing weather and navigational bulletins; and

>> Volume 5 GMDSS – which contains particulars of the GMDSS System, SAR, etc.

>> Volume 6, parts 1 and 2, which contains particulars of radiocommunications services operated by foreign port authorities and pilotage services.

148.5 British Admiralty volumes are updated weekly through Australian Notices to Mariners published by the RAN Hydrographic Service. They are generally available from retail outlets specialising in marine publications and navigational charts.

149. MEDICAL ADVICE

149.1 Coast stations operated by most foreign administrations have arrangements to provide medical advice to vessels at sea. In most cases, the exchange of messages and the advice is provided free of charge.

149.2 In very urgent circumstances, use of the radiotelephony urgency signal or DSC urgency alert is justified.

150. FOREIGN SHIP-REPORTING SYSTEMS

150.1 Many countries provide a voluntary ship reporting system similar to Australia's AUSREP system (see paragraphs 118.1 - 118.9). In the interests of safety, small vessels on overseas voyages are encouraged to participate in these schemes. Particulars may be found in Volume 1 of the British Admiralty List of Radio Signals. Also, coast stations may be able to provide details of their country's system. (See paragraph 148.4)

150.2 The Automated Mutual-Assistance Vessel Rescue System (AMVER) operated by the United States Coast Guard (USCG) provides an aid to search and rescue in all offshore areas of the world. Yachts, fishing vessels and other small vessels proceeding on offshore voyages of longer than twenty-four hours are eligible to participate. Further information is available from the AMVER Maritime Relations, USCG Battery Park Building, New York NY, USA 10004-1499.
Telephone + 1 212 668 7762.
Fax + 1 212 668 7684.
Internet http://www.uscg.mil

151. TIME SIGNALS

151.1 Accurate time signals suitable for navigational purposes are still available on the frequencies: 5000, 10 000, 15 000 and 20 000 kHz from various land stations in other parts of the world. Full details of foreign stations broadcasting time signals may be found in the appropriate volumes detailed in paragraphs 148.1 - 148.5.

NOTES

Maritime Communications Satellite Systems and Equipment

CHAPTER 13

SECTION 29 MARITIME COMMUNICATIONS SATELLITE SYSTEMS AND EQUIPMENT: GENERAL INFORMATION

152. THE INTERNATIONAL MARITIME SATELLITE ORGANISATION

152.1 The International Maritime Satellite Organisation (Inmarsat) operates a system of satellites providing a range of telecommunications services to vessels. The system also incorporates distress and safety communications. ■

153. INMARSAT SYSTEM

153.1 The Inmarsat system employs four operational satellites in geostationary orbit above the equator, over the Atlantic, Indian and Pacific Oceans. In combination the satellites provide continuous high quality communications to virtually the entire Earth's surface. Back-up satellites are ready for use if necessary. ■

153.2 The geostationary orbit of the satellites means that each moves at exactly the same rate as the Earth's own rotation and therefore remains in the same relative position to any point on the Earth. ■

153.3 Powered by solar energy, each satellite acts as a transmitting and receiving station, relaying messages between stations located on the Earth's surface. ■

153.4 Each satellite has its own area of coverage (known as a "footprint") which is that part of the Earth's surface within which an antenna can obtain a view of the satellite. ■

153.5 The coverage chart shows the four Inmarsat satellites and their coverage areas. These areas are called ocean regions and are designated as follows:

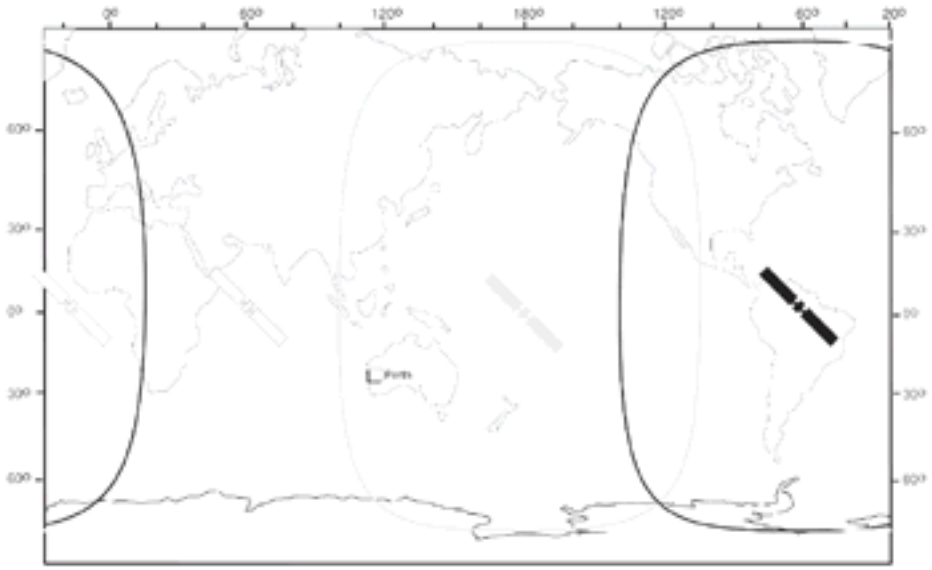
>> the Pacific Ocean Region (POR);

>> the Indian Ocean Region (IOR);

>> the Atlantic Ocean East Region (AOR East) and;

>> the Atlantic Ocean West Region (AOR West) ■

Inmarsat satellite placement and coverage



154. INMARSAT SYSTEM STATIONS

154.1 An Inmarsat installation aboard any vessel is referred to as a Ship Earth Station (SES). ■

154.2 Each ocean region has a number of Land Earth Stations (LES) which provide the communications interface between vessels at sea and shore based telecommunications networks. This function is fully automated and is effectively transparent as far as the Inmarsat system user is concerned. Each LES has an associated Maritime Rescue Co-ordination Centre (MRCC). ■

154.3 The Australian LES is located at Perth WA and serves both the Indian (IOR) and Pacific (POR) ocean regions. Its associated MRCC is located in Canberra and is operated by AusSAR. ■

154.4 Each ocean region has a Network Co-ordination Station (NCS) which is responsible for the overall management for the exchange of traffic in its region. ■

155. COMMUNICATIONS SERVICES

155.1 Operating at ultra high frequencies (UHF) in the 1.5 to 1.6 GHz and super high frequencies (SHF) in the 4 to 6GHz bands, the Inmarsat system provides the following types of communications:

>> telex in both real time, and store and forward modes;

>> telephone and facsimile; and

>> computer data in both real time, and store and forward modes. ■

155.2 Priority distress facilities exist for Ship Earth Stations. Once a vessel selects and transmits a "distress priority" signal, the call is automatically routed to an appropriate Maritime Rescue Co-ordination Centre. ■

156. TYPES OF INMARSAT SHIP TERMINALS

156.1 Inmarsat-A provides high quality real time telex, telephone, facsimile and data services. ■ (Due to be discontinued on 31st December 2007)

156.2 Inmarsat-B is the digital version of Inmarsat A and will eventually replace it. ■

156.3 Inmarsat-C provides a data (telex and facsimile) exchange in the store and forward mode. This means that there is no real time connection between the originating station and the receiving station, and delivery may be in the order of 2 to 7 minutes. Inmarsat-C does not provide telephone (voice) communications. ■

156.4 Inmarsat-M provides a low quality telephone and data service in the real time mode. Inmarsat-M is not approved for use in the Global Maritime Distress and Safety System (GMDSS). ■

156.5 Inmarsat Fleet F77 is equipped to meet the latest distress and safety requirements as specified by the International Maritime Organisation (IMO) in resolution A.888 for voice pre-emption and prioritisation within the Global Maritime Distress and Safety System (GMDSS). Inmarsat Fleet F77 was approved by IMO's Maritime Safety Committee (MSC75) as meeting the requirements and recommended fitting on vessels participating within the GMDSS.

