GMDSS
Maritime Radio Operator

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2012
GMDSS Maritime Radio Operator
www.gantioler.at

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Part I

Short Range Certificate
SRC

Harmonised European Conference of Postal and Telecommunications Administrations CEPT procedures for the Short Range Certificate SRC for non-SOLAS vessels. ¹

1. General knowledge of maritime radio communication
   (a) The general principles and basic features
   (b) System overview of the GMDSS structure
   (c) Search and Rescue SAR
   (d) Maritime Safety Information MSI

2. Practical knowledge of radio equipment
   (a) Very High Frequency VHF radio installation
   (b) Digital Selective Calling DSC
   (c) Antennas, interfacing and power sources

3. Procedures and practical operation of the subsystems
   (a) DSC Distress, urgency, safety communication procedures
   (b) Protection of distress frequencies
   (c) Alerting, Communication and Locating Signals

4. Radio Telephony RT procedures
   (a) Ability to exchange communications relevant to SOLAS
   (b) Knowledge of radio communication procedures

5. Regulations for VHF communication
   (a) Regulations, obligatory procedures and practices

¹CEPT/ERC/REC 31-04 Edition October 2009
1 Global Maritime Distress and Safety System GMDSS

1.1 Regulations and Rules

1.1.1 Safety Of Life At Sea SOLAS

The SOLAS convention is concerning the safety of merchant ships in response to the Titanic disaster 1914. SOLAS was adopted 1960 by the International Maritime Organisation IMO. www.imo.org

IMO is a specialized agency of the United Nations UN and based in London. www.un.org

Vessels complying to SOLAS:

- Passenger vessels
- Cargo vessels >300GRT
- Other vessels >24m defined by some national authorities

In 1988 radio communication Chapter IV of SOLAS convention incorporates GMDSS.

1.1.2 Radio Regulations RR

The Radio Regulations RR mainly setting out frequency bands and technical parameters. Radio Regulations incorporating decisions of the World Radio communication Conferences WRC by the International Telecommunication Organisation ITU. www.itu.int

ITU is a specialized agency of the United Nations UN and based in Geneva. www.un.org
1.2 Shorebased system

1.2.1 Sea areas A1-A4

A1 Very High Frequency VHF
An area within radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may by defined by a contracting government.

A2 Medium Frequency MF
An area within radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a contracting government.
(excluding A1)

A3 International Maritime Satellite INMARSAT
An area within the coverage of all INMARSAT geostationary satellites, in which continuous distress alerting is available.
(excluding A1 and A2)

A4 polar regions
The remaining sea area.
(outside A1, A2 and A3)
1.2.2 Master Plan

The Master Plan contains status of shore-based facilities for the GMDSS.

- Rescue Co-ordination Centres RCC
- Coast Stations CS
- Satellite services

IMO International Maritime Organisation
GMDSS Master Plan
ALRS Admiralty List of Radio Signals
NP 285 GMDSS (ALRS Volume 5)

1.2.3 Search And Rescue SAR

The Search And Rescue convention SAR from IMO aimed an international SAR plan, so that, no matter where an accident occurs, the rescue of persons in distress at sea will be co-ordinated by a SAR organization.

Examples of national SAR organisations:

- Germany:
  Deutsche Gesellschaft zur Rettung Schiffbrüchiger DGzRS
  Bremen Rescue

- Switzerland:
  Swiss Maritime Navigation Office, RCC Zürich
  Swiss Air Rescue

- United Kingdom:
  Her Majesty Coastguard HMCG

Every SAR organisation is responsible for a defined Search and Rescue Region SRR.

\(^2\)GMDSS.1/Circ.13 23 May 2011
1.3 Shipborne system

1.3.1 Radio equipment defined by national regulations

Ships not sailing under provisions of SOLAS are voluntary GMDSS fitted and called non-SOLAS vessels (i.e. yachts). GMDSS equipment may recommended by national organisation (Germany, United Kingdom, Switzerland, ... or required by national law (Austria,...).

<table>
<thead>
<tr>
<th>country</th>
<th>area</th>
<th>equipment</th>
<th>certificate required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>at sea</td>
<td>radio receiver</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>&gt;3nm</td>
<td>VHF RT</td>
<td>SRC</td>
</tr>
<tr>
<td></td>
<td>&gt;200nm</td>
<td>EPIRB</td>
<td>-</td>
</tr>
<tr>
<td>Germany</td>
<td>at sea</td>
<td>radio/NAVTEX receiver</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>inshore</td>
<td>VHF RT</td>
<td>SRC</td>
</tr>
<tr>
<td></td>
<td>ocean</td>
<td>EPIRB</td>
<td>-</td>
</tr>
<tr>
<td>Switzerland</td>
<td>at sea</td>
<td>SSB radio receiver</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ocean</td>
<td>EPIRB</td>
<td>-</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>at sea</td>
<td>VHF handheld</td>
<td>SRC</td>
</tr>
<tr>
<td></td>
<td>&gt;3nm</td>
<td>VHF RT/DSC</td>
<td>SRC</td>
</tr>
<tr>
<td></td>
<td>&gt;20nm</td>
<td>NAVTEX receiver</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>&gt;60nm</td>
<td>EPIRB</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SART</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MF RT/DSC</td>
<td>LRC</td>
</tr>
<tr>
<td></td>
<td>&gt;150nm</td>
<td>INMARSAT</td>
<td>LRC</td>
</tr>
</tbody>
</table>

All equipment must comply to European Union EU Radio & Telecommunication Terminal Equipment guideline R&TTE and therefor carry a Conform European CE symbol.

[EUR-LEX](https://eur-lex.europa.eu)

---

list of equipment will be updated in 2012
1.3.2 Ship radio licence

Ship radio stations have to be licenced and are costumable. Licence is issued by authority of state and must be carried on board.

It is containing ships and owner identification, list of radio equipment and if required the following identifications:

<table>
<thead>
<tr>
<th>identification</th>
<th>equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>callsign</strong></td>
<td>Radio Telephone RT VHF, MF, HF</td>
</tr>
<tr>
<td><strong>MMSI</strong></td>
<td>Digital Selective Calling DSC VHF, MF, HF</td>
</tr>
<tr>
<td><strong>INM</strong></td>
<td>Mobile Earth Station MES INMARSAT</td>
</tr>
<tr>
<td>selcal</td>
<td>telex MF, HF</td>
</tr>
<tr>
<td><strong>AAIC</strong></td>
<td>public correspondence VHF, MF, HF, INMARSAT</td>
</tr>
</tbody>
</table>

National ships radio licencing administrations:

- **Austria:**
  - Licencing fee 49,05 EUR, using fee 10,90 EUR/month
  - validation: life of vessel
  - Fernmeldebehöde FMB [www.bmvit.gv.at](http://www.bmvit.gv.at)

- **Germany:**
  - Licencing fee 130,- EUR, using fee 21,10 EUR/year
  - validation: life of vessel
  - Bundesnetzagentur BNetzA [www.bundesnetzagentur.de](http://www.bundesnetzagentur.de)

- **Switzerland:**
  - Licencing fee 50,- SFR, using fee 10,- SFR/month
  - validation: 1 year
  - Bundesamt für Kommunikation BAKOM [www.bakom.ch](http://www.bakom.ch)

- **United Kingdom:**
  - Licencing fee 20,- GBP, using fee 20,- GBP/year
  - validation: life of vessel
  - Office for Communication OFCOM [www.ofcom.org.uk](http://www.ofcom.org.uk)
1.3.3 Radio operator certificate

Every ship radio station must be controlled by an operator holding a certificate issued or recognised by the government to which the station is subject.

On pleasure crafts normally the minimum requirement would be a Short Range Certificate SRC.

This certificate authorises the holder to use a Radio Telephone RT on the Very High Frequency VHF channels of the Maritime Mobile Band including Digital Selective Calling DSC on board voluntary GMDSS fitted non-SOLAS vessels.

At least one holder of a certificate of competence for maritime radio stations is required, normally by the shipmaster himself and occasionally his mate. Certificate of competence must be carried on board.

The operator must hold an authority to operate by the shipmaster.

National radio operator certificate licencing administrations:

- Austrian SRC = UKW Betriebszeugnis II UBZ II
  Fernmeldebehörde FMB  [www.bmvit.gv.at](http://www.bmvit.gv.at)

- German SRC = Beschränkt gültiges Funkbetriebszeugnis
  Deutscher Segler-Verband DSV  [www.dsv.org](http://www.dsv.org)
  Deutscher Motoryachtverband DMYV  [www.dmyv.de](http://www.dmyv.de)

- Swiss SRC
  = Beschränkt gültiges Betriebszeugnis für die Sportschifffahrt
  Schweizer Bundesamt für Kommunikation  [www.bakom.ch](http://www.bakom.ch)

- United Kingdom SRC = Short Range Certificate
  Royal Yachting Association RYA  [www.rya.co.uk](http://www.rya.co.uk)
1.3.4 Radio secrecy

No person shall divulge or publish the contents of any messages transmitted or received by such station, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Radio operators have to declare this.

1.3.5 Accounting Authority AAIC

Accounting authorities are used to facilitate the effective collection and distribution of radio communication charges between ship and coast stations and the Public Switched Telephone Network PSTN, Packet Switched Data Network PSDN and Internet. Therefore ship stations need a contract with AAIC.

AAIC: 2 letters (country) + 2 numbers (company):
   Examples:
   AU01 Telekom Austria AG www.telekom.at
   DP07 Seefunk www.dp07.de
   GB11 NSSLGlobal www.nsslglobal.com

Maritime Mobile Access and Retrieval System MARS www.itu.int

Traffic containing nautical information is free of charge.

1.3.6 Documents

Documents to be carried on board of non-SOLAS vessels defined by national law, in most European countries it would be

   Ships radio licence
   Radio operator certificate(s)
2 VHF Maritime Mobile Radio

2.1 Very High Frequency VHF

2.1.1 VHF wave propagation

Electromagnetic waves in the maritime VHF Band 156-174MHz are propagating in the line of sight. These are called space waves. Due to the earth’s curvature the range will depend on the height of the transmitting and receiving antenna. $d[\text{nm}] \approx 2.5(\sqrt{h_1[\text{m}]} + \sqrt{h_2[\text{m}]})$

<table>
<thead>
<tr>
<th>radio contact</th>
<th>antenna height</th>
<th>distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 handheld</td>
<td>1m/1m</td>
<td>5nm</td>
</tr>
<tr>
<td>2 motor yachts</td>
<td>4m/4m</td>
<td>10nm</td>
</tr>
<tr>
<td>2 sailing yachts</td>
<td>16m/16m</td>
<td>20nm</td>
</tr>
<tr>
<td>motor yacht - coast station</td>
<td>4m/100m</td>
<td>30nm</td>
</tr>
<tr>
<td>sailing yacht - coast station</td>
<td>16m/100m</td>
<td>35nm</td>
</tr>
</tbody>
</table>

2.1.2 VHF antenna

Vessels are using VHF omni-directional rod antennas (length $\sim$1m).

2.1.3 VHF Modulation

Modulation is superimposing low Audio Frequency AF (voice) onto a High Frequency HF carrier. Phase Modulation PM is used in VHF maritime radio (G3E used for RT and G2B for DSC).

2.1.4 VHF simplex/duplex communication

Simplex ship to ship and ship to shore: A single frequency is used for TX and RX. While pushing the transmit button PTT the radio changes from receive RX to transmit TX.

Duplex ship to shore: Two separate frequencies for TX and RX are used for simultaneously receiving and transmission. Transceivers for yachts using simplex mode on a duplex channel, called semiduplex.
2.1.5 VHF international channels

DSC alerting / calling (distress, urgency, safety and routine) 70

RT distress, urgency, safety, calling 16
RT Search And Rescue 06
RT on board (bridge to handheld, tender, tow, ...) 15, 17
RT primary intership working 06, 08, 72, 77
RT secondary intership working 09, 10, 15, 17, 67, 69, 73

RT intership for safety of navigation 13

Communications between ships whose purpose contributes to the safe of movement of ships. Bridge-to-bridge communication on ch13 is used without preceding a DSC call.

AIS Automatic Identification System AIS1, AIS2

Ships information as position, course, speed, MMSI, ... is transmitted periodically for safety of navigation. AIS signals for AIS screens, Electronic Chart Display Information Systems ECDIS (SOLAS vessels) or Electronic Charting Systems ECS (chart plotter) in radio range.

2.1.6 VHF national channels

<table>
<thead>
<tr>
<th>nation</th>
<th>ch</th>
<th>usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>17</td>
<td>Marina</td>
</tr>
<tr>
<td>Germany</td>
<td>69, 72</td>
<td>pleasure crafts</td>
</tr>
<tr>
<td>Scandinavia</td>
<td>F1, F2, F3</td>
<td>fishing vessels</td>
</tr>
<tr>
<td></td>
<td>L1, L2, L3</td>
<td>pleasure crafts</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>M, M2</td>
<td>club safety, race control</td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>Her Majesty Coast Guard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for small craft safety</td>
</tr>
</tbody>
</table>
### VHF international channels 01-28

<table>
<thead>
<tr>
<th>ch</th>
<th>Ship TX [MHz]</th>
<th>Ship RX [MHz]</th>
<th>Sim Dup</th>
<th>usage primary</th>
<th>secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>156,050</td>
<td>160,650</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>156,100</td>
<td>160,700</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>156,150</td>
<td>160,750</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>156,200</td>
<td>160,800</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>156,250</td>
<td>160,850</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>156,300</td>
<td>156,300</td>
<td>S</td>
<td>intership</td>
<td>SAR</td>
</tr>
<tr>
<td>07</td>
<td>156,350</td>
<td>160,950</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>156,400</td>
<td>156,400</td>
<td>S</td>
<td>intership</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>156,450</td>
<td>156,450</td>
<td>S</td>
<td>intership</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>156,500</td>
<td>156,500</td>
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## 2.1.8 VHF international channels 60-88

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<thead>
<tr>
<th>ch</th>
<th>Ship TX [MHz]</th>
<th>Ship RX [MHz]</th>
<th>Sim</th>
<th>usage</th>
<th>Dup primary</th>
<th>secondary</th>
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<td>156,075</td>
<td>160,675</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>156,125</td>
<td>160,725</td>
<td>D</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>63</td>
<td>156,175</td>
<td>160,775</td>
<td>D</td>
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<tr>
<td>64</td>
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<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>156,275</td>
<td>160,875</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66</td>
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<td>160,925</td>
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<tr>
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<tr>
<td>75</td>
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<td>156,775</td>
<td>S</td>
<td>safety of navigation, 1W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>156,825</td>
<td>156,825</td>
<td>S</td>
<td>safety of navigation, 1W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
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<td>S</td>
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<tr>
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<tr>
<td>81</td>
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<td></td>
<td></td>
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<tr>
<td>82</td>
<td>157,125</td>
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<tr>
<td>83</td>
<td>157,175</td>
<td>161,775</td>
<td>D</td>
<td></td>
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</tr>
<tr>
<td>84</td>
<td>157,225</td>
<td>161,825</td>
<td>D</td>
<td></td>
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<tr>
<td>85</td>
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</tr>
<tr>
<td>86</td>
<td>157,325</td>
<td>161,925</td>
<td>D</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>87</td>
<td>157,375</td>
<td>157,375</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>88</td>
<td>157,425</td>
<td>157,425</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2 VHF Radio Telephone RT

Transceiver
TRANSMITTER and RECEIVER

fig. 5: Simrad RD68

2.2.1 RT name and callsign

For calling each station needs a name, normally this would be the ships name. As the ships name is not unique a radio callsign is allocated by national radio communication agency with ship radio licence.

callsign = 3 digits country code + 1 or more digits

Examples for ITU callsign series (country codes):

- Austria: OEA-OEZ
- Croatia: 9AA-9AZ
- Germany: DAA-DRZ, Y2A-Y9Z
- Ireland: EIA-EJZ
- Italy: IAA-IZZ
- Slovenia: S5A-S5Z
- Switzerland: HBA-HBZ, HEA-HEZ
- United Kingdom: 2AA-2ZZ, GAA-GZZ, MAA-MZZ, VPA-VQZ, VSA-VSZ, ZBA-ZJZ, ZNA-ZOZ, ZQA-ZQZ

Global Administration Data System GLAD www.itu.int
GMDSS Maritime Radio Operator
www.gantioler.at

Coast Station CS

Name: place of station + RADIO SPLIT RADIO
Call Sign: 3 characters 9AS

Pilot Services, Vessel Traffic Services VTS and Port Operations

place + function
Coast Guard FALMOUTH COASTGARD
Port PULA PORT
Bridge MALI LOSINJ BRIDGE
Pilot KOPER PILOT
Marina OBAN MARINA
Radar MILFORD RADAR
Lock KILRUSH LOCK
Traffic control TARIFA TRAFFIC
Vessel Traffic Service ORKNEY VTS

Ship Station SS

Type of vessel S/Y Sailing Yacht
Name of vessel MOUSE
Call Sign: 4 or more characters OEDF

Survival Craft

Name of parent vessel + 2 digits (20-99) MOUSE 20
Call Sign of parent vessel + 2 digits (20-99) OEDF 20

On board

Master (fixed): + CONTROL MOUSE CONTROL
Sub (handheld): + 1 character MOUSE A

Maritime Mobile Access and Retrieval System MARS www.itu.int

Traffic is controlled by coast station or station called.
2.2.2 VHF Receiver RX

- Power ON/OFF: (may in combination with volume control)
- Volume control VOL: set volume of loudspeaker
- Squelch SQL: set receive signal limiter (noise limiter)
- Distress channel 16: select distress channel (and 25W TX)
- Working channel: 01-28, 60-88, national channels
- Dual Watch DW: alternating with ch16 (no TX)

2.2.3 VHF Transmitter TX

- Transmission range in line of sight, depending on antenna height
  - Low power 1W: range about 4nm
  - High power 25W: range up to 100nm
- Push To Talk PTT: activate transmitter

2.2.4 VHF handheld device

To be used on board, tender, survival craft, towing, mooring, ...
2.3 VHF Digital Selective Calling DSC

2.3.1 Maritime Mobile Service Identification MMSI

For selective calling each station needs a unique 9-digit MMSI, including the 3-digit country code MID.

<table>
<thead>
<tr>
<th>Type</th>
<th>MMSI Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship station</td>
<td>MMSI = MIDxxxxxx</td>
</tr>
<tr>
<td>group of stations</td>
<td>MMSI = 0MIDxxxxx</td>
</tr>
<tr>
<td>coast station</td>
<td>MMSI = 00MIDxxxx</td>
</tr>
</tbody>
</table>

Examples for ITU Maritime Identification Digit MID:

- Austria         203
- Croatia         238
- Germany         211, 218
- Ireland         250
- Italy           247
- Slovenia         278
- Switzerland     269
- United Kingdom  232-235

Global Administration Data System GLAD [www.itu.int](http://www.itu.int)
2.3.2 VHF DSC calls

Following primary types of calls are provided: 4 5

<table>
<thead>
<tr>
<th>priority</th>
<th>type of call/alert</th>
<th>station called</th>
</tr>
</thead>
<tbody>
<tr>
<td>distress</td>
<td>alert</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>acknowledge</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>cancellation</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>relay all</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>relay all acknowledge</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>relay individual</td>
<td>MMSI coast</td>
</tr>
<tr>
<td></td>
<td>relay individual acknowledge</td>
<td>MMSI ship</td>
</tr>
<tr>
<td>urgency</td>
<td>all ships</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>individual</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td></td>
<td>individual acknowledge</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td>safety</td>
<td>all ships</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>individual</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td></td>
<td>individual acknowledge</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td>routine</td>
<td>group</td>
<td>MMSI group</td>
</tr>
<tr>
<td></td>
<td>individual</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td></td>
<td>individual acknowledge</td>
<td>MMSI ship/coast</td>
</tr>
</tbody>
</table>

2.3.3 VHF DSC controller classes

class A all facilities for compulsory fitted SOLAS vessels
class B full requirements for compulsory fitted SOLAS vessels
class D minimum facilities for voluntary fitted non-SOLAS vessels

Watch receiver continuous digital watch on VHF DSC ch70

4 ITU-R M.493-13 October 2009
5 distress cancellation call implemented in 1997
6 classes C, F und G withdrawn in 2000
2.4 VHF RT calling and working

2.4.1 Phonetic Alphabet

<table>
<thead>
<tr>
<th>Letter</th>
<th>Word</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Alpha</td>
<td>AL FAH</td>
</tr>
<tr>
<td>B</td>
<td>Bravo</td>
<td>BRAH VOH</td>
</tr>
<tr>
<td>C</td>
<td>Charlie</td>
<td>CHAR LEE</td>
</tr>
<tr>
<td>D</td>
<td>Delta</td>
<td>DELL TAH</td>
</tr>
<tr>
<td>E</td>
<td>Echo</td>
<td>ECK OH</td>
</tr>
<tr>
<td>F</td>
<td>Foxtrot</td>
<td>FOKS TROT</td>
</tr>
<tr>
<td>G</td>
<td>Golf</td>
<td>GOLF</td>
</tr>
<tr>
<td>H</td>
<td>Hotel</td>
<td>HOH TELL</td>
</tr>
<tr>
<td>I</td>
<td>India</td>
<td>IN DEE AH</td>
</tr>
<tr>
<td>J</td>
<td>Juliett</td>
<td>JEW LEE ETT</td>
</tr>
<tr>
<td>K</td>
<td>Kilo</td>
<td>KEY LOH</td>
</tr>
<tr>
<td>L</td>
<td>Lima</td>
<td>LEE MAH</td>
</tr>
<tr>
<td>M</td>
<td>Mike</td>
<td>MIKE</td>
</tr>
<tr>
<td>N</td>
<td>November</td>
<td>NO VEM BER</td>
</tr>
<tr>
<td>O</td>
<td>Oscar</td>
<td>OSS CAH</td>
</tr>
<tr>
<td>P</td>
<td>Papa</td>
<td>PAH PAH</td>
</tr>
<tr>
<td>Q</td>
<td>Quebec</td>
<td>KEH BECK</td>
</tr>
<tr>
<td>R</td>
<td>Romeo</td>
<td>ROW ME OH</td>
</tr>
<tr>
<td>S</td>
<td>Sierra</td>
<td>SEE AIR RAH</td>
</tr>
<tr>
<td>T</td>
<td>Tango</td>
<td>TANG GO</td>
</tr>
<tr>
<td>U</td>
<td>Uniform</td>
<td>YOU NEE FORM</td>
</tr>
<tr>
<td>V</td>
<td>Victor</td>
<td>VIK TAH</td>
</tr>
<tr>
<td>W</td>
<td>Whiskey</td>
<td>WISS KEY</td>
</tr>
<tr>
<td>X</td>
<td>X-ray</td>
<td>ECKS RAY</td>
</tr>
<tr>
<td>Y</td>
<td>Yankee</td>
<td>YANG KEY</td>
</tr>
<tr>
<td>Z</td>
<td>Zulu</td>
<td>ZOO LOO</td>
</tr>
</tbody>
</table>

Decimal point  Decimal  DAY-SEE-MAL
Full stop       Stop      STOP
2.4.2 Standard Marine Communication Phrases SMCP

CORRECT an error has been made
IN FIGURES numbers are written in figures
IN LETTERS numbers are written in letters
MAYDAY distress signal
French spoken: m’aidez
OUT termination of working, no reply expected
OVER expect reply
RADIO CHECK request strength an clarity of transmission
READ BACK receiving station read back information
RECEIVED acknowledge receipt of transmission
PAN PAN urgency signal
French spoken: panne
SAY AGAIN repeat part or all of message
ALL AFTER, ALL BEFORE
WORD AFTER, WORD BEFORE
SECURITE safety signal
SAYCURITAY French spoken: sécuritée
SILENCE MAYDAY keep radio silence
SEELONCE MAYDAY French spoken: silence m’aidez
SILENCE FINI normal working
SEELONCE FEENEE French: silence fini
SPELL spelling the next word phonetically
STATION CALLING unsure of the identity of calling station
THIS IS identification of station calling follows
TRAFFIC radio traffic
### 2.4.3 Priorities

Priorities for Marine Communication: 7

<table>
<thead>
<tr>
<th>Priority</th>
<th>Situation</th>
<th>DSC Call</th>
<th>RT Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distress</strong></td>
<td>grave and imminent danger to ship or crew, immediate assistance required.</td>
<td>distress alert</td>
<td>MAYDAY</td>
</tr>
<tr>
<td></td>
<td>distress situation observed or received</td>
<td>distress relay alert / call</td>
<td>MAYDAY RELAY</td>
</tr>
<tr>
<td><strong>Urgency</strong></td>
<td>a very urgent message concerning the safety of a ship or a person.</td>
<td>urgency alert</td>
<td>PAN PAN</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>a very important information to shipping.</td>
<td>safety alert</td>
<td>SECURITE</td>
</tr>
<tr>
<td><strong>Routine</strong></td>
<td>nautical information private is charged by AAIC</td>
<td>routine call</td>
<td></td>
</tr>
</tbody>
</table>

---

7 DSC priority shipmaster (ships business) withdrawn in 1997
2.5 **VHF priority distress**

Grave and imminent danger to ship or crew, immediate assistance required. Only be sent by authority of shipmaster or person in charge.

2.5.1 **VHF DSC distress alert**

**undesignated** DSC distress alert  
push DISTRESS button >5s  
TX/25W/ch70

**designated** DSC distress alert

a) push appropriate button(s) to enter DSC distress menu
b) select nature of distress from list
   undefined, undesignated
   fire, explosion
   flooding
   collision
   grounding
   listing, danger of capsizing
   sinking
   disabled, adrift
   abandoning vessel
   piracy, armed robbery
   MOB - man / person over board

c) enter position or filled in by interconnected GPS
d) transmit push DISTRESS button >5s  
TX/25W/ch70

VHF DSC distress alert with MMSI, position, nature, working ch16  
received by VHF DSC ship or coast stations in radio range  ≈30nm

Await **DSC distress acknowledge** from CS/RCC <3min; RX/ch70  
with coast MMSI, distressed MMSI, position, nature, working ch16

If not acknowledged, automatic repetition of alert 3.5-4.5min

Follow up with RT distress call and message.
2.5.2 VHF RT distress call and message

RT distress call

<table>
<thead>
<tr>
<th>3x distress signal</th>
<th>MAYDAY MAYDAY MAYDAY</th>
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</thead>
<tbody>
<tr>
<td>(French spoken: m’aidez)</td>
<td></td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x name</td>
<td>sailing yacht BELLA BELLA BELLA</td>
</tr>
<tr>
<td>callsign</td>
<td>callsign OEX6437</td>
</tr>
<tr>
<td>MMSI</td>
<td>MMSI 203783420</td>
</tr>
</tbody>
</table>

RT distress message

<table>
<thead>
<tr>
<th>distress signal</th>
<th>MAYDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>sailing yacht BELLA</td>
</tr>
<tr>
<td>callsign</td>
<td>callsign OEX6437</td>
</tr>
<tr>
<td>MMSI</td>
<td>MMSI 203783420</td>
</tr>
<tr>
<td>position</td>
<td>position 43°59.2’N 013°28.9’W</td>
</tr>
<tr>
<td>nature of distress</td>
<td>abandon ship to liferaft</td>
</tr>
<tr>
<td>kind of assistance</td>
<td>immediate assistance required</td>
</tr>
<tr>
<td>additional information</td>
<td>4 adults with life jackets</td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>

Await RT distress acknowledge from CS/RCC: RX/ch16

| distress signal | MAYDAY |
| 3x station called | BELLA BELLA BELLA OEX6437 203783420 |
| this is | this is |
| 3x station calling | 3x RIJEKA RADIO |
| acknowledge | RECEIVED MAYDAY |

If not acknowledged, repeat RT distress call and message. >5min
2.5.3 **Distress message examples**

There is grave and imminant danger to ship or crew, immediate assistance required. Shipmaster advised you to transmit distress signals.

1. position 43-41.3S 017-12.7E
   badly holed, ship is sinking, 4 persons

2. position 44-13.6N 017-45.3E
   explosion in engine room, ship is on fire, 3 persons

3. position 43-57.1S 016-59.9E
   lost prop shaft, flooding, 5 persons

4. position 44-01.0N 016-48.8W
   dense fog, collision with fishing vessel, 8 persons

5. position 43-26.5S 117-15.0W
   hit an underwater rock, 1 person

6. position 44-33.2S 016-29.6E
   lost keel, heavy list to port, 8 persons

7. position 44-19.9N 015-59.1E
   lost rudder, drifting ashore in heavy sea, 2 persons

8. position 43-00.2S 116-25.8E
   7 persons abandon ship to liferaft

   attack by 4 armed pirates, 6 persons

10. position 01-21.2S 017-45.9W
    person over board in heavy sea

11. position 44-32.7N 016-56.0E
    62 years old crew member had a heart attack

12. position 12-43.4S 017-17.6E
    capsized, no life raft, no dinghy, 1 person on board
2.5.4 VHF DSC distress cancellation

Distress has to be duly canceled after transmission of a false DSC distress alert.