The first Inmarsat Fleet service, Fleet F77, provides for voice communication by connecting to the telephone network and both the high quality and speed of a full 64 kbit/s Mobile ISDN service and the flexibility of the Inmarsat Mobile Packet Data Service (MPDS). ■

SECTION 30 INMARSAT-B SHIP EARTH STATIONS

157. COMMUNICATIONS CAPABILITY

157.1 Inmarsat-B equipment has the capability of providing telex and telephone communications. In addition to voice, the telephony channel may be used for facsimile and other medium to high-speed communications services. ■

158. TERMINAL EQUIPMENT

158.1 Because of the range of communications available with Inmarsat-B and the consequent radio bandwidth and power required, it is necessary that the transmitted energy be concentrated into a narrow beam by use of a dish antenna. This antenna is normally protected by a fibreglass housing. ■

158.2 To ensure communications, it is essential that the dish antenna associated with an Inmarsat-B installation remains continuously pointing at the satellite during all the usual motions of a vessel at sea. This is achieved by mounting the antenna on a multi-axis platform which is stabilised against pitch and roll motions. Compensation for yawing and course changes is achieved by an input from the vessel's gyro compass to the stabilisation mechanism. ■

158.3 Equipment below-decks consist of the actual terminal, usually with a computer monitor and keyboard attached, and peripherals such as telephones, facsimile machines and call alarms. Signals from the equipment are fed to the dish antenna unit via special coaxial cables and then converted to the final UHF radio uplink transmit frequency for communications with the satellite.

159. PRINCIPLES OF OPERATION

159.1 On first switching-on an Inmarsat-B terminal, position information may be automatically downloaded from the GPS system or the operator must enter the vessel's position and course into the terminal. Software in the terminal will calculate the satellite azimuth and elevation and drive the antenna into that position. The vessel's terminal then locks on to the Time Division Multiplex (TDM) carrier relayed by the satellite from the Network Control Station. ■

159.2 Once locked on to the satellite and the TDM, most subsequent operations are performed automatically. However, in the event of a shipboard power failure, it is possible that the dish antenna will require repositioning once power is restored. ■

159.3 A TDM channel is used to automatically assign a working channel to a Ship Earth Station (SES) whenever communication to or from a Land Earth Station (LES) is required, and for other "housekeeping" tasks. After the exchange of messages via the LES, the SES automatically returns to a stand-by condition on the TDM.

159.4 Details of Land Earth Stations offering Inmarsat-B services together with their identification numbers and charges for commercial communications may be found in the publications produced by the International Telecommunications Union and the British Admiralty. For further information see paragraphs 148.2. and 148.4.

159.5 The Inmarsat system provides for the automatic reception of Maritime Safety Information (distress alerts, navigational and weather warnings and other important information) by a method known as Enhanced Group Calling (EGC). However, few Inmarsat-B models incorporate an EGC facility.

160. DISTRESS COMMUNICATIONS

160.1 Distress alerts may only be sent on the authority of the master, skipper or other person responsible for the safety of the vessel. ■

160.2 Initiation of a distress alert from an Inmarsat-B terminal is made simple by the provision of a distress button, or, in some cases, by the input of a brief keyboard code. This simple operation provides an automatic, direct and assured connection to a Maritime Rescue Co-ordination Centre (MRCC) within a few seconds. ■

160.3 The transmission of the distress alert by a vessel may be made using either the telex or telephone communication mode. It is not necessary for the operator to have address information as the LES will automatically note the distress priority and route the call to its associated MRCC. ■

160.4 Should the distress alert be made in the telex mode, the operator should pause until receiving the answerback of the MRCC, and then type essential details of the distress situation, including the vessel's name, position, nature of the distress and type of assistance required.

160.5 Should the distress alert be made in the telephone mode, the operator should clearly convey details of the distress situation using the standard radiotelephony distress sequence, on receiving acknowledgment of connection to the MRCC.

161. ANTENNA SITING

161.1 Depending on the position of the vessel and its orientation relative to the satellite, parts of the vessel's superstructure may obstruct the "view" of the dish antenna to the satellite. ■

161.2 Careful attention must be paid to siting an Inmarsat-B dish antenna if shadow sectors are to be eliminated or minimised in all azimuths and elevations. It must be remembered that dish elevations at footprint margins will be very low.

162. RADIATION HAZARD

162.1 The concentrated beam of radio energy from an Inmarsat-B antenna can be potentially harmful to humans. ■

162.2 The terminal should be shut down, or the transmitter disabled, if a person is likely to spend time within 7 metres of a Inmarsat-B antenna. ■

SECTION 31 INMARSAT-C SHIP EARTH STATIONS

163. COMMUNICATIONS CAPABILITY

163.1 Inmarsat-C is a two way data messaging system that enables users to transmit and receive messages to and from other Ship Earth Stations as well as telex and data subscribers anywhere in the world. ■

163.2 Inmarsat-C does not provide voice communications. ■

163.3 The Inmarsat-C service operates on a store and forward basis. Unlike Inmarsat-B there is no real time connection between the transmitting and receiving stations. A message must be completely assembled by the operator prior to transmission. On command the equipment transmits that message in packets (or bursts) of data. ■

163.4 The routine delivery time for an Inmarsat-C message depends on message length but is in the order of two to seven minutes. Once the message is successfully delivered, a delivery advice message will be sent to the originating station. ■

163.5 The Inmarsat-C service allows the necessary interchange of data to support the Vessel Monitoring System (VMS) used by fisheries management authorities in Australia and other parts of the world.

164. TERMINAL EQUIPMENT

164.1 An Inmarsat-C Ship Earth Station consists of an antenna, an electronics unit, a message processor, a visual display unit (VDU), keyboard and printer. The message processor may contain a floppy disk drive for storing transmitted and received messages. An Enhanced Group Calling (EGC) receiver will be incorporated. ■

164.2 Transmitted messages are prepared on the keyboard prior to transmission or may be transferred by floppy disk from other computer sources. Received messages will be available on the VDU and/or the printer. ■

164.3 The terminal will provide an audible and/or visual alarm to alert a vessel's watch keeper to the reception of any distress or other important message received by the Enhanced Group Calling system. ■

164.4 Operators should take care that computer virus infection is not transferred to the terminal software. ■

164.5 Inmarsat-C has the advantage over Inmarsat-B of only requiring a narrow bandwidth of radio spectrum to enable communications. As a consequence, only relatively low power is required to communicate with the satellites, and a small, lightweight omnidirectional (radiating equally in all directions) antenna is necessary. ■

164.6 The omnidirectional characteristics of the antenna mean that it requires no moving parts and stabilisation against vessel movement is not necessary. ■

164.7 Ideally, an Inmarsat-C terminal should be interfaced with satellite position-fixing equipment such as GPS, to provide current position information in the event of a distress situation. ■

165. PRINCIPLES OF OPERATION

165.1 The Inmarsat-C system uses four Network Co-ordination Stations (NCS), one in each of the ocean regions, to manage communications within that region. The Network Co-ordination Stations are linked to Land Earth Stations by special satellite signalling links which are used to exchange vital system control and monitoring information. ■

165.2 Each NCS transmits continuously on a special satellite channel known as the NCS common channel which is used for the broadcast of service information and Enhanced Group Calling (EGC) information to Ship Earth Stations. ■

165.3 However, before Inmarsat-C service is available to a Ship Earth Station (SES) it is necessary for that SES to be logged-in to the NCS in the appropriate ocean region. ■

165.4 Once logged-in the SES equipment continuously monitors the NCS common channel when in an idle condition (that is, when not performing other tasks). ■

165.5 By using the information contained on the NCS common channel, the SES equipment can automatically gain access to a working channel for a particular Land Earth Station for the transmission or reception of a message.

166. LOGGING-IN AND LOGGING-OUT PROCEDURES

166.1 On initial switch-on and whenever the equipment has been switched off, it is necessary for the operator of an Inmarsat-C Ship Earth Station to perform a log-in. This simple procedure synchronises the SES's terminal to the NCS common channel and informs the NCS that the SES is operational. Some models of Inmarsat-C will perform this task automatically on switch-on. ■

166.2 As a vessel transits from one ocean region to another, it is necessary to change the log-in (for example from the Indian Ocean NCS to the Pacific Ocean NCS). Some models of Inmarsat-C will perform this task automatically while others require operator intervention.