- a) push appropriate cancel button to stop transmission
- b) select distress cancellation call (distress acknowledge call by station in distress itself)
- c) push appropriate button to transmit TX/25W/ch70

Follow up with VHF RT distress cancellation call and message.

2.5.5 VHF RT distress cancellation call and message

If distress situation is no longer valid. TX/25W/ch16

<table>
<thead>
<tr>
<th>3x station called</th>
<th>3x ALL STATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>BELLA BELLA BELLA OEX6437 203783420</td>
</tr>
<tr>
<td>position</td>
<td>position 43°59.2’N 013°28.9’W</td>
</tr>
<tr>
<td>cancellation</td>
<td>please cancel my distress alert</td>
</tr>
<tr>
<td>date and time</td>
<td>of 0837 UTC today</td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>

Await **RT distress cancellation acknowledge** from CS/RCC RX/ch16
2.6 **VHF priority distress relay**

There is a distress situation if you

- observe
  - orange smoke, red parachute flares, raising an lowering arms, flying a ball over/under square shape, SOS by any means, ...

- receive
  - RX
  - DSC distress alert, acknowledge or relay, ch70
  - RT distress call, message, acknowledge or relay, ch16
  - NAVTEX distress relay message 490kHz, 518kHz, 4209.5kHz
  - Radar SART on your radar 9GHz
  - AIS SART on chart plotter chAIS1, chAIS2
  - EPIRB 121,5MHz, 406MHz

Take the following actions:

1. Set continuous watch on VHF ch16 >5 min RX/ch16 until normal working can be resumed.

2. Transmit RT distress acknowledge if applicable: >5 min
   - Give time to acknowledge by CS/RCC TX/25W/ch16

<table>
<thead>
<tr>
<th>distress signal</th>
<th>MAYDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>BELLA BELLA BELLA OEX6437 203783420</td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>FOXI FOXI FOXI DG4568 211746382</td>
</tr>
<tr>
<td>acknowledge</td>
<td>RECEIVED MAYDAY</td>
</tr>
</tbody>
</table>

3. If no CS/RCC involved relay ashore by any means >5 min

   **Sea area A1 (CS or RCC in range)**
   - VHF DSC individual distress relay alert followed up by
   - VHF RT distress relay call and message to CS or RCC

   **Sea area A2, A3, A4 (CS or RCC not in range)**
   - VHF DSC all ships distress relay alert followed up by
   - VHF RT distress relay call and message to ALL STATIONS
2.6.1 **VHF DSC distress relay alert**

a) push appropriate button(s) to enter DSC menu  
b) select type of call with priority distress relay  
   - **individual call** to CS/RCC  
   - **all ships call**  
c) select working ch16  
d) enter distressed MMSI, POS, nature  
e) push appropriate button to transmit TX/25W/ch70

On individual call await DSC acknowledge from CS/RCC RX/ch70. If not acknowledged repeat after 5min, at least after another 15min.

2.6.2 **VHF RT distress relay call and message**

VHF RT distress relay call: TX/25W/ch16

<table>
<thead>
<tr>
<th>3x distress signal</th>
<th>3x MAYDAY RELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>3x RIJEKA RADIO (or 3x ALL STATIONS)</td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>FOXI FOXI FOXI DG4568 211746382</td>
</tr>
</tbody>
</table>

VHF RT distress relay message: TX/25W/ch16

<table>
<thead>
<tr>
<th>message</th>
<th>received following distress message on VHF ch16</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAYDAY S/Y BELLA OEX6437 203783420</td>
<td></td>
</tr>
<tr>
<td>position 43°59.2'N 013°28.9'W</td>
<td></td>
</tr>
<tr>
<td>abandon ship to liferaft, immediate assistance required</td>
<td></td>
</tr>
<tr>
<td>4 adults with life jackets, end of message</td>
<td></td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>

Await RT distress relay acknowledge from SS/CS/RCC RX/ch16

---

8 some class D DSC  
no individual distress relay call, individual routine call only  
no all ships distress relay call, all ships urgency call only  
no matter to change working channel, ch16 only  
no matter to enter distressed MMSI, position and nature of distress
2.6.3 Distress relay message examples

Shipmaster advised you to transmit distress relay message to coast station after reception of following distress message on VHF ch16.

1. MAYDAY cargo vessel Fjaellfjord LGBX 257456348
   position 4nm NW of Helgoland
   explosion in engine room, 6 persons injured
   require immediate medical assistance

2. MAYDAY fishing vessel Freyburg DCAW 218647538
   position 2nm N of RACON buoy Elbe
   person over board
   ships in vicinity please assist with search and rescue

3. MAYDAY cargo vessel Blue Sky MCDF 235748569
   position 54-10.7N 004-15.4E
   fire in hold, no dangerous goods, 1 person injured
   require immediate firefighting assistance

4. MAYDAY passenger vessel Seven Ocean DGRT 211634528
   position 3nm W of Buesum
   broken rudder, drifting ashore in rough sea
   require immediate tug assistance

5. MAYDAY passenger vessel Parrain FHEF 226128639
   position 17nm N of Puttgarden
   collision with fishing vessel Meyenburg DCYJ, vessel is sinking
   require immediate assistance

6. MAYDAY cargo vessel Uranus OEX2435 203818462
   position 16-28.7S 174-51.8E
   dangerous leak below water line, cannot control flooding
   immediate pumping assistance required
Shipmaster advised you to transmit distress relay message to coast station after reception of following DSC distress alert on VHF ch70.

7. position 41-31.3N 011-02.3E
   received DSC distress alert on VHF ch70 from MMSI 238746194 position 41-41.1N 011-02.9E, nature of distress fire
   no further information received

Shipmaster advised you to transmit distress relay message to coast station after reception of distress signals on Radar Screen.

8. position 43-41.3S 017-12.7E
   received radar SART signals on my radar screen
   distress position 43-39.1S 017-10.3E
   no further information received

Shipmaster advised you to transmit distress relay message to coast station after reception of following distress signal on Chart Plotter.

9. position 36-21.5N 021-25.6E
   received AIS SART signals on my chart plotter
   distress position 36-26.1N 021-20.3E, MMSI 238654923
   no further information received

Shipmaster advised you to transmit distress relay message to coast station after observing a distress situation.

10. position 55-16.9N 016-23.1E
   observed red rockets
   in true bearing of about 045 estimated distance 8nm

11. position 56-12.4N 001-59.8E
   observed liferaft drifting in heavy sea
   about 2nm N of my position

12. position 58-55.8N 002-24.3E
   small unknown aircraft with two propellers ditched
   aircraft is still afloat
2.6.4 VHF RT distress relay acknowledge

If you receive DSC/RT or NAVTEX distress relay from CS/RCC:

<table>
<thead>
<tr>
<th>3x distress signal</th>
<th>3x MAYDAY RELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>3x ALL STATIONS</td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>3x RIJEKA RADIO</td>
</tr>
</tbody>
</table>

received following distress message on VHF ch16
MAYDAY S/Y BELLA OEX6437 203783420
position 43°59.2'N 013°28.9'W
abandon ship to liferaft,
immediate assistance required
4 adults with life jackets
please report to RIJEKA RADIO
expect reply OVER

Take the following actions, if you are able to assist:

1. Set continuous watch on VHF ch16 ≥5min RX/ch16 until normal working can be resumed.

2. Transmit RT distress acknowledge to CS or RCC if appreciate TX/25W/ch16

<table>
<thead>
<tr>
<th>distress signal</th>
<th>MAYDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>3x RIJEKA RADIO</td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>LEO LEO LEO DG4568 211746382</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>acknowledge</th>
<th>RECEIVED MAYDAY RELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>position</td>
<td>position 43°49.9'N 013°27.1'W</td>
</tr>
<tr>
<td>distance to incident</td>
<td>15nm from incident</td>
</tr>
<tr>
<td>maximum speed</td>
<td>speed 10kn</td>
</tr>
<tr>
<td>ETA / ETE</td>
<td>ETE 1.5h</td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>
2.6.5 Radio silence

Whilst a distress situation is in force, radio silence is required on distress channel used. No radio traffic allowed, except distress.

Controlling stations may impose silence on stations which interfere with distress or SAR traffic.

to all:

<table>
<thead>
<tr>
<th>station called</th>
<th>ALL STATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>impose silence</td>
<td>SILENCE MAYDAY</td>
</tr>
<tr>
<td></td>
<td>(French spoken: silence m’aidez)</td>
</tr>
</tbody>
</table>

to one:

<table>
<thead>
<tr>
<th>station called</th>
<th>MOUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>impose silence</td>
<td>SILENCE MAYDAY</td>
</tr>
<tr>
<td></td>
<td>(French spoken: silence m’aidez)</td>
</tr>
</tbody>
</table>

2.6.6 Normal working

End of distress, the control station indicates that normal working can be resumed.

<table>
<thead>
<tr>
<th>distress signal</th>
<th>MAYDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>3x ALL STATIONS</td>
</tr>
<tr>
<td>this is</td>
<td>this is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>3x RIJEKA RADIO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>time of handling in name callsign MMSI normal working</th>
<th>1541 UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BELLA OEX6437 203783420 SILENCE FINI</td>
<td></td>
</tr>
<tr>
<td>(French spoken: silence fini)</td>
<td></td>
</tr>
</tbody>
</table>
2.7 VHF priority urgency

A very urgent message concerning the safety of a ship or a person. Only be sent by authority of shipmaster or person in charge.

- medical assistance (Radio Medical Advice RMA)
- maritime assistance (tug, towing, ...)

2.7.1 VHF DSC urgency alert

| a) push appropriate button(s) to enter DSC menu |
| b) select type of call with priority urgency |
| individual call to CS/RCC |
| all ships call |
| c) select working ch16 or chxx |
| d) push appropriate button to transmit TX/25W/ch70 |

On individual call await DSC acknowledge from CS/RCC RX/ch70. If not, repeat after 5min, third transmission after another 15min.

2.7.2 VHF RT urgency call and message

```
3x urgency signal 3x PAN PAN (French spoken: panne)
3x station called 3x ALL STATIONS (or 3x station called)
this is this is
3x station calling BELLA BELLA BELLA OEX6437 203783420
position position 43°59.2'N 013°28.9'W
grounded in heavy swell.
require urgent tug assistance.
expect reply OVER
```

Cancel message if urgency situation is no longer required.

---

9 some class D DSC
no individual urgency call, individual routine call only
no matter to change working channel, ch16 only
2.7.3 Urgent message examples

Shipmaster advised you to transmit a very urgent message concerning the safety of ship.

1. position 51-10.4N 003-45.6E
due to steering gear problems vessel is not under command, require urgent tug assistance.

2. position 56-25.8N 027-19.3W
vessel struck growler, ship is making water, require urgent assistance with towing and pumping.

3. position 55-23.4N 006-18.1E
engine broken down, ship not under command, very rough sea, require urgent tug assistance.

4. position 19-50.1N 006-11.4E
cargo has shifted, making heavy list to starboard require urgent tug assistance.

5. position 54-10.9N 004-15.0E
ship on fire in the hold, have dangerous cargo on board require urgent fire fighting assistance.

6. position 5nm northwest of Borkum Lighthouse
rudder is broken, anchor chain parted, ship is not under command, drifting towards the banks, require urgent tug assistance.
Shipmaster advised you to transmit a very urgent message concerning the safety of a person.

7. position 55-12.4N 005-08.7E
crew member 56 years old, unconscious, suspect heart attack
require urgent medical help by helicopter

8. position 54-48.1N 006-55.7E
require medical advice for man fallen from the mast,
seriously injured, heavy loss of blood.

9. position 12nm south of Cape Spartivento
course 275° speed 13kn
a crewmember is fallen into a hatch and is seriously injured
require urgent medical assistance

Coast Station transmits a very urgent message concerning Search And Rescue SAR.

10. Sailing boat Rubin 12m red hull, white sails, 2 persons on board,
left Klintholm on July 16th at 0600 local time, bound for Visby,
ship has not yet arrived, shipping are requested to keep sharp lookout and report to Lyngby Radio.

11. Sailing yacht Relaxe SWLU, lengths 40 feet, white hull, brown sails,
underway from Martinique to Azores unreported since January 16th, ship on route please keep sharp lookout and report to US Coast Guard.

12. Miami Coast Guard received an overdue report of a 38 feet sailing vessel Windigo left Fajardo with destination Canaveral.
The sailing vessel is white with red superstructure. Shipping is requested to keep a sharp lookout and report sightings to US Coast Guard Miami.
2.8 VHF priority safety

A very important information to shipping.
Only be sent by authority of shipmaster or person in charge.

- navigational warning (light unlit, firing exercises, ..)
- meteorological warning (gale warning, heavy swell, ..)

2.8.1 VHF DSC safety alert on ch70

a) push appropriate button(s) to enter DSC menu
b) select type of call with priority safety
   - individual call to CS/RCC
   - all ships call

c) select working ch16 or appropriate chxx
d) push appropriate button to transmit TX/25W/ch70

On individual call await DSC acknowledge from CS/RCC RX/ch70
If not, repeat after 5min, third transmission after another 15min.

2.8.2 VHF RT safety call and message

TX/25W/ch16

<table>
<thead>
<tr>
<th>3x safety signal</th>
<th>3x SECURITE (French spoken: sécurite)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x station called</td>
<td>3x ALL STATIONS (or 3x station called)</td>
</tr>
<tr>
<td>this is</td>
<td>is</td>
</tr>
<tr>
<td>3x station calling</td>
<td>BELLA BELLA BELLA OEX6437 203783420</td>
</tr>
<tr>
<td>position</td>
<td>position 43°59.2′N 013°28.9′W nearly submerged container observed. danger to navigation.</td>
</tr>
<tr>
<td>termination</td>
<td>OUT</td>
</tr>
</tbody>
</table>

Cancel message if safety situation is no longer required.

\(^{10}\text{some class D DSC}\)

no individual call priority safety, individual routine call only
2.8.3 Safety message examples

Shipmaster advised you to transmit a very important navigational warning to shipping.

1. 54-27.7N 007-28.0E, ship aground, shipping is requested to keep a wide berth.

2. Humber-Elbe-Route in position 53-25.7N 005-28,4E observed nearly submerged drifting yellow colored bell buoy, dangerous to navigation.

3. In Position 4nm NW of Cape Finisterre sighted several drifting 40feet containers red painted, one container marked with TEXASCON, ships in area are requested to navigate carefully.

4. Dunkerque approach, in position 51-04.6N 001-52.2E dangerous wreck located. Vessels are requested to keep a wide berth.

5. Fairway between Den Helder and Den Oever light and whistle buoy MG18 is reported unlit, shipping in this area is requested to navigate with caution.

6. Underwater cable operations by motor vessel Leon Thevesin in progress until February 16th, wide berth is requested in area within 2nm of 33-55,6N 008-04.2W.
Coast Station transmits a very important meteorological information to shipping.

7. Area Humber, Thames, Dover Isle of Wight and Belgian Coast NE gentle to moderate breeze force 3 to 4, moderate or poor visibility, mainly fair.

8. Weather forecast for the area North of Portugal, rain or showers, at times SW 6, temporarily increasing W 8 veering to NW 5 later.

9. Gale warning for Skagerrak and Kattegat, W gale force 8 to 9, decreasing to 7, rough sea, showers, good to moderate visibility.

10. Ice warning: Icebergs are reported in area around Belle Isle and Cape Freels. Ice situation is not expected to change in the next 24 hours.

11. Lake Vaerern from this night north 25 to 35kn. The Sound, the Belts, western and southern Baltic: southwest increasing to 35kn. From late night west 30 to 40kn. Archipelago Sea: tonight south 30kn. Sea of Bothnia: From tonight northeast 35 to 45kn and close to very close ice.

12. Sea area Dogger Bank to Isle of Wight strong westerly winds increasing to gale force 8 to 9 veering later, drizzle at times, moderate to good visibility.
2.9 VHF priority routine

2.9.1 VHF DSC routine call

- a) push appropriate button(s) to enter DSC menu
- b) select type of call with priority routine
  - **individual call** to ship or coast MMSI
  - **group call** to group MMSI
- c) select appropriate working channel chXX
- d) push appropriate button to transmit TX/ch70/25W

On individual call await DSC individual acknowledge RX/ch70
If not, repeat after 5min, third transmission after another 15min.

**RT message** on working channel: TX/25W(1W)/chXX

<table>
<thead>
<tr>
<th>call</th>
<th>SEAGULL this is SILVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>message</td>
<td>what is your destination?</td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>

2.9.2 VHF RT routine call on calling channel

3x station called SEAGULL SEAGULL SEAGULL
this is this is
3x station calling SILVI SILVI SILVI
expect reply OVER

Maximum length allowed 1min, in total 3 calls within 3min delay.

RT reply on channel 16:

<table>
<thead>
<tr>
<th>call</th>
<th>SILVI this is SEAGULL</th>
</tr>
</thead>
<tbody>
<tr>
<td>message</td>
<td>switch to channel 72</td>
</tr>
</tbody>
</table>

Follow up with **RT message** on working channel 72.

2.9.3 VHF RT routine call on working channel

<table>
<thead>
<tr>
<th>call</th>
<th>KILRUSH LOCK this is SILVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>message</td>
<td>can you open the lock, please</td>
</tr>
<tr>
<td>expect reply</td>
<td>OVER</td>
</tr>
</tbody>
</table>
2.9.4 **Routine message examples**

Shipmaster advised you to

1. Request permission to enter territorial waters of Russia.
2. Request a berth in Port Pula.
3. Request opening bridge in Mali Losinj.
4. Request a pilot to enter St. Petersburg.
5. Request a Marina berth in Oban.
6. Request Radar assistance from Radar station in Dover.
7. Request permission to enter lock to Marina in Kilrush.
8. Request position from sailing yacht DOLPHIN.
11. Give travel report to Italian Coast Guard.
12. Give position report to Falmouth Coast Guard.
3 Emergency Position Indicating Radio Beacon EPIRB

Grave and imminent danger to ship or crew, immediate assistance required. Only activated by authority of shipmaster or person in charge.

3.1 VHF DSC EPIRB distress alert

EPIRB provided for seas area A1 transmitting VHF DSC distress alert on ch70 including MMSI, position and nature of distress EPIRB.

3.2 Cosmicheskaya Sistyema Poiska Avariynich Sudov Search And Rescue Satellite COSPAS/SARSAT

COSPAS/SARSAT was founded in 1979 by Russia, USA, Canada and France. It is used for worldwide locating persons or mobile units in distress in GMDSS since 1988. www.cospas-sarsat.org

fig. 6: satellites

3 geostationary satellites GEOSAR in 36000km height.
4 polar orbiting satellites LEOSAR in 850km height.
3.2.1 **COSPAS/SARSAT EPIRB distress alert**

EPIRB provided for all sea areas A1-A4.

EPIRB distress alert includes ships MMSI and position from integrated GPS.

EPIRB can be activated manually or by hydrostatic release. Once activated it transmits a periodic distress alert for more than 48h on 406MHz.

Deploy outside of liferaft:
- good visibility of strobe light
- hinder free signal transmitting
- fasten against not drifting away

Routing of COSPA/SARSAT EPIRB distress alert:
- COSPAS/SARSAT satellite(s) in view
- Local User Terminal LUT ashore
- co-ordinating Mission Control Centre MCC
- responsible Maritime Rescue Coordination Centre MRCC

3.2.2 **COSPAS/SARSAT EPIRB distress cancellation**

Do not switch off after a false alert!
Contact RCC by any means and switch off by instruction.

3.2.3 **EPIRB distress homing signal**

Additional homing transmitter on 121.5MHz for Radio Direction Finding RDF by SAR forces.
4 Search And Rescue Transponder SART

Transponder = TRANSmit and reSPOND.

Grave and imminent danger to ship or crew, immediate assistance required. Only activated by authority of shipmaster or person in charge.

A SART is used to indicate a distress situation and locate distress position by SAR forces.

They are manually activated. The range is about 10nm. Devices should be deployed at a minimum of 1m above sea.

4.1 Radio Aided Detecting And Ranging RADAR SART

On reception of a 9GHz radar pulse a RADAR SART transmits 12 radar pulses. That means a distress signal on the radar screen.

As you get closer to an active RADAR SART 12 dots become 12 arcs and at least 12 circles.

fig. 8:
RADAR
SART

4.2 Automatic Identification System AIS SART

Once activated it transmits periodic distress alert on VHF channels AIS1 and AIS2. Alert includes MMSI and position (integrated GPS).

AIS SART signals are visible on AIS screens, Electronic Chart Display Information Systems ECDIS (SOLAS vessels) or Electronic Charting Systems ECS (i.e. chart plotter) in range.
5 Naval Text NAVTEX

5.1 Navigation Area NAVAREA

NAVAREAs established for co-ordinating the broadcast of MSI.

![Map of NAVAREAs](image)

fig. 9: NAVAREAs

5.2 Maritime Safety Information MSI

Important information concerning the safety of persons or vessels.

- navigational warning
- meteorological information
- Search And Rescue information SAR

IMO International Maritime Organisation [www.imo.org](http://www.imo.org)
GMDSS Master Plan
ALRS Admiralty List of Radio Signals [www.ukho.gov.uk](http://www.ukho.gov.uk)
NP 283 Maritime Safety Information Services (ALRS Volume 3)
NP 285 GMDSS (ALRS Volume 5)
5.2.1 NAVTEX Frequencies

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF 490kHz</td>
<td>national language (for non-SOLAS vessels)</td>
</tr>
<tr>
<td>MF 518kHz</td>
<td>international English language</td>
</tr>
<tr>
<td>HF 4209.5kHz</td>
<td>international English for tropical areas</td>
</tr>
</tbody>
</table>

Scheduled transmission time every 4 hours for <10min.

Urgent messages are transmitted immediately.

5.2.2 NAVTEX coast stations

Expected range up to 200nm by day and up to 400nm by night.

Each coast station is assigned a transmitter identification letter.

Examples:

NAVAREA I 518kHz NAVTEX coast stations for British Isles:

<table>
<thead>
<tr>
<th>country</th>
<th>place</th>
<th>range</th>
<th>letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>Niton</td>
<td>270M</td>
<td>E</td>
</tr>
<tr>
<td>England</td>
<td>Cullercoats</td>
<td>270M</td>
<td>G</td>
</tr>
<tr>
<td>Scotland</td>
<td>Portpatrick</td>
<td>270M</td>
<td>O</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>Malin Head</td>
<td>400M</td>
<td>Q</td>
</tr>
<tr>
<td>Ireland</td>
<td>Valencia</td>
<td>400M</td>
<td>W</td>
</tr>
</tbody>
</table>

NAVAREA I 490kHz NAVTEX coast stations for British Isles:

<table>
<thead>
<tr>
<th>country</th>
<th>place</th>
<th>range</th>
<th>letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>Niton</td>
<td>270M</td>
<td>I</td>
</tr>
<tr>
<td>Scotland</td>
<td>Portpatrick</td>
<td>270M</td>
<td>C</td>
</tr>
</tbody>
</table>
5.2.3 NAVTEX message types

Each message is assigned a category letter:

- A navigational warning
- B meteorological warning
- C ice report
- D SAR Information, pirate attack warning
- E meteorological forecast
- F pilot service
- G Automatic Identification System AIS
- H LORAN message
- J GPS message
- K other electronic navaid message
- L navigational warning in addition to A
- Z no message on hand

Letter A, B and D cannot be rejected by SOLAS related receivers.

5.2.4 NAVTEX message contents

1. start of message ZCZC
2. coast station character A-Z
3. message type character A-Z
4. message counter 00-99

Each message is allocated a serial number between 01 and 99. Very urgent messages assigned with 00 cause an receiver alert.

5. message text

6. end of message NNNN
5.2.5 Examples of NAVTEX messages

Meteorological information:

1. ZCZC
   QE17 061840 UTC MAR SPLITRADIO/9AS
   SHIPPING FCST FOR ADRIATIC AT 1800 UTC
   WNG: GUSTS OF SOUTHEAST 35-45 KTS.
   STATE OF SEA MOD/ROUGH.
   SYNOPSIS: TROUGH FROM NORTHWEST
   SPREADING TOWARD LIGURIA AND ADRIATIC SEA.
   OUTLOOK 24 HRS: SOUTHEAST 12/26, OFFSHORE 32 KTS.
   SEA INCREASING TO SLIGHT/MOD, OFFSHORE MOD/ROUGH.
   VSBY 10-20 KM, BECOMING CLOUDY WITH RAIN
   NNNN

2. ZCZC
   QE55 051840 UTC JAN SPLIT RADIO/9AS
   WEATHER REPORT FOR ADRIATIC AT 1800 UTC.
   WARNING: ISOLATED GUSTS OF NE, S-ADRIATIC, 30/40 KTS.
   STATE OF SEA: OFFSHORE SOUTHERN ADRIATIC, ROUGH.
   SYNOPSIS: RIDGE OF HIGH APPROACHING TO ADRIATIC.
   OUTLOOK 24HRS: NE 10/20, S-ADRIATIC, NW 15/25 KTS.
   SEA SMOOTH/SLIGHT, OFFSHORE SLIGHT/MOD.
   VISIBILITY GOOD/EXCELLENT, MOSTLY FINE
   NNNN

3. ZCZC
   QE56 211840 UTC OCT SPLITRADIO/9AS
   SHIPPING FOREAST FOR ADRIATIC AT 1900 UTC
   WNG: GUSTS NE 35-55 KTS, IN THE NIGHT TO 65 KTS.
   SYNOPSIS: RIDGE OF HIGH FROM NORTH
   SPREADING TOWARD ADRIATIC,
   AND LOW OVER SOUTH ITALY DEEPENING.
   OUTLOOK 24 HRS: NE 20-30 KTS, LOCALLY TO 36 KTS.
   SEA 3-4, ON THE OPEN 4-5. VSBY 10-20 KM.
   MAINLY CLOUDY RAIN AND THUNDERSHOWERS.
   NNNN
Navigational warning:

4. ZCZC
   QA10 101440 UTC JUL SPLITRADIO/9AS
   CENTRAL ADRIATIC, CHART 100-21, SIBENSKI KANAL,
   RT GRMINE LIGHTED BUOY YELLOW, WITH ‘X’ SIGN ON TOP
   IN 43-41.3N 015-53.1E ESTABLISHED.
   CHARACTERISTIC: FL Y 3 SECONDS 3 MILES.
   NNNN

5. ZCZC
   QA20 051040 UTC JUN SPLITRADIO/9AS
   NORTHERN ADRIATIC, CHARTS: 100-16, 300-31
   TILL NEXT NOTICE UNDERWATER WORKS BY BARGE REGINA
   IN PSN 44-49.3N 013-33.4E.
   NAVIGATION IN RADIUS 500 MTRS FROM BARGE PROHIBITED.
   WIDE BERTH REQUESTED.
   NNNN

6. ZCZC
   QA47 211040UTC AUG SPLITRADIO/9AS
   SOUTH ADRIATIC CHART: 100-25 ISLAND LASTOVO,
   ZAKLOPATICA, LIGHT IN 42-46.5N 016-52.9E ESTABLISHED.
   CHARACTERISTIC FL R 3 SECONDS 9 MTRS 5 NM.
   OBSCURED SECTOR FROM 243 TO 350.
   NNNN
6 Power supply

Radio equipment needs electric power. Normally this would be Direct Current DC with nominal supply voltage of $12V_{DC}$ for small pleasure crafts and $24V_{DC}$ for larger yachts.

6.1 Direct Current $12V_{DC}/24V_{DC}$

Power sources:
1. Alternator on main engine
2. Battery charging unit
3. Batteries

Lead acid batteries:
- charging $\leq 14.4/28.8V_{DC}$ if higher explosive $H_2$ and $O_2$ gas!
  - acid density $1280\text{kg/m}^3$ charged
- discharging $\geq 10.8/21.6V_{DC}$ if lower damage caused!
  - acid density $1180\text{kg/m}^3$ discharged
- no load $12.2/24.4V_{DC}$ (standby)
- load can cause decreasing to $11.0/22.0V_{DC}$

6.2 Alternating Current $230V_{AC}$ (Europe)

Power sources:
1. Shorepower
2. Generator
3. Inverter
Part II

Restricted Operator Certificate ROC

CEPT examination syllabus for maritime radio operators in sea area A1 for using GMDSS mandatory on board SOLAS vessels.  