166.3 A distress alert can still be transmitted even if the Ship Earth Station is not logged-in. ■

166.4 If, for any reason, the terminal is to be switched off for an extended time, the operator should perform a logging-out procedure. Failure to do this means that the terminal remains registered with the Network Co-ordination Station as active and a Land Earth Station may keep trying to deliver a message. This may result in an unnecessary delay in advising the sender of non-delivery of a message and charges for the repeated attempts. ■

167. INTERFACE WITH NAVIGATIONAL EQUIPMENT

167.1 Usually a Ship Earth Station terminal will be interfaced with the vessel's satellite position-fixing equipment (for example GPS) to provide accurate and current position information in the case of a distress alert. This information resides in the memory of the equipment's distress alert generator. ■

167.2 Accurate position information is also necessary to ensure that the terminal's Enhanced Group Calling receiver responds to shore-to-ship distress alerts and other important messages which are relevant to the vessel's position. ■

167.3 On vessels where the Inmarsat-C terminal is not interfaced with position-fixing equipment, it is essential that the vessel's position, course and speed are manually entered by the operator at intervals not exceeding 2 hours. ■

167.4 Most modern Inmarsat-C terminals have an inbuilt GPS receiver.

168. PRIORITY COMMUNICATIONS

168.1 Distress alerts may only be sent on the authority of the master, skipper or other person responsible for the safety of the vessel. ■

168.2 The transmission of a distress alert does not require the operator to nominate a Land Earth Station or have an electronic address for a Maritime RESCUE Co-ordination Centre (MRCC). The Inmarsat C equipment software and the Network Co-ordination Station will ensure that the alert is routed to an appropriate Land Earth Station (LES) where it will be passed the associated MRCC. ■

168.3 In the case of distress alerts received by the Land Earth Station operated by Xantic, located in Perth, the information will immediately be forwarded to the Rescue Co-ordination Centre in Canberra operated by AusSAR (Australian Search and Rescue). ■

168.4 Inmarsat-C equipment contains a distress alert generator. The quickest means of transmitting a distress alert requires the operator to perform two simple manual operations (for example, the simultaneous pressing of two control buttons). These actions will generate a default distress alert containing the following information:

>> the identity of the Ship Earth Station;

>> the nature of the distress (in this case "maritime unspecified"); and

>> the most recent information contained in the equipment's memory regarding the vessel's position, course and speed. ■

168.5 If time permits, the operator may edit the distress alert generator before transmission and enter the nature of the distress from a menu of situations. Alternatively, the operator may use the keyboard to assemble a distress alert and select "distress priority" before transmission. ■

168.6 The Inmarsat-C equipment will provide an indication to the operator that the distress alert is being transmitted, and more importantly, an indication of the receipt of an acknowledgment from a Land Earth Station. If an acknowledgment is not received from both a LES and its associated MRCC within 5 minutes, the distress alert should be repeated. ■

168.7 Communications after the initial distress alert are conducted by keyboard and selection of the "distress priority". Received messages will be available on the visual display unit and/or the printer. ■

168.8 Other priority alerts should be assembled by the operator and the appropriate priority selected for transmission. Urgency messages should commence with the word ""PAN PAN"" and safety messages with the word "SECURITE". Circumstances of use of these priority messages are detailed in paragraphs 138 and 139. ■

168.9 Operators should be familiar with the Inmarsat 2 digit code service, also known as "Special Access Codes" SACs, which facilitates automatic routing of messages and delivery to the appropriate organisation without the need to know any details of that addressee (for example Code 32 for seeking medical advice, Code 42 for reporting navigational hazards). Further information is available from the Australian Maritime Safety Authority's (AMSA) internet site. ■

168.10 Reception of shore to ship distress alerts made by Enhanced Group Calling will be marked by audible and/or visual alarms to attract the attention of a vessel's watch keeper. Such alarms may not be self-cancelling and may have to be reset manually. Reception of messages which carry an "urgent priority" classification will also cause the alarms to operate. ■

168.11 Shore-to-ship distress alerts will commence with the word "MAYDAY". Urgency messages will commence with the word ""PAN PAN"", and safety messages with the word "SECURITE". ■

168.12 Should a distress alert be generated inadvertently, it is essential that the appropriate MRCC is notified by sending a message with distress priority cancelling the distress alert. Vessel name, call sign and Inmarsat identity should be provided. ■

169. PERFORMANCE VERIFICATION TEST

169.1 A performance verification test (PVT), also known as a link test, is conducted when an Inmarsat-C terminal is first commissioned. The test consists of a transmitted message, a received message, a distress alert, and a distress alert acknowledgment. ■

169.2 A vessel's operator may initiate a performance verification test if there is concern about the condition of the equipment. The test may take up to twenty minutes to complete depending on the level of Inmarsat system congestion. ■

169.3 An operator should be aware that while conducting a performance verification test, a situation may arise where a "genuine" distress alert is inadvertently transmitted. During the PVT, the equipment software will request the operator to initiate a test distress alert. If the operator fails to respond to this request within thirty seconds, the software will automatically initiate a genuine distress alert. ■

170. ANTENNA SITING

170.1 The compact size of the antenna makes it relatively simple to locate it in a position on the vessel where its view of the satellite will be unobstructed.

170.2 However, superstructure or other large objects, especially those within 1 metre of the antenna which cause a shadow sector of greater than 2 degrees may seriously degrade the performance of the equipment. It must be remembered that angles of radiation at footprint margins will be very low.

171. RADIATION HAZARD

171.1 The omnidirectional characteristics of an Inmarsat-C antenna mean that there is no concentration of transmitted radio energy and the radiation hazard to personnel is minimised. However, the terminal should be shut down if a person is likely to spend time within 1 metre of an Inmarsat-C antenna. ■

SECTION 32 INMARSAT ENHANCED GROUP CALLING RECEIVERS

172. GENERAL INFORMATION

172.1 The Inmarsat system provides a service known as Enhanced Group Calling (EGC) which provides the broadcast of information to selected Ship Earth Stations in an ocean region. This information includes maritime safety information (MSI) that includes distress alerts, navigational warnings, meteorological warnings and forecasts, and other important safety information for vessels. ■

172.2 An EGC receiver is incorporated into most Inmarsat-C equipment. Some Inmarsat-A models also have the feature. ■

172.3 Two types of EGC messages are available SafetyNET™ and FleetNET™ (both names are registered trademarks of Inmarsat). ■

172.4 SafetyNET™ allows authorised organisations to broadcast shore-to-ship maritime safety information. Authorised organisations include:

>> hydrographic offices, for navigational warnings;