1. Maritime Mobile VHF Radio Telephone RT communications
   (a) General principles and basic features

2. Detailed working knowledge of radio equipment
   (a) Very High Frequency VHF radio installation
   (b) Purpose and use of Digital Selective Calling DSC

3. Operational procedures of the GMDSS
   (a) Search and Rescue SAR procedures
   (b) Distress, urgency and safety communication
   (c) Protection of distress frequencies
   (d) Maritime Safety Information MSI
   (e) Alerting and Locating Signals
   (f) Communication with non-SOLAS vessels

4. Operational procedures and regulations
   (a) Ability to exchange communications relevant to SOLAS
   (b) Regulations, obligatory procedures and practices
   (c) Practical and theoretical knowledge of RT procedures
   (d) English language written and spoken

---

11 ERC/DEC/(99)01
7 GMDSS

7.1 Shipborne system

7.1.1 Radio equipment for SOLAS vessels

SOLAS vessels on international voyages are compulsory fitted.

<table>
<thead>
<tr>
<th>area</th>
<th>mandatory equipment</th>
<th>certificate required</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>VHF RT, DSC, DSC watch receiver</td>
<td>ROC</td>
</tr>
<tr>
<td></td>
<td>VHF handheld device</td>
<td>ROC</td>
</tr>
<tr>
<td></td>
<td>NAVTEX receiver</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>EPIRB float free</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SART</td>
<td>-</td>
</tr>
<tr>
<td>A2</td>
<td>MF RT DSC, DSC watch receiver</td>
<td>GOC</td>
</tr>
<tr>
<td>A3</td>
<td>either INMARSAT MES + EGC receiver</td>
<td>GOC</td>
</tr>
<tr>
<td></td>
<td>or MF/HF RT DSC telex, DSC watch receiver</td>
<td>GOC</td>
</tr>
<tr>
<td>A4</td>
<td>MF/HF RT DSC telex, DSC watch receiver</td>
<td>GOC</td>
</tr>
</tbody>
</table>

Availability of equipment must be guarantied.
This can be done by 3 different methods listed.

- Duplication of equipment
  - A1 and A2: VHF RT DSC
  - A3 and A4: MF/HF RT DSC or INMARSAT MES
- Shore based maintenance (contract, arrangement)
- At sea maintenance (qualified personal)

All equipment must comply with regulations of the European Union EU (Marine Equipment Directive MarED) and therefore carry a wheelmark symbol.

www.mared.org

fig. 10: weehlmark
7.1.2 Radio equipment tests

Equipment tests are required while at sea (enter in log).

Daily
- DSC internal (self test)
- batteries (damage, voltage test, load test, charge)
- printer (function, paper)

Weekly
- MF/HF DSC test call (to coast station) GOC
- generator (function)

Monthly
- VHF handheld (batteries, damages, RX, TX)
- EPIRB internal (batteries, damages, selftest)
- SART (batteries, damages, selftest)
- antenna (damages, cleaning, insulators)

Yearly
- EPIRB transmission test (company ashore)

7.1.3 Radio watch

Continuous digital radio watchkeeping is required while at sea.

- MF NAVTEX receiver 518kHz
- VHF DSC watch receiver ch70
- MF DSC watch receiver 2187.5kHz
- HF DSC watch receiver 8414.5kHz + one other
- INMARSAT C SafetyNET EGC receiver

Every ship, while at sea, shall continue to maintain, when practicable, continuous watch.

- VHF RT listening on ch16
- VHF RT listening on ch13
7.1.4 Radio log book

For SOLAS vessels a GMDSS radio log book with the following minimum entries is required:

<table>
<thead>
<tr>
<th>every day</th>
<th>ships position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>equipment tests (MF/HF DSC, printer, batteries)</td>
</tr>
<tr>
<td></td>
<td>Master sign</td>
</tr>
<tr>
<td>on demand</td>
<td>important incidents connected to the radio service</td>
</tr>
<tr>
<td></td>
<td>summary of distress, urgency, safety (sign in/out)</td>
</tr>
</tbody>
</table>

Logbook form: Maritime Safety Agency  
[www.mcga.gov.uk](http://www.mcga.gov.uk)

<table>
<thead>
<tr>
<th>date/time UTC</th>
<th>station to</th>
<th>station from</th>
<th>communications summary, tests, remarks</th>
<th>frequency channel, satellite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.1.5 Documents

The following documents must be carried on board of SOLAS vessels:

- Ships radio licence
- Radio operator certificates
- Radio log book

ITU International Telecommunications Union:  
[www.itu.int](http://www.itu.int)

- List of Coast Stations and Special Service Stations
- List of Ship Stations & Maritime Mobile Service Identity
- Manual for Maritime Mobile & Maritime Mobile-Satellite Services

ALRS Admiralty List of Radio Signals  
[www.ukho.gov.uk](http://www.ukho.gov.uk)

- NP 281 Maritime Radio Stations (Volume 1)
- NP 286 Pilot, Vessel Traffic Service, Port Operations (Volume 6)
7.1.6 Radio Operator Certificate

On vessels complying to SOLAS the minimum requirement in sea area A1 would be a Restricted Operator Certificate ROC.

This certificate authorises the holder to use a Radio Telephone RT on the Very High Frequency VHF channels of the Maritime Mobile Band including Digital Selective Calling DSC on board compulsory GMDSS fitted SOLAS vessels which sail in GMDSS sea area A1.

At least one holder of a certificate of competence for maritime radio stations is required, normally by the shipmaster himself and all marine officers.

National radio operator licencing administrations:

- Austrian ROC = UKW Betriebszeugnis I UBZ I Fernmeldebehörde FMB  
  www.bmvit.gv.at

- German ROC = Beschränkt gültiges Betriebszeugnis für Funker BBZ  
  Bundesamt für Seeschifffahrt und Hydrografie  
  www.bsh.de

- United Kingdom ROC = Restricted Operator Certificate  
  Association of Marine Electronics and Radio Colleges  
  www.amerc.ac.uk
7.1.7 Standards for Training, Certification and Watchkeeping of Seafarers STCW

The STCW convention defines international basic requirements on training, certification and watchkeeping for seafarers on commercial vessels.

1. Medical Certificate
   Austria: Seeschifffahrtsverordnung www.ris.bka.gv.at
   United Kingdom: MSN 1765 www.mcga.gov.uk

2. STCW 95 Basic Safety
   (a) Elementary First Aid
   (b) Personal Survival Techniques
   (c) Fire Prevention and Fire Fighting
   (d) Personal Safety and Social Responsibilities

ROC and GOC must be endorsed by the national maritime agency.

- Germany:
  Bundesamt für Seeschifffahrt und Hydrografie www.bsh.de

- United Kingdom:
  Maritime and Coastguard Agency www.mcga.gov.uk

STCW revalidation is required every 5 years.
Part III

Long Range Certificate
LRC

CEPT examination syllabus for maritime radio operators for using GMDSS voluntary on board non-SOLAS vessels.  www.cept.org

1. Maritime Mobile Radio Telephone RT communications
   (a) General principles and basic features

2. Detailed working knowledge of radio equipment
   (a) Medium/High/Very High MF/HF/VHF radio installation
   (b) Purpose and use of Digital Selective Calling DSC

3. Operational procedures of the GMDSS
   (a) Search and Rescue SAR Procedures
   (b) Distress, urgency and safety communication
   (c) Protection of distress frequencies
   (d) Maritime Safety Information MSI
   (e) Alerting and Locating Signals

4. Operational procedures and regulations
   (a) English language written and spoken
   (b) Ability to exchange communications relevant to SOLAS
   (c) Regulations, obligatory procedures and practices
   (d) Practical and theoretical knowledge of RT procedures

5. Maritime Mobile Satellite Service LRC satellite module
   (a) INMARSAT System
   (b) INMARSAT C operation, Enhanced Group Call EGC
8 GMDSS

8.1 Shipborne system

8.1.1 Radio operator certificate

On small crafts used for pleasure or fishing normally offshore requirement would be a Long Range Certificate LRC.

This certificate authorises the holder to use a Radio Telephone RT on all maritime mobile bands including Digital Selective Calling DSC and maritime mobile satellite communications on board voluntary GMDSS fitted non-SOLAS vessels.

fig. 12: LRC

At least one holder of a certificate of competence for maritime radio stations is required, normally by the shipmaster himself and occasionally his mate.

National radio operator certificate licencing administrations:

- Austrian LRC = Allgemeines Betriebszeugnis II ABZ II
  Fernmeldebehörde FMB www.bmvit.gv.at

- German LRC = Allgemein gültiges Funkbetriebszeugnis
  Deutscher Segler-Verband DSV www.dsv.org
  Deutscher Motoryachtverband DMYV www.dmyv.de

- Swiss LRC =
  Allgemein gültiges Betriebszeugnis für die Sportschifffahrt
  Schweizer Bundesamt für Kommunikation www.bakom.ch

- United Kingdom LRC = Long Range Certificate
  Association of Marine Electronics and Radio Colleges
  www.amerc.ac.uk
9 MF/HF Maritime Mobile Radio

9.1 Medium Frequency MF / High Frequency HF

9.1.1 Radio bands

<table>
<thead>
<tr>
<th>band</th>
<th>frequency range</th>
<th>wavelength</th>
<th>maritime communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td>300-3000kHz</td>
<td>1000-100m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>490kHz/518kHz</td>
<td>600m</td>
<td>NAVTEX</td>
</tr>
<tr>
<td></td>
<td>1605-3800kHz</td>
<td>160m</td>
<td>MF RT/DSC 2MHz band</td>
</tr>
<tr>
<td>HF</td>
<td>3-30MHz</td>
<td>100-10m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4065-4438kHz</td>
<td>80m</td>
<td>HF RT/DSC 4MHz band</td>
</tr>
<tr>
<td></td>
<td>6200-6525kHz</td>
<td>60m</td>
<td>HF RT/DSC 6MHz band</td>
</tr>
<tr>
<td></td>
<td>8195-8815kHz</td>
<td>40m</td>
<td>HF RT/DSC 8MHz band</td>
</tr>
<tr>
<td></td>
<td>12230-13200kHz</td>
<td>30m</td>
<td>HF RT/DSC 12MHz band</td>
</tr>
<tr>
<td></td>
<td>16360-17410kHz</td>
<td>20m</td>
<td>HF RT/DSC 16MHz band</td>
</tr>
<tr>
<td></td>
<td>18780-19800kHz</td>
<td>15m</td>
<td>HF RT/DSC 18MHz band</td>
</tr>
<tr>
<td></td>
<td>22000-22855kHz</td>
<td>13m</td>
<td>HF RT/DSC 22MHz band</td>
</tr>
<tr>
<td></td>
<td>25070-16175kHz</td>
<td>12m</td>
<td>HF RT/DSC 25MHz band</td>
</tr>
<tr>
<td>VHF</td>
<td>30-300MHz</td>
<td>10-1m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>121.5MHz</td>
<td>3m</td>
<td>VHF distress homing signal</td>
</tr>
<tr>
<td></td>
<td>156-162MHz</td>
<td>2m</td>
<td>VHF RT/DSC/AIS</td>
</tr>
<tr>
<td>UHF</td>
<td>300-3000MHz</td>
<td>10-1dm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>406MHz</td>
<td>70cm</td>
<td>COSPAS/SARSAT EPIRB</td>
</tr>
<tr>
<td></td>
<td>1.5GHz</td>
<td>20cm</td>
<td>GPS Receiver</td>
</tr>
<tr>
<td></td>
<td>1.5/1.6GHz</td>
<td>20cm</td>
<td>INMARSAT Terminal</td>
</tr>
<tr>
<td>SHF</td>
<td>3-30GHz</td>
<td>10-1cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3GHz</td>
<td>10cm</td>
<td>S-band RADAR</td>
</tr>
<tr>
<td></td>
<td>9GHz</td>
<td>3cm</td>
<td>X-band RADAR, SART</td>
</tr>
</tbody>
</table>
9.1.2 MF/HF propagation

Ground wave

This type of waves travels along the surface of the ground. Propagation is influenced by the frequency and the conductivity of the earth. At MF the ground wave has a range of 150-250nm during daylight. At HF the absorption of the ground increases and the range can be less than 5 miles.

Dead zone

No signals are heard between the end of the ground wave and the skip of the sky wave and so it is called the dead zone.

Sky wave

The sky wave has the ability to bend or reflect in the upper atmosphere (labeled F1 and F2) so that it returns to the earth. With more than one skips you can reach stations around the world. Skip distance increases with the frequency. Lower bands 2/4/8MHz have to be sent in the morning and at night. During sunlight at mid afternoon use higher bands 16/22MHz. And in the evening 8/12MHz.

Fading

If more than one reflection is received the receiver will combine the signals. Combining these two signals means the strength of the signal can vary greatly. Variations from zero to maximum are possible, called fading.
9.2 MF/HF Radio Telephone RT

Based on the same technology a single MF/HF radio device is used for MF and HF communication.

fig. 13: ICOM M710 GMDSS

9.2.1 MF/HF Receiver RX

- RX/TX paired frequencies
  - Select ITU channel (associated RX/TX frequency table)
  - Input RX and TX carrier frequency
  - 2182 direct tune to MF 2182kHz (J3E, high power)

- Class of emission mode; J3E, H3E, A3E, F1B, J2B, ...

- Radio Frequency RF gain signal sensitivity

- Automatic Gain Control AGC reduce fading

- Audio Frequency AF gain volume of loudspeaker

- Fine tune / clarify shift RX carrier frequency ±150Hz

9.2.2 MF/HF Transmitter TX

- Tune activate antenna tuner

- Power MF 60-400W, HF 60-1500W
9.2.3 MF/HF classes of emission

<table>
<thead>
<tr>
<th></th>
<th>modulation</th>
<th>signal</th>
<th>information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>DSB AM</td>
<td>1 digital</td>
<td>B teleprinting</td>
</tr>
<tr>
<td>H</td>
<td>SSB carrier</td>
<td>2 digital subcarrier</td>
<td>C telefax</td>
</tr>
<tr>
<td>J</td>
<td>SSB no carrier</td>
<td>3 analog</td>
<td>D telecommand</td>
</tr>
<tr>
<td>F</td>
<td>FM</td>
<td></td>
<td>E telephony</td>
</tr>
<tr>
<td>G</td>
<td>PM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A3E Double Side Band DSB MF/HF broadcast

The Radio Frequency RF carrier and 3kHz bandwidth of the Audio Frequency AF are fed into the amplitude modulator AM. On the output is a Double Side Band DSB signal with 6kHz bandwidth, named A3E. Those two bands called Lower Side Band LSB and Upper Side Band USB.

H3E Single Side Band SSB with carrier former MF RT 2182kHz

An LSB filter makes the Lower Side Band LSB, a Single Side Band SSB with carrier H3E, from Double Side Band A3E. You spare 25% of power.

J3E Single Side Band SSB no carrier MF/HF RT

A carrier filter produces the SSB without carrier J3E. You spare another 50% of power. On receiving J3E signals you must reinsert a carrier to demodulate information.

F1B Frequency Shift Keying FSK MF/HF DSC & telex

FSK means the transmission of two different frequencies for two states of binary digits 0 and 1.

J2B Single Side Band SSB with subcarrier MF/HF DSC & telex

Bit 0/1 are converted into two different audio tone signals and sent in J3E like voice.
9.2.4 MF/HF Antenna

- Wire: more than about 7m, insulated from superstructure. Sailing yachts using the aft stay, larger vessels a wire between two masts bow and stern.

- Whip: more than about 4m Power yachts using pushpit or flybridge mounting, larger vessels the top of bridge tower.

9.2.5 MF/HF Tuner

The MF/HF carrier frequency changes from minimum MF 1.6MHz to maximum HF 26MHz and therefore the wave length from 188m to 10m. But the antenna has a fixed length.

Automatic antenna tuner matches the real length to the ideal length using coils and capacitors.

It should be mounted close to antenna.
9.3 MF/HF Digital Selective Calling DSC

9.3.1 MF/HF DSC calls

Primary type of calls to one, some or all stations in radio range:

<table>
<thead>
<tr>
<th>priority</th>
<th>type of call/alert</th>
<th>station called</th>
</tr>
</thead>
<tbody>
<tr>
<td>distress</td>
<td>alert (acknowledge)</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>cancellation</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>relay all (acknowledge)</td>
<td>all</td>
</tr>
<tr>
<td></td>
<td>relay individual (acknowledge)</td>
<td>MMSI coast</td>
</tr>
<tr>
<td>urgency</td>
<td>group</td>
<td>MMSI group</td>
</tr>
<tr>
<td></td>
<td>geographical area</td>
<td>ref point &amp; extension</td>
</tr>
<tr>
<td></td>
<td>individual (acknowledge)</td>
<td>or centre point &amp; radius</td>
</tr>
<tr>
<td>safety</td>
<td>group</td>
<td>MMSI group</td>
</tr>
<tr>
<td></td>
<td>geographical area</td>
<td>coordinates &amp; distances</td>
</tr>
<tr>
<td></td>
<td>individual (acknowledge)</td>
<td>MMSI ship/coast</td>
</tr>
<tr>
<td></td>
<td>test (acknowledge)</td>
<td>MMSI coast</td>
</tr>
<tr>
<td>routine</td>
<td>group</td>
<td>MMSI group</td>
</tr>
<tr>
<td></td>
<td>individual (acknowledge)</td>
<td>MMSI ship/coast</td>
</tr>
</tbody>
</table>

9.3.2 MF/HF DSC controller

class A full requirements for compulsory fitted SOLAS vessels
class E minimum facilities for voluntary fitted non-SOLAS vessels

MF watch receiver continuous digital watch on MF 2187.5kHz

MF/HF scan watch receiver scanning 6 DSC distress frequencies
2187.5, 4207.5, 6312.0, 8414.5, 12577.0, 16804.5kHz
9.4 MF/HF priority distress

Grave and imminent danger to ship or crew, immediate assistance required. Only be sent by authority of shipmaster or person in charge.

9.4.1 MF/HF DSC distress alert

**undesignated** DSC distress alert
push DISTRESS button >5s

**designated** DSC distress alert

- a) push appropriate button(s) to enter DSC distress menu
- b) enter position or filled in by interconnected GPS
- c) select nature of distress from list
- d) select DSC calling frequency (position an propagation)
  - single: 5 consecutive calls on 1 frequency (<42s)
  - multi: 6 consecutive calls on 6 frequencies (<42s)
  - MF 2187.5kHz
  - HF 4207.5, 6312.0, 8414.5, 12577.0, 16804.5kHz
- e) select mode RT J3E simplex class A DSC sets only
- f) select associated RT working/traffic frequency:
  - MF 2182kHz
  - HF 4125, 6215, 8291, 12290, 16420kHz
- g) transmit push DISTRESS button >5s

MF DSC received by ship & coast stations in radio range ~150nm
HF DSC received by ship & coast stations in propagation range

Await DSC distress acknowledge from CS/RCC <3min
If not, automatic repetition of DSC distress alert 3.5-4.5min

Follow up with MF/HF RT distress call and message;
for single DSC call on associated RT working frequency;
for multi DSC call: on each of 6 associated RT working frequencies.
9.5 MF/HF priority distress relay

9.5.1 MF distress signals

If you receive distress signals on MF take the following actions:

1. Set continuous watch on VHF ch16 and MF 2182kHz >5 min until normal working can be resumed.

2. Transmit MF RT distress acknowledge if applicable:
   Give time to acknowledge by CS or RCC >5 min

3. If no CS/RCC involved relay ashore by any means >5 min

<table>
<thead>
<tr>
<th>Sea Area</th>
<th>Distress Relay Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>VHF distress relay DSC and RT to CS/RCC</td>
</tr>
<tr>
<td>A2</td>
<td>MF distress relay DSC and RT to CS/RCC</td>
</tr>
<tr>
<td>A3</td>
<td>SAT-C distress relay telex message to RCC</td>
</tr>
<tr>
<td>A4</td>
<td>HF distress relay DSC and RT to CS/RCC</td>
</tr>
</tbody>
</table>

9.5.2 HF distress signals

If you receive distress signals on HF inform RCC if applicable.

9.5.3 MF/HF DSC distress relay alert

a) push appropriate button(s) to enter DSC menu
b) select individual call, priority distress relay
   enter MMSI of CS/RCC or select from directory
c) select DSC calling frequency (position and propagation)
   MF 2187.5kHz
   HF 4207.5, 6312.0, 8414.5, 12577.0, 16804.5kHz
d) select mode RT J3E simplex class A DSC sets only
e) select associated RT working frequency:
   MF 2182kHz
   HF 4125, 6215, 8291, 12290, 16420kHz
f) push appropriate button to transmit
9.6  MF priority urgency

A very urgent message concerning the safety of a ship or a person. Only be sent by authority of shipmaster or person in charge.

9.6.1  MF DSC urgency alert on 2187.5kHz

a) push appropriate button(s) to enter DSC menu
b) select type of call with priority urgency
   - **individual call** to coast MMSI
   - **group call** to group MMSI
   - **area call** to ref point & extension
     or to centre point & radius
c) select DSC calling frequency MF 2187.5kHz
d) select mode RT J3E simplex class A DSC sets only
e) select associated RT working frequency MF 2182kHz

9.7  MF priority safety

A very important information to shipping. Only be sent by authority of shipmaster or person in charge.

9.7.1  MF DSC safety alert on 2187.5kHz

a) push appropriate button(s) to enter DSC menu
b) select type of call with priority safety
   - **individual call** to coast MMSI
   - **test call** to coast MMSI
   - **group call** to group MMSI
   - **area call** to ref point & extension
     or to centre point & radius
c) select DSC calling frequency MF 2187.5kHz
d) select mode RT J3E simplex class A DSC sets only
e) select associated RT working frequency MF 2182kHz
   (no subsequent traffic on test calls)
9.8  MF/HF priority routine

9.8.1  MF/HF DSC routine call

a) push appropriate button(s) to enter DSC menu
b) select individual, group or area call, priority routine enter ref point & extension or centre point & radius or MMSI
c) select DSC calling frequency (position and propagation)
   MF ship-ship TX/RX 2177/2177kHz
   MF ship-shore TX/RX 2189.5/2177kHz
   HF 24 DSC frequencies within 8 bands: ship TX/RX [kHz]
   4MHz: 4208.0/4219.5, 4208.5/4220.0, 4209.0/4220.5
   6MHz: 6312.5/6331.0, 6313.0/6331.5, 6313.5/6332.0
   8MHz: 8415.0/8436.5, 8415.5/8437.0, 8416.0/8437.5
   12MHz: 12577.5/12657.0, 12578.0/12657.5, 12578.5/12658.0
   16MHz: 16805.0/16903.0, 16805.5/16903.5, 16806.0/16904.0
   18MHz: 18898.5/19703.5, 18899.0/19704.0, 18899.5/19704.5
   22MHz: 22375.5/22444.0, 22376.0/22444.5, 22376.5/22445.0
   25MHz: 25208.5/26121.0, 25209.0/26121.5, 25209.5/26122.0
   d) select mode RT J3E simplex/duplex class A DSC sets only
   e) select RT working frequency TX/RX [kHz] same band as calling
      MF ship-ship TX/RX (i.e. 2048/2048kHz)
      MF ship-shore TX/RX or select 55 ITU channels: ship TX/RX
      2MHz: 241-267: 2060/1635, 2063/1638, ... 2138/1713
      2MHz: 268-295: 2060/1716, 2063/1719, ... 2141/1797
      HF 242 ITU channels within 8 bands: ship TX/RX [kHz]
      4MHz: 401-427: 4065/4357, 4068/4360, ..., 4143/4435
      6MHz: 601-608: 6200/6501, 6203/6504, ..., 6221/6522
      8MHz: 801-832: 8195/8719, 8198/8722, ..., 8288/8812
      12MHz: 1201-1241: 12230/13077, 12233/13080, ..., 12350/13197
      16MHz: 1601-1656: 16360/17242, 16363/17245, ..., 16525/17407
      18MHz: 1801-1815: 18780/19755, 18783/19758, ..., 18822/19797
      22MHz: 2201-2253: 22000/22696, 22003/22699, ..., 22156/22852
      25MHz: 2501-2510: 25070/26145, 25073/26148, ..., 25097/26172
      f) enter additional information if required
      g) push appropriate button to transmit
10 SAT-C Mobile Earth Station MES

10.1 International Maritime Satellite INMARSAT

10.1.1 INMARSAT system

INMARSAT is a private company and located in London with its Operation Control Centre OCC.

4 satellites AOR-W, AOR-E, IOR, POR are geostationary located in 36.000km height above the equator.

At your known ships position you can calculate the azimuth and elevation angle.

Maritime communication standards: www.inmarsat.com

<table>
<thead>
<tr>
<th>standard</th>
<th>GMDSS</th>
<th>phone</th>
<th>telex</th>
<th>data ( \text{kBit/s} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>64</td>
</tr>
<tr>
<td>C</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>0.6</td>
</tr>
<tr>
<td>M</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>2.4</td>
</tr>
<tr>
<td>Fleet 33</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>9.6</td>
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<tr>
<td>Fleet 55</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>64</td>
</tr>
<tr>
<td><strong>Fleet 77</strong></td>
<td><strong>yes</strong></td>
<td>yes</td>
<td>no</td>
<td><strong>128</strong></td>
</tr>
<tr>
<td>Fleet Broadband FB 150</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>150</td>
</tr>
<tr>
<td>Fleet Broadband FB 250</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>284</td>
</tr>
<tr>
<td>Fleet Broadband FB 500</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>432</td>
</tr>
</tbody>
</table>
10.1.2 INMARSAT Land Earth Station LES

There are about 15 Land Earth Stations around the world. Dishes with a diameter of 20m are used for communication RX/TX 3.6/6.4GHz.

LES are interconnected to Public Switched Telephone Network PSTN, Packet Switched Data Network PSDN, Internet, Tele Medical Advice System TMAS and RCC.

SAT-C LES list and Access Codes:

<table>
<thead>
<tr>
<th>country</th>
<th>operator</th>
<th>AOR-W</th>
<th>AOR-E</th>
<th>POR</th>
<th>IOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>MCN</td>
<td></td>
<td></td>
<td></td>
<td>211</td>
</tr>
<tr>
<td>Brazil</td>
<td>Embratel</td>
<td></td>
<td></td>
<td></td>
<td>114</td>
</tr>
<tr>
<td>France</td>
<td>Vizada</td>
<td>021</td>
<td>121</td>
<td>221</td>
<td>321</td>
</tr>
<tr>
<td>Greece</td>
<td>OTESAT</td>
<td></td>
<td></td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>Italy</td>
<td>Telecom Italia</td>
<td></td>
<td></td>
<td></td>
<td>105</td>
</tr>
<tr>
<td>Japan</td>
<td>KDDI</td>
<td>003</td>
<td>103</td>
<td>203</td>
<td>303</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Stratos</td>
<td>012</td>
<td>112</td>
<td>212</td>
<td>312</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Stratos</td>
<td></td>
<td></td>
<td></td>
<td>202</td>
</tr>
<tr>
<td>Norway</td>
<td>Vizada</td>
<td>004</td>
<td>104</td>
<td>204</td>
<td>304</td>
</tr>
<tr>
<td>Poland</td>
<td>Polish Telekom</td>
<td></td>
<td></td>
<td></td>
<td>116</td>
</tr>
<tr>
<td>Russia</td>
<td>Morsviazsputnik</td>
<td></td>
<td></td>
<td></td>
<td>117</td>
</tr>
<tr>
<td>Singapore</td>
<td>Singapore Telecom</td>
<td></td>
<td></td>
<td></td>
<td>210</td>
</tr>
<tr>
<td>Vietnam</td>
<td>VISHIPEL</td>
<td></td>
<td></td>
<td></td>
<td>330</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Stratos</td>
<td>002</td>
<td>102</td>
<td></td>
<td>302</td>
</tr>
<tr>
<td>USA</td>
<td>Vizada</td>
<td>001</td>
<td>101</td>
<td></td>
<td>301</td>
</tr>
</tbody>
</table>

4 Network Co-ordination Stations NCS are responsible for allocating ships TX communication channels and ships RX calling.

fig. 16: INMARSAT NCS
10.2 SAT-C Terminal

Communication frequencies
RX/TX 1.5/1.6GHz

Omnidirectional antenna
Transceiver
User Terminal

The satellite has to be in the line of sight, that is possible up to 70°N/S.

Store-and-forward data messaging only (similar to SMS).
No phone and no TCP/IP internet connection possible.