>> meteorological offices, for weather warnings and forecasts; and

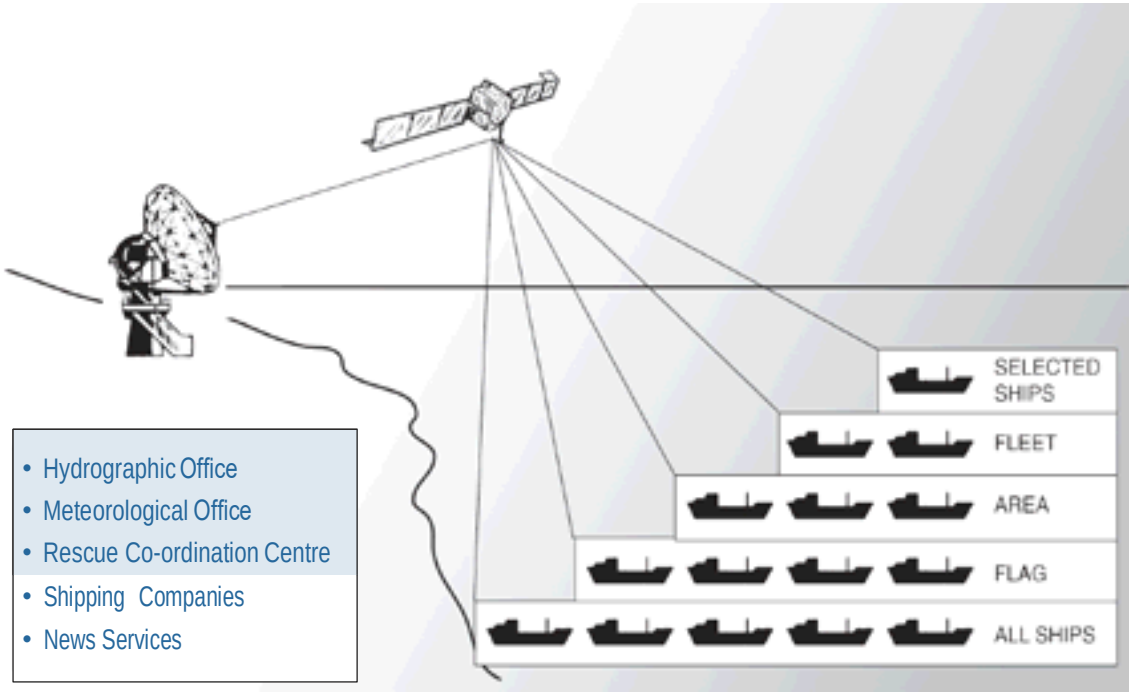
>> maritime rescue co-ordination centres, for shore to ship distress alerts, search and rescue communications and other urgent or important information. ■

172.5 FleetNET™ allows authorised organisations to broadcast information to selected groups of Ship Earth Stations. The selected SESs may belong to a particular fleet or flag, or be a registered subscriber to a commercial service. Authorised users include;

>> shipowners, for the broadcast of fleet or company information;

>> government's, for the broadcast of messages to a particular country's vessels; and

>> news subscription services, for the broadcast of news bulletins.



Basic concept of the Inmarsat Enhanced Group Calling System (the shaded area indicates functions of the SafetyNet™ Service)

172.6 Most Inmarsat-C models can only receive EGC information when not engaged in normal message transmission or reception with a Land Earth Station (LES). When engaged in these tasks the installation is tuned to a LES channel and not to the Network Co-ordination Station (NCS) common channel on which the EGC broadcasts are made. However, on completion of communications with the LES, the Ship Earth Station will automatically return to the NCS common channel. ■

172.7 The Inmarsat system provides a six minute "echo" of EGC information to allow vessels that have been engaged with a LES to return to the NCS common channel and receive the information. Inmarsat-C equipment is divided into three classes:

>> Class 1 - has no EGC facility;

>> Class 2 - receives EGC on completion of normal mail reception; and

>> Class 3 - can receive EGC and mail simultaneously. ■

173. BROADCASTS OF EGC MESSAGES

173.1 An EGC message, whether SafetyNET™ or FleetNET™, is broadcast over an entire ocean region and is received by all Ship Earth Stations which are tuned to the Network Co-ordination Station common channel. However, the message is only accepted by those EGC receivers which are in the geographical area specified by the authorised information provider, or have been programmed to accept that particular type of EGC message. All other EGC receivers reject the message. ■

173.2 EGC address selections that may be specified by an authorised information provider are:

>> vessels within a fixed, or uniquely defined, geographical area;

>> vessels belonging to a particular flag or fleet;

>> a particular vessel; and

>> all vessels within an ocean region. ■

173.3 All EGC messages carry a unique coding which allows the EGC receiver to automatically suppress storage and printing of messages that are received more than once if the original message has been correctly received. ■

174. BROADCASTS OF SAFETYNET™ INFORMATION

174.1 Information providers of maritime safety information make use of the EGC system's geographical area addressing capabilities. For example, EGC messages containing weather forecasts and navigational warnings will normally be sent to fixed areas, while EGC messages concerning a local storm warning or distress alert relay will be sent to a uniquely defined area. Information about EGC broadcasts of weather forecasts and warnings by the Bureau of Meteorology can be obtained from the Bureau's website (www.bom.gov.au). ■

174.2 The decision made by a Ship Earth Station's EGC receiver to accept or reject such messages is entirely electronic and relies solely on comparison with the geographical position data which resides in the memory of the EGC facility. Therefore it is essential that the EGC facility is continuously provided with correct vessel position information. If an interface with a satellite position fixing equipment is not provided, the EGC facility should be manually updated at intervals not exceeding two hours. ■

174.3 On most Inmarsat-C equipment, the position routinely entered into the distress alert generator, either manually or electronically by an interface, also updates the EGC facility. ■

174.4 Failure to update the EGC facility within a 12 hour interval will result in the EGC receiver accepting all maritime safety information with priorities higher than "routine" for the entire ocean region, regardless of the specified geographical address. ■

174.5 Operators of Inmarsat-A, B and Inmarsat-C Ship Earth Stations which incorporate an EGC facility should obtain a copy of the Australian Marine Notice which details the arrangements for the promulgation of maritime safety information via Inmarsat's EGC system. Further information is available from the Australian Maritime Safety Authority's (AMSA) Internet site (http://www.amsa.gov.au). Further information regarding broadcasts of SafetyNET™ information can be found in the Australian GMDSS Handbook also available from AMSA offices.

174.6 Operators should also consult the equipment manufacturer's handbook for specific instructions on how to programme the EGC facility to ensure that relevant information is received and, if required, printed.

174.7 Reception of shore to ship distress alerts and messages which carry an "urgent priority" will be marked by audible and/or visual alarms to attract the attention of a vessel's watch keeper. ■

SECTION 33 INMARSAT-M EQUIPMENT

175. GENERAL INFORMATION

175.1 The Inmarsat-M system provides lower quality telephone and data service in the real time mode.

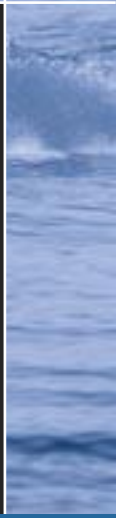
175.2 Inmarsat-M requires a small, lightweight antenna. However, it is necessary to arrange stabilisation of the antenna to ensure that it continues to view the satellite during all the normal motions of a vessel at sea.

175.3 Inmarsat-M is not approved for use in the Global Maritime Distress and Safety System (GMDSS).

Appendices





APPENDIX 1

QUALIFICATIONS EXAMINATION SYLLABI

EXAMINATION SYLLABUS FOR THE MARINE RADIO OPERATORS CERTIFICATE OF PROFICIENCY (MROCP)

A candidate will be required to:

1. Demonstrate a practical knowledge of GMDSS sub-systems and equipment which is appropriate to vessels operating in Australian waters on which a radio installation is not compulsory under international agreements. Specifically, MF/HF and VHF radiotelephony equipment with digital selective calling (DSC) facilities and emergency position indicating radio beacons of the 406 MHz and 121.5/243 MHz type.
2. Demonstrate an ability to use MF/HF and VHF radiotelephony and digital selective calling (DSC) operating procedures, particularly those relating to distress, urgency and safety.
3. Demonstrate an understanding of simple maintenance practices required to keep the marine radio equipment specified in (1) in good working order, including the repair of minor faults.
4. Demonstrate an understanding of the regulations applicable to ship stations equipped with radiotelephony and digital selective calling facilities.
5. Demonstrate a basic knowledge of the Australian marine search and rescue system.

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EXAMINATION SYLLABUS FOR THE MARINE RADIO OPERATORS VHF CERTIFICATE OF PROFICIENCY (MROVCP)

A candidate for the Marine Radio Operators VHF Certificate of Proficiency will be required to:

1. Demonstrate a practical knowledge of GMDSS sub-systems and equipment which is appropriate to vessels operating in Australian waters on which a radio installation is not compulsory under international agreements. Specifically, VHF radiotelephony equipment with digital selective calling (DSC) facilities, and emergency position indicating radio beacons of the 406 MHz and 121.5/243 MHz type.
2. Demonstrate an ability to use VHF radiotelephony and digital selective calling (DSC) operating procedures, particularly those relating to distress, urgency and safety.
3. Demonstrate an understanding of simple maintenance practices required to keep the marine radio equipment specified in (1) in good working order, including the repair of minor faults.
4. Demonstrate an understanding of the regulations applicable to ship stations equipped with VHF radiotelephony and digital selective calling facilities.
5. Demonstrate a basic knowledge of the Australian marine search and rescue system.