10.2.1 SAT-C Inmarsat Mobile Number IMN

<table>
<thead>
<tr>
<th>subscriber</th>
<th>Mobile Earth Station(s)</th>
<th>identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship telex</td>
<td>SAT-C Terminal (individual)</td>
<td>IMN: 4MIDxxxxx</td>
</tr>
<tr>
<td>ship data</td>
<td>SAT-C Terminal (individual)</td>
<td>DNIC: xxxxx</td>
</tr>
<tr>
<td>FleetNET</td>
<td>EGC Receiver (group)</td>
<td>ENID: xxxxx</td>
</tr>
<tr>
<td>SafetyNET</td>
<td>EGC Receiver (MSI)</td>
<td>position</td>
</tr>
</tbody>
</table>

Inmarsat Mobile Numbers IMN are allocated by INMARSAT London.

10.2.2 SAT-C login/logout

You get messages after login to NCS ocean region.
Login is only possible if MES is in contract with INMARSAT.

Logging out informs the NCS that your MES is no longer available for communication. The NCS in your ocean region updates its database with this information. The system knows not to accept any messages intended for your MES and informs would-be callers that your MES is not available. Logging out inhibits loss of data.
10.3 SAT-C priority distress

If you select distress priority your message will be routed only to an RCC associated with the LES selected, regardless of the destination.

10.3.1 SAT-C telex distress alert

Grave and imminent danger to ship or crew, immediate assistance required. Only be sent by authority of shipmaster or person in charge.

**undesignated distress alert** push DISTRESS button(s) >5s

**designated distress alert** enter menu

a) select distress alert
b) enter position or filled in by interconnected GPS
c) select nature of distress from list
   - unspecified, fire/explosion, flooding, collision,
   - grounding, listing, sinking, disabled/adrift, abandon,
   - further assistance, piracy/armed attack
d) select nearest LES/CES depending on position
e) push appropriate button to transmit

Received by Inmarsat satellite → LES → RCC ~70°S-70°N
Await SAT-C distress acknowledge from RCC <5min.
If not repeat SAT-C distress alert as above.

10.3.2 SAT-C telex distress message

a) select distress priority
b) prepare distress message or retrieve from memory
   - MAYDAY
   - ships name / call sign / IMN
   - position, nature of distress, assistance required
   - additional information
c) select the same LES/CES through the alert was sent
d) to transmit push appropriate button
10.3.3 SAT-C telex distress cancellation message

Distress has to be dully canceled after transmission of a false SAT-C distress alert. Notify appropriate RCC by sending a distress priority message via the same LES through which the false alert was sent.

a) select distress priority
b) prepare distress cancellation message or retrieve from memory
   ships name / call sign / IMN
   position
   cancel my distress alert
   of date and time
c) select the same LES/CES through the alert was sent
d) to transmit push appropriate button

10.3.4 SAT-C telex distress relay message to RCC

If you observe or receive distress signals take the following actions:

1. Set continuous watch on VHF ch16 and MF 2182kHz >5 min until normal working can be resumed.

2. Transmit VHF or MF RT distress acknowledge if applicable:
   Give time to acknowledge by CS or RCC >5 min

3. If no CS/RCC involved relay ashore by any means >5 min

a) select distress priority
b) prepare message or retrieve from memory
   MAYDAY RELAY
   ships name / call sign / IMN
   position
   observed / received the following ...
c) select appropriate LES/CES
d) to transmit push appropriate button
10.4 SAT-C priority routine

Priority messages are selected by 2-digit short dialing codes. Special Access Code SAC.

10.4.1 SAT-C telex urgency message

A very urgent message concerning the safety of a ship or a person. Only be sent by authority of shipmaster or person in charge.

a) select routine priority
b) select message type special access
c) enter 2-digit SAC
   32 medical advice
   38 medical assistance
   39 maritime assistance
d) prepare message or retrieve from memory
   PAN PAN / ships name / call sign / IMN / position
   urgent message
e) select LES/CES
f) to transmit push appropriate button

10.4.2 SAT-C telex safety message

A very important information to shipping. Only be sent by authority of shipmaster or person in charge.

a) select routine priority
b) select message type special access
c) enter 2-digit SAC
   42 navigational hazards and warnings
d) prepare message or retrieve from memory
   SECURITE ships name / call sign / IMN / position
   safety message
e) select LES/CES
f) to transmit push appropriate button
10.4.3 SAT-C telex routine message

- select routine priority
- select message type, country, destination, prefix, extension

<table>
<thead>
<tr>
<th>type</th>
<th>country code</th>
<th>destination</th>
<th>prefix</th>
<th>ext.</th>
<th>preamble</th>
</tr>
</thead>
<tbody>
<tr>
<td>shore</td>
<td>telex</td>
<td>country</td>
<td>subscriber</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ship</td>
<td>telex</td>
<td>581 AOR/E</td>
<td>IMN</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>582 POR</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>583 IOR</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>584 AOR/W</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>data</td>
<td>PSDN</td>
<td>DNIC</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>fax</td>
<td>PSTN</td>
<td>country code</td>
<td>subscriber</td>
<td>T30</td>
<td>-</td>
</tr>
<tr>
<td>sms</td>
<td>SAC</td>
<td>28</td>
<td></td>
<td>TO+</td>
<td>&lt;no.&gt;</td>
</tr>
<tr>
<td>email</td>
<td>SAC</td>
<td>28</td>
<td></td>
<td>TO+</td>
<td>&lt;addr.&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SUBJ+</td>
<td>&lt;subject&gt;</td>
</tr>
</tbody>
</table>

- prepare message or retrieve from memory
- select LES/CES
- to transmit push appropriate button

Inmarsat air charges by AAIC per 256Bit $\approx 0.50\text{USD} / 256\text{Bit}$

- ITA-2, 5Bit, telex 50 character / 256Bit
- ASCII, 7Bit, text 36 character / 256Bit
- Binary, 8Bit, data 32 character / 256Bit

Inmarsat sms/email Provider: contract required

- Vizada (former Telenor, France Telecom) www.vizada.com
- Stratos (former Xantic) www.stratosglobal.com

Inmarsat Mobile Number IMN:

- ITU List of Ship Stations & Maritime Mobile Service Identity
- Maritime Access and Retrieval System MARS www.itu.int
- Inmarsat ships directory www.inmarsat.com

Data Network Identification Code DNIC: www.itu.int
10.5 SAT-C shore-to-ship routine

Dialing a MES from ashore or another MES:

<table>
<thead>
<tr>
<th>destination</th>
<th>extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>telex</td>
<td></td>
</tr>
<tr>
<td>581 AOR/E</td>
<td>IMN</td>
</tr>
<tr>
<td>582 POR</td>
<td></td>
</tr>
<tr>
<td>583 IOR</td>
<td></td>
</tr>
<tr>
<td>584 AOR/W</td>
<td></td>
</tr>
<tr>
<td>data</td>
<td>DNIC</td>
</tr>
<tr>
<td>1111 AOR/E</td>
<td></td>
</tr>
<tr>
<td>1112 POR</td>
<td></td>
</tr>
<tr>
<td>1113 IOR</td>
<td></td>
</tr>
<tr>
<td>1114 AOR/W</td>
<td></td>
</tr>
<tr>
<td>fax</td>
<td>not supported</td>
</tr>
<tr>
<td>sms</td>
<td>Vizada: +49-1709127629 MES: Stratos; +47-95222333 i IMN</td>
</tr>
<tr>
<td>email</td>
<td>Vizada: <a href="mailto:username.tlx@skyfile-c.com">username.tlx@skyfile-c.com</a> subject: keyword Stratos: <a href="mailto:IMN@stratosmobile.net">IMN@stratosmobile.net</a> subject: al:telex</td>
</tr>
</tbody>
</table>

Contract with service provider for SMS and email required.
10.6 SAT-C shore-to-ship Enhanced Group Call EGC

10.6.1 SafetyNET

SafetyNET provides Maritime Safety Information MSI broadcasts outside NAVTEX coverage free of charge.

MSI can be addressed to all ships within

- one, more or all 4 ocean region(s)
- one, more or all 16 NAVAREA(s)
- circle
- rectangle
- coastal area

Priority levels: distress, urgency, safety, routine

NAVAREA I, II, III: scheduled MSI broadcasts (UTC)

<table>
<thead>
<tr>
<th>area</th>
<th>ocean region</th>
<th>NAV warning</th>
<th>MET information</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>AOR-E</td>
<td>0530, 1730</td>
<td>0930, 2130</td>
</tr>
<tr>
<td></td>
<td>AOR-W</td>
<td></td>
<td>warnings only</td>
</tr>
<tr>
<td>II</td>
<td>AOR-E</td>
<td>0430, 1630</td>
<td>0900, 2100</td>
</tr>
<tr>
<td></td>
<td>AOR-W</td>
<td></td>
<td>0900, 2100</td>
</tr>
<tr>
<td>III</td>
<td>AOR-E</td>
<td>1200, 2400, on receipt</td>
<td>1000, 2200</td>
</tr>
</tbody>
</table>

IMO International Maritime Organisation www.imo.org
GMDSS Master Plan
ALRS Admiralty List of Radio Signals www.ukho.gov.uk
NP 285 GMDSS (ALRS Volume 5)
INMARSAT www.inmarsat.com

10.6.2 FleetNET

FleetNET provides charged commercial broadcasts to a group of stations selected by EGC Network Identification code ENID code.
10.6.3 EGC receiver

Set up EGC receiver:

a) automatic update of ships position from GPS or manually input at least every 4 hours
b) designate current NAVAREA I-XVI based on ships position
c) designate INMARSAT ocean region based on NAVAREA
d) login in to designated ocean region AOR-W, AOR-E, POR or IOR
e) enter NAVAREA I-XVI
f) select NAVTEX codes and/or EGC services from list
g) enter alternative NAVAREA

fig. 19: MSI SafetyNet
Part IV

General Operator Certificate

GOC

1. Maritime Mobile Radio Telephone RT communications
   (a) General principles and basic features

2. Detailed working knowledge of radio equipment
   (a) VHF, MF/HF radio installation
   (b) Purpose and use of Digital Selective Calling DSC
   (c) Narrow Band Direct Printing NBDP, telex

3. Operational procedures of the GMDSS
   (a) Search and Rescue SAR Procedures
   (b) Distress, urgency and safety communication
   (c) Communication with non-SOLAS vessels
   (d) Protection of distress frequencies
   (e) Maritime Safety Information MSI
   (f) Alerting and Locating Signals

4. Operational procedures and regulations
   (a) English language written and spoken
   (b) Ability to exchange communications relevant to SOLAS
   (c) Regulations, obligatory procedures and practices
   (d) Practical and theoretical knowledge of RT procedures

5. Maritime Mobile Satellite Service
   (a) INMARSAT System
   (b) INMARSAT C operation, Enhanced Group Call EGC
   (c) INMARSAT B/M, Fleet 77
11 GMDSS

11.1 Shipborne system

11.1.1 Radio Operator Certificate

On vessels complying to SOLAS in sea area A2-A4 a General Operator Certificate GOC is required.

This certificate authorises the holder to use a Radio Telephone RT on all maritime mobile bands including Digital Selective Calling DSC and maritime mobile satellite communications on a compulsory GMDSS fitted SOLAS vessels.

At least one holder of a certificate of competence for maritime radio stations is required, normally by the shipmaster himself and all marine officers.

National radio operator licencing administrations:

- Austrian GOC = Allgemeines Betriebszeugnis I ABZ I
  Fernmeldebehörde FMB www.bmvit.gv.at

- German GOC =
  Allgemein gültiges Betriebszeugnis für Funker ABZ
  Bundesamt für Seeschifffahrt und Hydrografie www.bsh.de

- United Kingdom GOC = General Operator Certificate
  Association of Marine Electronics and Radio Colleges
  www.amerc.ac.uk
12 SAT-B/M Mobile Earth Station MES

12.1 SAT-B/M Terminal

![SAT B/M Terminal Diagram]

The antenna is directional and must be pointed accurately at the satellite. Normally it is automatically tracked by ships position (GPS) and heading (gyro) to satellite (azimuth and elevation).

SAT-B/M will phase out 2014.

12.1.1 SAT-B/M Inmarsat Mobile Number IMN

<table>
<thead>
<tr>
<th>subscriber</th>
<th>Mobile Earth Station</th>
<th>identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship phone/telex</td>
<td>SAT-B Terminal</td>
<td>IMN: 3MIDxxxxxx</td>
</tr>
<tr>
<td>ship phone</td>
<td>SAT-M Terminal</td>
<td>IMN: 6MIDxxxxxx</td>
</tr>
</tbody>
</table>
12.2 SAT-B/M priority distress

12.2.1 SAT-B telex distress

Grave and imminent danger to ship or crew, immediate assistance required. Only be sent by authority of shipmaster or person in charge.

- a) select telex mode (go online)
- b) select distress priority by pushing DISTRESS button >6s
- c) await RCC answerback and GA+ (Go Ahead)
- d) type distress message or retrieve from DMG
  MAYDAY
  ships name / call sign / IMN
  position, nature, assistance, additional information

Distress Message Generator DMG is a memory for pre-programmed telex distress message. Ships identification and position is included.