Chapter 1 - GENERAL

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EXAMINATION REQUIREMENTS FOR THE MARINE SATELLITE COMMUNICATIONS ENDORSEMENT (SATCOM)

Candidates require an understanding of:

- The concepts underlying the Inmarsat satellite system, including location of satellites, global coverage, ocean regions, network co-ordination and control stations and land earth stations.
- The worldwide rescue co-ordination centre (RCC) network and automatic routing of distress messages.

Candidates require a detailed knowledge of:

- Transmission and reception of distress alerts.
- The procedures to follow in the advent of a false distress alert transmission.
- Transmission and reception of priority alerts.
- The Enhanced Group Calling system for reception of Maritime Safety Information.
- Maritime Safety Information service providers.

Candidates require a knowledge of:

- The functionality of Inmarsat type A, B, C, E and M equipment.
- Antenna stabilization and shadows.
- Radiation hazards associated with Inmarsat equipment installations.
- Interfacing with navigational equipment and manual position updating of Inmarsat C.
- Logging-in and logging-out of Inmarsat C.
- Reception of EGC messages
- Transmission and reception of routine or general communications
- Two digit special access codes.
- Authorised users of SafetyNET™.
- Authorised users of FleetNET™.
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SUGGESTED FORMAT FOR A RADIO LOGBOOK PAGE:

Name of Vessel:

Call Sign:
MMSI:

Date and Time	Station/MMSI from	Station/MMSI to	Details of Calls, Signals & Distress Working	Frequency/Channel

APPENDIX 3

FREQUENCIES FOR USE BY SHIP STATIONS

All frequencies are carrier frequencies. In the case of single sideband (SSB) transmissions, the assigned frequency is 1.4 kHz higher.

TABLE 1. Distress, Urgency, Safety and Calling Frequencies (for use by all vessels) ♦ ●

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
2182 kHz	Limited coast and ship stations	Distress, urgency, safety & routine calling ●
2187.5 kHz	Limited coast and ship stations	DSC Distress, urgency & safety alerting ●
4125 kHz	Maritime communication*, limited coast** and ship stations	Distress, urgency and safety calling ●
4207.5 kHz	Maritime communication*, limited coast and ship stations	DSC Distress, urgency and safety alerting
6215 kHz	Maritime communication*, limited coast** and ship stations	Distress, urgency and safety calling ●
6312 kHz	Maritime communication, limited coast and ship stations	DSC Distress, urgency, safety alerting
8291 kHz	Maritime communication*, limited coast** and ship stations	Distress, urgency and safety calling ●
8414.5 kHz	Maritime communication, limited coast and ship stations	DSC Distress, urgency, safety alerting
12 290 kHz	Maritime communication*, limited coast and ship stations	Distress, urgency and safety ●
12 359 kHz	Limited coast and ship stations	Routine calling
12 577 kHz	Maritime communication, limited coast and ship stations	DSC Distress, urgency, safety alerting
16 420 kHz	Maritime communication*, limited coast and ship stations	Distress, urgency and safety ●
16 537 kHz	Limited coast and ship stations	Routine calling
16 804.5 kHz	Maritime communication, limited coast and ship stations	DSC Distress, urgency, safety alerting
121.5 / 243 MHz	Earth stations via satellites, aircraft	EPIRB ♦●
156.300 MHz (Ch 6)	Ship and aircraft	Co-ordinated Search and Rescue (SAR) ♦●
156.375 MHz (Ch 67)	Limited coast and ship stations	Distress, urgency and safety calling (supp to Ch 16) ♦●
156.525 MHz (Ch 70)	Limited coast and ship stations	DSC Distress, urgency, safety and routine alerting ♦●
156.650 MHz (Ch 13)	Ship stations	Intership Maritime Safety Information ♦●
156.800 MHz (Ch 16)	Limited coast and ship stations	Distress, urgency, safety and routine calling ♦●
406.025 MHz	Earth stations via satellites	EPIRBs ♦●
406.028 MHz	Earth stations via satellites	EPIRBs with GPS ♦●
1530-1545 MHz	Coast earth and ship earth stations via satellites	Inmarsat systems
1626.6-1646.5 MHz	Coast earth and ship earth stations via satellites	Inmarsat systems

* Maritime communication stations do not provide aural monitoring of these frequencies, but may continue to use them for establishing communication with ship stations.

** It is intended that these frequencies are monitored by stations set up by Governments of the States and the Northern Territory. See Section 7 for further information.

TABLE 2. Professional Fishing Vessels Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
2112 kHz	Limited coast and ship stations	Calling and working
2164 kHz	Ship Stations	Calling and working
4535 kHz*	Limited coast and ship stations	Calling and working
4620 kHz*	Limited coast and ship stations	Calling and working
27.72 MHz (Ch 72)	Limited coast and ship stations	Calling and working
27.82 MHz (Ch82)	Limited coast and ship stations	Calling and working
156.575 MHz (Ch 71)	Limited coast and ship stations	Calling and working
156.625 MHz (Ch 72)	Ship Stations	Calling and working
156.875 MHz (Ch 77)	Ship Stations	Calling and working

* Intership use restricted to communications concerning safety of vessels and persons.

TABLE 3. Commercial Vessel Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
1715 kHz*	Limited coast stations and ship stations	Calling and working
1725 kHz*	Limited coast stations and ship stations	Calling and working
1775 kHz*	Limited coast stations and ship stations	Calling and working
2008 kHz*	Limited coast stations and ship stations	Calling and working
2032 kHz*	Limited coast stations and ship stations	Calling and working
2436 kHz*	Limited coast stations and ship stations	Calling and working
2638 kHz	Ship stations	Calling and working
27.68 MHz (Ch 68)	Limited coast stations and ship stations	Calling and working
156.300 MHz (Ch6)	Ship Stations	Calling and working
156.400 MHz (Ch 8)	Ship Stations	Calling and working
156.625 MHz (Ch 72)	Ship Stations	Calling and working
156.725 MHz (Ch 74)	Limited coast stations and ship stations	Calling and working
156.925/161.525 MHz (Ch 78)	Limited coast stations	Calling and working

* Use restricted to communications with limited coast stations operated by an organisation of which the licensee is a member, and to intership communications with other members.

TABLE 4. Yachts and Pleasure Vessels Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
2284 kHz	Ship stations in pleasure vessels	Calling and working
2524 kHz*	Limited coast and ship stations in pleasure vessels	Calling and working
156.625 MHz (Ch 72)	Ship stations	Calling and working
156.675 MHz (Ch 73)	Limited coast and ship stations	Calling and working
156.875 MHz (Ch 77)	Ship stations	Calling and working

* Communications on 2524 kHz with limited coast stations restricted to those concerning the safety of vessels and persons.

TABLE 5. Inshore Boating Service Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
1715, 1725, 1775, 2008, 2032, 2436 kHz*	Limited coast stations and ship stations	Calling and working
27.90 MHz (Ch 90)*	Limited coast stations	Calling and working
27.91 MHz (Ch 91)*	Limited coast stations	Calling and working
27.94 MHz (Ch 94)*	Limited coast stations and ship stations	Calling and working
27.96 MHz (Ch 96)	Ship stations	Calling and working
27.98 MHz (Ch 98)	Limited coast stations, ship and mobile stations	Calling and working by safety organisations

* Use restricted to communications with limited coast stations operated by an organisation of which the licensee is a member, and to intership communications with other members.

TABLE 6. Port Operations Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
156.300 MHz (Ch 6)	Ship stations	Calling and working
156.400 MHz (Ch 8)	Ship stations	Calling and working
156.425 MHz (Ch 68)	Limited coast stations	Calling and working
156.450 MHz (Ch 9)	Limited coast stations and ship stations	Calling and working
165.500 MHz (Ch10)	Limited coast stations and ship stations	Calling and working
156.550 MHz (Ch 11)	Limited coast stations	Calling and working
156.600 MHz (Ch 12)	Limited coast stations	Calling and working
156.625 MHz (Ch 72)	Ship stations	Calling and working
156.650 MHz (Ch13)	Limited coast stations and ship stations	Calling and working
156.700 MHz (Ch 14)	Limited coast stations	Calling and working
156.975/161.575 MHz (Ch79)	Limited coast stations	Calling and working
157.000/161.600 MHz (Ch 20)	Limited coast stations	Calling and working

TABLE 7. Public Correspondence Frequencies

Ship stations may use those MF/HF and VHF frequencies detailed by their provider for public correspondence.

Subject to the International Radio Regulations, when operating outside Australian territorial waters, ship stations may use any maritime mobile frequency authorised by those regulations. Details may be found in the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Service, published by the International Telecommunication Union.

TABLE 8. VHF Marine Repeater Channels

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
157.050/161.650 MHz (Ch 21)	Limited coast and ship stations via repeaters	Vessel movements, safety of vessels and persons
157.100/161.700 MHz (Ch 22)	Limited coast and ship stations via repeaters	Vessel movements, safety of vessels and persons
157.025/161.625 MHz (Ch 80)	Limited coast and ship stations via repeaters	Vessel movements, safety of vessels and persons
157.075/161.675 MHz (Ch 81)	Limited coast and ship stations via repeaters	Vessel movements, safety of vessels and persons
157.125/161.725 MHz (Ch 82)	Limited coast and ship stations via repeaters	Vessel movements, safety of vessels and persons

TABLE 9. On-Board Communications Frequencies

Carrier Frequency (Tx/Rx) & Channel No.	Communicating with	Purpose
457.525 MHz	Stations on board the vessel	Calling and working
457.550 MHz	Stations on board the vessel	Calling and working
457.575 MHz	Stations on board the vessel	Calling and working
467.525 MHz	Stations on board the vessel	Calling and working
467.550 MHz	Stations on board the vessel	Calling and working
467.575 MHz	Stations on board the vessel	Calling and working

* These frequencies may be used with six simplex channels or three duplex channels.

TABLE 10. Radar Frequencies Frequency Band

Frequency Band	Purpose
2.9 – 3.1 GHz	Marine navigation
9.3 – 9.5 GHz	Marine navigation and radar transponders

TABLE 11. Broadcast of Weather Information from VMC Australia Weather East at Charleville (Qld)

Frequency Band	Purpose
2201 kHz 4426 kHz 6507 kHz 8176 kHz* 12 365 kHz	Frequencies used by Maritime communication stations to broadcast weather forecasts and warnings. The broadcasts are generated by the Bureau of Meteorology and automatically transmitted on these frequencies.

* This frequency is also used by stations set up by the States and the Northern Territory to broadcast navigational warnings. See Section 7 for more information.

TABLE 12. Broadcast of Weather Information from VMC Australian Weather West at Wiluna (WA)

Frequency Band	Purpose
2056 kHz 4149 kHz 6230 kHz 8113 kHz 12 362 kHz 16 528 kHz	Frequencies used by Maritime communication stations to broadcast weather forecasts and warnings. The broadcasts are generated by the Bureau of Meteorology and automatically transmitted on these frequencies.

TABLE 13. Broadcast of Weather and Ocean charts via Radio Fax from VMC Australia Weather East at Charleville (Qld)

Frequency Band	Purpose
2628 kHz 5100 kHz 11 030 kHz 13 920 kHz 20 469 kHz	Frequencies used by Maritime communication stations to broadcast weather forecasts and warnings. The broadcasts are generated by the Bureau of Meteorology and automatically transmitted on these frequencies

TABLE 14. Broadcast of Weather and Ocean charts via Radio Fax from VMW Australia Weather East at Wiluna (WA)

Frequency Band	Purpose
5755 kHz 7535 kHz 10 555 kHz 15 615 kHz 18 060 kHz	Frequencies used by Maritime communication stations to broadcast weather forecasts and warnings. The broadcasts are generated by the Bureau of Meteorology and automatically transmitted on these frequencies.

TABLE 15. Units of Frequency. Sub division of the radiofrequency spectrum

Units of Frequency		
The kilohertz (kHz)	=	1,000 hertz
The megahertz (MHz)	=	1,000,000 hertz
The gigahertz (GHz)	=	1,000,000,000 hertz

Spectrum – The radio frequency spectrum is sub-divided into eight bands, as follows:		
Very Low Frequencies	(VLF)	3 to 30 kHz
Low Frequencies	(LF)	30 to 300 kHz
Medium Frequencies	(MF)	300 to 3000 kHz (or 3MHz)
High Frequencies	(HF)	3 MHz to 30 MHz
Very High Frequencies	(VHF)	30 to 300 MHz
Ultra High Frequencies	(UHF)	300 to 3000 MHz (or 3 GHz)
Super High Frequencies	(SHF)	3 GHz to 30 GHz
Extra High Frequencies	(EHF)	30 – 300 GHz

TABLE 16. Internet websites for general interest

www.acma.gov.au	Australian Communications & Media Authority
www.amsa.gov.au	Australian Maritime Safety Authority
www.anta.gov.au	Australian National Training Authority
www.bom.gov.au	Bureau of Meteorology
www.cospas-sarsat.org	Cospas Sarsat
www.gmdss.com.au	Global Maritime Distress and Safety System
www.imo.org	International Maritime Organisation
www.inmarsat.com	International Maritime Satellite Service
www.itu.int	International Telecommunications Union
www.nmsc.gov.au	National Maritime Safety Committee
www.ntis.gov.au	National Training Information Service
www.painswessex.com.au	Pains Wessex Australia
www.admiraltyleisure.co.uk	British Admiralty/Products/Publications/Maritime Communications

APPENDIX 4

TABLE OF TRANSMITTING FREQUENCIES IN THE VHF MARITIME MOBILE BAND

Extracted from Appendix 18 (WRC 2000) to the ITU Radio Regulations

NOTE

- The channels of the present Appendix, with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may also be used for high-speed data and facsimile transmissions, subject to special arrangement between interested and affected administrations.
- The channels of the present Appendix, but preferably channel 28 and with the exception of channels 06, 13, 15,16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.
- The frequencies in this table may also be used for radiocommunications on inland waterways in accordance with the conditions specified in No. 5.226

Channel designator	Notes*	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movements		Public correspondence
		Ship stations	Coast stations		Single frequency	Two frequency	
60		156.025	160.625			X	X
01		156.050	160.650			X	X
61	m), o)	156.075	160.675		X	X	X
02	m), o)	156.100	160.700		X	X	X
62	m), o)	156.125	160.725		X	X	X
03	m), o)	156.150	160.750		X	X	X
63	m), o)	156.175	160.775		X	X	X
04	m), o)	156.200	160.800		X	X	X
64	m), o)	156.225	160.825		X	X	X
05	m), o)	156.250	160.850		X	X	X
65	m), o)	156.275	160.875		X	X	X
06	f)	156.300		X			
66		156.325	160.925			X	X
07		156.350	160.950			X	X
67	h)	156.375	156.375	X	X		
08		156.400		X			
68		156.425	156.425		X		
09	i)	156.450	156.450	X	X		
69		156.475	156.475	X	X		
10	h)	156.500	156.500	X	X		
70	j)	156.525	156.525	Digital selective calling for distress, safety and calling			
11		156.550	156.550		X		
71		156.575	156.575		X		
12		156.600	156.600		X		
72	i)	156.625		X			
13	k)	156.650	156.650	X	X		
73	h), i)	156.675	156.675	X	X		
14		156.700	156.700		X		
74		156.725	156.725		X		
15	g)	156.750	156.750	X	X		
75	n)	156.775			X		
16		156.800	156.800	DISTRESS, SAFETY AND CALLING			
76	n)	156.825			X		
17	g)	156.850	156.850	X	X		
77		156.875		X			
18	m)	156.900	161.500		X	X	X

Channel designator	Notes*	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movements		Public correspondence
		Ship stations	Coast stations		Single frequency	Two frequency	
78		156.925	161.525			X	X
19		156.950	161.550			X	X
79		156.975	161.575			X	X
20		157.000	161.600			X	X
80		157.025	161.625			X	X
21		157.050	161.650			X	X
81		157.075	161.675			X	X
22	m)	157.100	161.700		X	X	X
82	m), o)	157.125	161.725		X	X	X
23	m), o)	157.150	161.750		X	X	X
83	m), o)	157.175	161.775		X	X	X
24	m), o)	157.200	161.800		X	X	X
84	m), o)	157.225	161.825		X	X	X
25	m), o)	157.250	161.850		X	X	X
85	m), o)	157.275	161.875		X	X	X
26	m), o)	157.300	161.900		X	X	X
86	m), o)	157.325	161.925		X	X	X
27		157.350	161.950			X	X
87		157.375			X		
28		157.400	162.000			X	X
88	h)	157.425			X		
AIS 1	l)	161.975	161.975				
AIS 2	l)	162.025	162.025				

* TABLE NOTES

a) Administrations may designate frequencies in the intership, port operations and ship movement services for use by light aircraft and helicopters to communicate with ships participating coast stations in predominantly maritime support operations. However, the use of the channels which are shared with public correspondence shall be subject to prior agreement interested and affected administrations.

b) The channels of the present Appendix, with the exception of Channels 06, 13, 15, 16, 17, 70, 75 and 76, may also be used for high-speed data facsimile transmissions, subject to special arrangement between interested and affected administrations.

c) The channels of the present Appendix, but preferably Channel 28 and with the exception of Channels 06, 13, 15, 16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.

d) The frequencies used in this table may also be used for radiocommunications on inland waterways.

e) Administrations having an urgent need to reduce local congestion may apply 12.5 kHz Channel interleaving on a non-interference basis to 25 kHz channels, provided:

- Recommendation ITU-R M.1084-2 shall be taken into account when changing to 12.5 kHz Channels;
- it shall not affect the 25 kHz Channels of the Appendix 4 maritime mobile distress and safety frequencies, especially the Channels 06, 13, 15, 16, 17, and 70, nor the technical characteristics mentioned in Recommendation ITU-R M.489-2 for those channels;
- implementation of 12.5 kHz channel interleaving and consequential national requirements shall be subject to prior agreement between the implementing administrations and administrations whose ship stations or services may be affected.

SPECIFIC NOTES

f) The frequency 156.300 MHz (Channel 06) may also be used for communication between ship stations and aircraft stations engaged in co-ordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on Channel 06 as well as to communications between aircraft stations, ice-breakers and assisted ships during ice seasons.

g) Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 W, and subject to the national regulations of the administration concerned when these channels are used in its territorial waters.

h) Within the European Maritime Area and in Canada, these frequencies (Channels 10, 67, 73) may also be used, if so required, by the individual administrations concerned, for communication between ship stations, aircraft stations and participating land stations engaged in co-ordinated search and rescue and anti-pollution operations in local areas.

i) The preferred first three frequencies for the purpose indicated in Note a) are 156.450 MHz (channel 09), 156.625 MHz (channel 72) and 156.675 MHz (channel 73).

j) Channel 70 is to be used exclusively for digital selective calling for distress, safety and calling.

k) Channel 13 is designated for use on a worldwide basis as a navigation safety communication channel, primarily for intership navigation safety communications. It may also be used for the ship movement and port operations service subject to the national regulations of the administrations concerned.

l) These Channels (AIS 1 and AIS 2) will be used for an automatic ship identification and surveillance system capable of providing worldwide operation on high seas, unless other frequencies are designated on a regional basis for this purpose.

m) These Channels (18 and 82 to 86) may be operated as single frequency channels, subject to special arrangement between interested or affected administrations.

n) The use of these channels (75 and 76) should be restricted to navigation-related communications only and all precautions should be taken to avoid harmful interference to channel 16, e.g. by limiting the output power to 1 W or by means of geographical separation.

o) These Channels may be used to provide bands for initial testing and the possible future introduction of new technologies, subject to special arrangement between interested or affected administrations. Stations using these channels or bands for the testing and the possible future introduction of new technologies shall not cause harmful interference to, and shall not claim protection from, other stations operating in accordance with ITU Radio Regulations / Volume 1 / Chapter S11 – Frequencies / Article S5 / Frequency allocations.

APPENDIX 5

PHONETIC ALPHABET ♦●

As per the International Maritime Organisation (IMO) Standard Marine Communications Phrases (2002).
When it is necessary to spell out call signs and words the following letter spelling table should be used:

Letter to be transmitted	Codeword to be used	Spoken as*
A	Alfa	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE or SHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
G	Golf	GOLF
H	Hotel	HOH TELL
I	India	IN DEE AH
J	Juliett	JEW LEE ETT
K	Kilo	KEY LOH
L	Lima	LEE MAH
M	Mike	MIKE
N	November	NO VEM BER
O	Oscar	OSS CAH
P	Papa	PAH PAH
Q	Quebec	KEH BECK
R	Romeo	ROW ME OH
S	Sierra	SEE AIR RAH
T	Tango	TAN GO
U	Uniform	YOU NEE FORM or OO NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEY
Z	Zulu	ZU LU

* The syllables to be emphasised are underlined.

FIGURE CODE

A few digits and numbers have a modified pronunciation compared to general English:

Letter to be transmitted	Codeword to be used	Spoken as
0	zero	ZEEROH
1	one	WUN
2	two	TOO
3	three	TREE
4	four	FOWER
5	five	FIFE
6	six	SIX
7	seven	SEVEN
8	eight	AIT
9	nine	NINER
10	One zero	WUNZEEROH
1000	thousand	TOUSAND
Decimal point	Decimal	DAY-SEE-MAL
Full stop	Stop	STOP
/	Oblique Stroke	OBLIQUE

APPENDIX 6

STANDARD MARINE COMMUNICATION PHRASES

English is the language most widely used at sea. To facilitate radiotelephony communications, the International Maritime Organisation has compiled a vocabulary of frequently used words and phrases in a book entitled Standard Marine Communication Phrases (SMCP). The complete SMCP is also available at the IMO website at: http://www.imo.org.

In the interests of accuracy, brevity and clarity it is sound practice for operators to use the standard vocabulary when possible.

A selection of the standard vocabulary is contained in the following paragraphs.

MESSAGE MARKERS

If necessary, messages passed by radiotelephony may be preceded by the following message markers:

"Question" Indicates the following message is of interrogative character.

"Answer" Indicates that the following message is the reply to a previous question.

"Request" Indicates that the content of the following message is asking for action with respect to the ship.

"Information" Indicates that the following message is restricted to observed facts.

"Intention" Indicates that the following message informs others about immediate navigational actions intended to be taken.

"Warning" Indicates that the following message informs other traffic participants about dangers.

"Advice" Indicates that the following message implies the intention of the sender to influence the recipient(s) by a recommendation.

"Instruction" Indicates that the following message implies the intention of the sender to influence the recipient(s) by a regulation.

Responses Where the answer to a question is in the affirmative, say: "Yes" followed by the appropriate phrase in full.

Where the answer to a question is in the negative, say: "No" followed by the appropriate phrase in full.

Where the information is not immediately available, but soon will be, say: "Stand by".

Where the information cannot be obtained, say: "No information".

Where a message is not properly heard, say: "Say again".

Where a message is not understood, say: "Message not understood".

Miscellaneous Phrases

"What is your vessel's name (and call sign)?"

"How do you read (me)?"

"I read you. . .

bad/one	with signal strength one (i.e.) barely perceptible
poor/two	with signal strength two (i.e.) weak
fair/three	with signal strength three (i.e.) fairly good
Good/four	with signal strength four (i.e.) good
Excellent/five	with signal strength five (i.e.) very good

"Stand by on channel...."

"Change to channel...."

"I cannot read you (pass your message through..../Advise try channel....)"

"I cannot understand you. Please use the Standard Marine Vocabulary/ International Code of Signals."

Corrections	"Correction….." plus the corrected part of the message. "Mistake….." followed by the word e.g. Speed 14 (one four) kts – mistake – correction speed 12 (one two) kts."
Relay	I am passing a message for vessel....
Go ahead	I am ready/not ready to receive your message I do not have channel.... Please use channel....
Repetition	If any parts of the message are considered sufficiently important to need particular emphasis, use the word "repeat", e.g. "Do not repeat do not overtake".
Acknowledgement	"Romeo."
Position	When latitude and longitude are used, these should be expressed in degrees and minutes (and decimals of a minute, if necessary), north or south of the Equator and east or west of Greenwich. When the position is related to a mark, the mark shall be a well-defined charted object. The bearing shall be in the 360-degree notation from true north and shall be that of the position from the mark.
Courses	Courses should always be expressed in the 360-degree notation from true north (unless otherwise stated). Whether this is to, or from, a mark can be stated.
Bearings	The bearing of the mark or vessel concerned is the bearing in the 360-degree notation from true north (unless otherwise stated), except in the case of relative bearings Bearings may be either from the mark or from the vessel.
Distances	Distances should be expressed in nautical miles or cables (tenths of a nautical mile), otherwise in kilometres or metres. The unit should always be stated.
Speed	Speed should be expressed in knots (without further notation meaning speed through the water). "Ground speed" meaning speed over the ground.
Numbers	Numbers should be transmitted by speaking each digit separately, for example one five zero for 150
Geographical names	Place names used should be those on the chart or Sailing Directions in use. Should these not be understood, latitude and longitude should be used.
Time	Time should be expressed in the 24-hour notation indicating whether UTC, zone-time or local shoretime is being used.

APPENDIX 7

CONTACT DETAILS

Office of Maritime Communications Australian Maritime College (AMC)

Internet

www.amcom.amc.edu.au

Central Office

Newnham Way
Newnham 7250
PO Box 986
Launceston Tasmania 7250
Freecall 1300 365 262
Telephone (03) 6335 4869
Facsimile (03) 6335 4885
Email: amcom@amc.edu.au

Australian Search and Rescue (a division of the Australian Maritime Safety Authority)

GPO Box 2181
Canberra ACT 2601
Email: aussarquery@amsa.gov.au

Emergency Phone Numbers:

1800 641 792
1800 622 153

Australian Communications & Media Authority (ACMA)

Internet

www.ACMA.gov.au

Central Office - Canberra

Purple Building, Benjamin Offices
Belconnen ACT 2617
PO Box 78
Belconnen ACT 2616
Telephone (02) 6219 5555
Facsimile (02) 6219 5200

Outside Sydney, Brisbane, Melbourne, Perth and Cairns areas

(A call to this number can be made from outside the listed areas and will be charged at the local rate, except for mobile phones, which are timed.)
Telephone 1300 850 115

Bureau of Meteorology

Internet

www.bom.gov.au

Head Office - Melbourne

150 Lonsdale St.
Melbourne Vic
PO Box 1289K
Melbourne Vic 3001
Telephone (03) 9669 4000
Facsimile (03) 9669 4699

National Communications Manager

Telephone (03) 9669 4224

National Marine Weather Services Manager

Telephone (03) 9669 4510

APPENDIX 8

GLOSSARY OF TERMS AND ABBREVIATIONS

AAIC	Accounting Authority Identification Code.
ACMA	Formerly the Australian Communications Authority
AM	Amplitude modulation.
AMC	Australian Maritime College.
AMSA	Australian Maritime Safety Authority.
AusSAR	The operating authority for RCC Australia.
AUSREP	Australian Ship Reporting System.
Ch	Radio channel.
Coast Radio Station	A land station in the maritime mobile service providing terrestrial HF communications to and from ships at sea. These stations are operated on behalf of the State/Territory marine authorities. These stations are licensed as limited coast stations. References in the text to 'limited coast stations' should be taken to include these stations as well, unless otherwise specified. (See section 3a).
COSPAS-SARSAT System	A satellite-aided search and Rescue system based on low-altitude, near polar orbiting satellites and designed to locate emergency position indicating radio beacons transmitting on the frequencies of 121.5 and 406.025 MHz.
CQ	General call to all stations. Frequently used in Morse transmissions. May also be used in radiotelephony.
De	"from....." (used to precede the name or identification of the calling station). Frequently used in Morse transmissions. May also be used in radiotelephony.
DSC	Digital Selective Calling. A digitised alerting technique used between stations in the marine service.
Duplex Frequencies	Different but paired frequencies used for simultaneous transmission and reception.
EGC	Enhanced Group Calling.
EPIRB	Emergency Position Indicating Radio Beacon.
Geostationary Satellite	A satellite whose period of revolution is equal to the period of rotation of the Earth and whose circular and direct orbit lies in the plane of the equator, that is a satellite which remains approximately fixed relative to a position on Earth.
GHz	Gigahertz (1 000 000 000 hertz). A measurement unit of radio frequency.
GPS	Global Positioning System. A satellite-based system for calculating positions anywhere on the Earth's surface.
GMDSS	Global Maritime Distress and Safety System.
HF	High Frequency (3 to 30 MHz).
Hz	Hertz. A measurement unit of radio frequency.
H3E	Radiotelephony using amplitude modulation, single sideband, full carrier - the compatible mode. Often referred to as "AM". Permitted only on 2182 kHz
Inmarsat	International Maritime Satellite Organisation.
ITU	International Telecommunication union.
J3E	Radiotelephony using amplitude modulation, single sideband, suppressed carrier. Often referred to as "SSB".
km	Kilometre/s (0.54 of a nautical mile)
kHz	Kilohertz (1000 hertz). A measurement unit of radio frequency.

knots	Nautical miles per hour.
kW	Kilowatt (1000 watts). A measurement unit of radio power.
LCS	Limited Coast Station.
LES	Land Earth Station.
Limited Coast Station	A land station in the maritime mobile service providing terrestrial communications to and from ships at sea. These differ from the Australian Maritime Communication Stations in the services they provide.
Local user Terminal (LUT)	A ground receiving station which receives data from COSPAS and SARSAT satellites, calculates the position of the beacon and forwards the resultant information to search and rescue authorities.
Maritime Communication	One of the two major Australian land stations in the maritime mobile service providing terrestrial communications to and from ships at sea. Overseas, stations providing the same services as Maritime Communication Stations may be called 'coast stations'.
MID	Maritime Identification Digit. A three figure group included as part of a MMSI to indicate the station's country of location or, in the case of a ship, its country of registration.
MMSI	Maritime Mobile Service Identity. A unique nine digit group required as electronic identification by stations using digital selective calling techniques.
MHz	Megahertz (1 000 000 hertz). A measurement unit of radio frequency.
MF	Medium Frequency (300 to 3000 kHz).
MRCC	Maritime Rescue Co-ordination Centre.
MSI	Maritime safety information - a term used in the GMDSS to describe distress alerts, navigational warnings, meteorological warnings and forecasts and other important safety information for vessels.
NCS	Network Co-ordination Station.
Nm	Nautical mile/s (1.85 km).
RCC Australia	Rescue Co-ordination Centre located in Canberra. Operated by AusSAR.
Rx	Receiver or receive frequency.
SAR	Search and Rescue
SART	Survival craft radar transponder. Also known as a Search And Rescue Transponder.
SES	Ship Earth Station.
SIMPLEX	The same frequency used for transmission and reception.
SOLAS Convention	Safety Of Life At Sea Convention as adopted by the International Maritime Organisation and accepted by contracting governments.
SSB	Single sideband.
USB	Upper sideband.
TAFE	Technical And Further Education, College of.
Telstra	Telstra Global Satellite and Radio Services.
Tx	Transmitter or transmit frequency.
UTC	Co-ordinated universal Time (replaced Greenwich Mean Time as the world standard in 1986).
VHF	Very High Frequency (30 to 300 MHz).

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SUBJECT-PARAGRAPH