12.2.2 SAT-B/M phone distress

- a) select phone mode (lift headset)
- b) select distress priority by pushing DISTRESS button >6s
- c) push # -key to start call
- d) await RCC operator answers
- e) give distress message
  MAYDAY
  ships name / call sign / IMN
  position, nature, assistance, additional information
12.3 SAT-B/M priority routine

Priority messages are selected by 2-digit short dialing codes.
Special Access Code SAC.  www.inmarsat.com

12.3.1 SAT-B/M urgency message

A very urgent message concerning the safety of a ship or a person. Only be sent by authority of shipmaster or person in charge.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a) | select mode: phone  
| b) | select routine priority  
| c) | select LES/CES  
| d) | lift headset  
| e) | await RCC answers  
| f) | enter SAC  
|   | 32 medical advice  
|   | 38 medical assistance  
|   | 39 maritime assistance  
| g) | enter #  
| h) | give phone urgency message type telex urgency message  

12.3.2 SAT-B/M safety message

A very important information to shipping. Only be sent by authority of shipmaster or person in charge.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a) | select mode: phone  
| b) | select routine priority  
| c) | select LES/CES  
| d) | lift headset  
| e) | await RCC answers  
| f) | enter SAC  
|   | 42 navigational hazard  
| g) | enter #  
| h) | give phone safety message type telex safety message  

12.3.3 SAT-B/M routine message

a) select mode: phone telex (SAT-B only)
b) select routine priority
c) select LES/CES
d) lift headset go online
e) await RCC answers answerback GA+
f) enter SAC
   00 automatic dialing
g) enter # +
h) give phone routine message type telex routine message

12.4 SAT-B/M shore-to-ship routine

SAT-B/M Phone call shore-to-ship: +870-IMN

SAT-B telex call shore-to-ship:

<table>
<thead>
<tr>
<th>AOR/E</th>
<th>581 + IMN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POR</td>
<td>582 + IMN</td>
</tr>
<tr>
<td>IOR</td>
<td>583 + IMN</td>
</tr>
<tr>
<td>AOR/W</td>
<td>584 + IMN</td>
</tr>
</tbody>
</table>
13    Fleet 77 Mobile Earth Station

13.1    Fleet 77 Terminal

ISDN
Integrated Services Digital Network

MPDS
Mobile Packet Data Service

Pre-emption
interrupt by higher priorities

fig. 22: Fleet 77

13.1.1    Fleet 77 Inmarsat Mobile Number IMN

<table>
<thead>
<tr>
<th>subscriber</th>
<th>Mobile Earth Station</th>
<th>identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship phone</td>
<td>Fleet 77 Terminal</td>
<td>IMN: 76xxxxxxx</td>
</tr>
</tbody>
</table>

13.2    Fleet 77 priority distress

Grave and imminent danger to ship or crew, immediate assistance required. Only be sent by authority of shipmaster or person in charge.

a) lift headset
b) select priority distress by pushing DISTRESS button >6s
c) select LES (nearest to incident) or use default
d) await RCC operator answers
e) give distress message
   MAYDAY
   ships name / call sign / IMN
   position, nature, assistance, additional information
13.3 Fleet 77 priority urgency

A very urgent message concerning the safety of a ship or a person. Only be sent by authority of shipmaster or person in charge.

a) lift headset
b) select priority urgency by entering SAC
   32 medical advice
   38 medical assistance
   39 maritime assistance
c) select LES or use default
d) await RCC operator answers
e) give urgency message
   PAN PAN
   ships name / call sign / IMN
   position, message

13.4 Fleet 77 priority safety

A very important information to shipping. Only be sent by authority of shipmaster or person in charge.

a) lift headset
b) select priority safety by entering SAC
   42 navigational hazard
c) select LES or use default
d) await RCC operator answers
e) give safety message
   SECURITE
   ships name / call sign / IMN
   position, message
13.5 **Fleet 77 priority routine**

- a) lift headset
- b) select priority routine by entering SAC 00 automatic dialing
- c) select LES or use default
- d) enter number (country + area + subscriber)
- e) await answer
- f) give message

13.6 **Fleet 77 shore-to-ship routine**

Automatic phone call shore-to-ship: +870-IMN
14 MF/HF Maritime Mobile Radio

14.1 MF/HF telex Terminal

A telex terminal consists of

- Video Display Unit VDU
- Keyboard
- Printer
- telex MODEM (modulator/demodulator)
- MF/HF Transceiver (F1B or J2B)
- MF/HF DSC class A

Operation modes for Narrow Band Direct Printing NBDP.

- Automatic Reception Request ARC station to station
- Forward Error Correction FEC broadcast
- Selective FEC SELFEC station to station

SITOR Simplex Telex Over Radio

14.1.1 MF/HF telex identification selcal

<table>
<thead>
<tr>
<th>subscriber</th>
<th>telex station</th>
<th>identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship telex</td>
<td>MF/HF Terminal</td>
<td>selcal: xxxxx</td>
</tr>
<tr>
<td>coast telex</td>
<td>MF/HF Terminal</td>
<td>selcal: xxxx</td>
</tr>
</tbody>
</table>

ITU International Telecommunications Union: [www.itu.int](http://www.itu.int)
- List of Coast Stations and Special Service Stations
- List of Ship Stations & Maritime Mobile Service Identity
- Maritime Access and Retrieval System MARS

ALRS Admiralty List of Radio Signals [www.ukho.gov.uk](http://www.ukho.gov.uk)
- NP 281 Maritime Radio Stations (Volume 1)
14.2 MF/HF telex communication

14.2.1 MF/HF DSC alert / call

a) push appropriate button(s) to enter DSC menu
b) select station called (all ships, area, group, individual)
c) select priority: distress, distress relay, urgency, safety, routine
d) select mode: telex/RTTY/NBDP, F1B/J2B, simplex/duplex
   distress, urgency, safety: FEC
   routine: ARQ, FEC, SELFEC
e) select DSC calling frequency (position and propagation)
   distress, urgency, safety:
      MF 2187.5kHz
      HF 4207.5, 6312.0, 8414.5, 12577.0, 16804.5kHz
   routine:
      MF ship-ship TX/RX 2177/2177kHz
      MF ship-shore TX/RX 2189.5/2177kHz
   HF 24 DSC frequencies within 8 bands: ship TX/RX [kHz]
      4MHz: 4208.0/4219.5, 4208.5/4220.0, 4209.0/4220.5
      6MHz: 6312.5/6331.0, 6331.0/6313.5, 6313.5/6332.0
      8MHz: 8415.0/8436.5, 8415.5/8437.0, 8416.0/8437.5
      12MHz: 12577.5/12657.0, 12578.0/12657.5, 12578.5/12658.0
      16MHz: 16805.0/16903.0, 16805.5/16903.5, 16806.0/16904.0
      18MHz: 18898.5/19703.5, 18899.0/19704.0, 18899.5/19704.5
      22MHz: 22375.5/22444.0, 22376.0/22444.5, 22376.5/22445.0
      25MHz: 25208.5/26121.0, 25209.0/26121.5, 25209.5/26122.0
f) select associated telex working frequency in same band
   distress, urgency, safety:
      MF 2174.5kHz
      HF 4177.5, 6268.0, 8376.5, 12520.0, 16695.0kHz
   routine:
      MF ship-ship TX/RX
      MF ship-shore TX/RX
      HF ship-ship: ITU simplex or duplex channel
      HF ship-shore: ITU duplex channel
g) push appropriate button to transmit
14.2.2 MF/HF telex message

Prepare and transmit with telex Terminal Software.

Examples for telex abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA+</td>
<td>go ahead</td>
</tr>
<tr>
<td>MED+</td>
<td>medical assistance required</td>
</tr>
<tr>
<td>OBS+</td>
<td>weather messages</td>
</tr>
<tr>
<td>OCC+</td>
<td>occupied (engaged)</td>
</tr>
<tr>
<td>URG+</td>
<td>urgent assistant required</td>
</tr>
</tbody>
</table>

14.3 MF/HF Maritime Safety Information MSI

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Range</th>
<th>Wavelength</th>
<th>Maritime Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td>490kHz</td>
<td>600m</td>
<td>NAVTEX national</td>
</tr>
<tr>
<td></td>
<td>518kHz</td>
<td>600m</td>
<td>NAVTEX international</td>
</tr>
<tr>
<td>HF</td>
<td>4209.5kHz</td>
<td>80m</td>
<td>NAVTEX tropical areas</td>
</tr>
<tr>
<td></td>
<td>4210.0kHz</td>
<td>80m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>6314.0kHz</td>
<td>60m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>8416.5kHz</td>
<td>40m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>12579.0kHz</td>
<td>30m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>16806.5kHz</td>
<td>20m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>19680.5kHz</td>
<td>15m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>22376.0kHz</td>
<td>13m</td>
<td>telex</td>
</tr>
<tr>
<td></td>
<td>26100.5kHz</td>
<td>12m</td>
<td>telex</td>
</tr>
</tbody>
</table>
Part V
Appendix

15 Nautical terms

15.1 Weather

<table>
<thead>
<tr>
<th>Bf</th>
<th>wind force</th>
<th>kn</th>
<th>SS</th>
<th>state of sea</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>calm</td>
<td>&lt;1</td>
<td>0</td>
<td>calm</td>
<td>0.0</td>
</tr>
<tr>
<td>1</td>
<td>light air</td>
<td>1-3</td>
<td>1</td>
<td>rippled</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>light breeze</td>
<td>4-6</td>
<td>2</td>
<td>smooth</td>
<td>0.2</td>
</tr>
<tr>
<td>3</td>
<td>gentle breeze</td>
<td>7-10</td>
<td>3</td>
<td>slight</td>
<td>0.6</td>
</tr>
<tr>
<td>4</td>
<td>moderate breeze</td>
<td>11-16</td>
<td>3-4</td>
<td>slight - moderate</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>fresh breeze</td>
<td>17-21</td>
<td>4</td>
<td>moderate</td>
<td>2.0</td>
</tr>
<tr>
<td>6</td>
<td>strong breeze</td>
<td>22-27</td>
<td>5</td>
<td>rough</td>
<td>3.0</td>
</tr>
<tr>
<td>7</td>
<td>near gale</td>
<td>28-33</td>
<td>5-6</td>
<td>rough - very rough</td>
<td>4.0</td>
</tr>
<tr>
<td>8</td>
<td>gale</td>
<td>34-40</td>
<td>6-7</td>
<td>very rough - high</td>
<td>5.5</td>
</tr>
<tr>
<td>9</td>
<td>strong gale</td>
<td>41-47</td>
<td>7</td>
<td>high</td>
<td>7.0</td>
</tr>
<tr>
<td>10</td>
<td>storm</td>
<td>48-55</td>
<td>8</td>
<td>very high</td>
<td>9.0</td>
</tr>
<tr>
<td>11</td>
<td>violent storm</td>
<td>56-63</td>
<td>8</td>
<td>very high</td>
<td>11.5</td>
</tr>
<tr>
<td>12</td>
<td>hurricane</td>
<td>&gt;64</td>
<td>9</td>
<td>phenomenal</td>
<td>&gt;14.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>distance</th>
<th>visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>40km</td>
<td>excellent</td>
</tr>
<tr>
<td>20km</td>
<td>very good</td>
</tr>
<tr>
<td>10km</td>
<td>good</td>
</tr>
<tr>
<td>4km</td>
<td>moderate</td>
</tr>
<tr>
<td>2km</td>
<td>poor</td>
</tr>
<tr>
<td>1km</td>
<td>very poor</td>
</tr>
<tr>
<td>500m</td>
<td>moderate fog</td>
</tr>
<tr>
<td>200m</td>
<td>fog</td>
</tr>
<tr>
<td>50m</td>
<td>thick fog</td>
</tr>
<tr>
<td>&lt;50m</td>
<td>dense fog</td>
</tr>
</tbody>
</table>
## 15.2 Vessel

<table>
<thead>
<tr>
<th>English</th>
<th>German</th>
</tr>
</thead>
<tbody>
<tr>
<td>vessel</td>
<td>Schiff</td>
</tr>
<tr>
<td>cargo vessel</td>
<td>Frachtschiff</td>
</tr>
<tr>
<td>merchant vessel</td>
<td>Handelsschiff</td>
</tr>
<tr>
<td>motor vessel</td>
<td>Motorschiff</td>
</tr>
<tr>
<td>passenger vessel</td>
<td>Fahrgastschiff</td>
</tr>
<tr>
<td>sailing vessel</td>
<td>Segelschiff</td>
</tr>
<tr>
<td>towing vessel</td>
<td>Schleppendes Schiff</td>
</tr>
<tr>
<td>tug</td>
<td>Schlepper</td>
</tr>
<tr>
<td>boat</td>
<td>Boot</td>
</tr>
<tr>
<td>pleasure boat</td>
<td>Sportboot</td>
</tr>
<tr>
<td>small craft</td>
<td>Kleinfahrzeug (&lt; 24m)</td>
</tr>
<tr>
<td>bow ahead</td>
<td>Bug / vorne</td>
</tr>
<tr>
<td>stern astern</td>
<td>Heck / hinten</td>
</tr>
<tr>
<td>port(side)</td>
<td>Backbord</td>
</tr>
<tr>
<td>star(board)</td>
<td>Steuerbord</td>
</tr>
<tr>
<td>abeam</td>
<td>querab</td>
</tr>
<tr>
<td>draught</td>
<td>Tiefgang</td>
</tr>
<tr>
<td>air draught</td>
<td>Höhe</td>
</tr>
<tr>
<td>master</td>
<td>Kapitän</td>
</tr>
<tr>
<td>shipmaster</td>
<td>Schiffsführer</td>
</tr>
</tbody>
</table>
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ampere</td>
</tr>
<tr>
<td>AAIC</td>
<td>Accounting Authority Identification Code</td>
</tr>
<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>AF</td>
<td>Audio Frequency (=NF)</td>
</tr>
<tr>
<td>Ah</td>
<td>Ampere hours</td>
</tr>
<tr>
<td>AIS</td>
<td>Automatic Identification System</td>
</tr>
<tr>
<td>ALRS</td>
<td>Admiralty List of Radio Signals</td>
</tr>
<tr>
<td>AOR-E</td>
<td>Atlantic Ocean Region Est</td>
</tr>
<tr>
<td>AOR-W</td>
<td>Atlantic Ocean Region West</td>
</tr>
<tr>
<td>ARQ</td>
<td>Automatic Reception Request</td>
</tr>
<tr>
<td>ASCII</td>
<td>American Standard Code for Information Interchange</td>
</tr>
<tr>
<td>CEPT</td>
<td>European Conference of Postal and Telecommunications Administrations</td>
</tr>
<tr>
<td>CES</td>
<td>Coast Earth Stations (=LES)</td>
</tr>
<tr>
<td>CG</td>
<td>Coast Guard</td>
</tr>
<tr>
<td>COG</td>
<td>Course Over Ground</td>
</tr>
<tr>
<td>COMSAR</td>
<td>Communication SAR</td>
</tr>
<tr>
<td>COSPAS</td>
<td>Cosmicheskaya Sistyema Poiska Avariynich Sudov</td>
</tr>
<tr>
<td>CS</td>
<td>Coast Station</td>
</tr>
<tr>
<td>CRS</td>
<td>Coast Radio Station</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DGPS</td>
<td>Differential GPS</td>
</tr>
<tr>
<td>DMG</td>
<td>Distress Message Generator</td>
</tr>
<tr>
<td>DNIC</td>
<td>Data Network Identification Code</td>
</tr>
<tr>
<td>DSC</td>
<td>Digital Selective Calling</td>
</tr>
<tr>
<td>DW</td>
<td>Dual Watch</td>
</tr>
<tr>
<td>ECS</td>
<td>Electronic Charting System</td>
</tr>
<tr>
<td>ECDIS</td>
<td>Electronic Chart Display Information System</td>
</tr>
<tr>
<td>EGC</td>
<td>Enhanced Group Call</td>
</tr>
<tr>
<td>EHF</td>
<td>Extra High Frequency</td>
</tr>
<tr>
<td>ELF</td>
<td>Extreme Low Frequency</td>
</tr>
<tr>
<td>ENID</td>
<td>EGC Network Identification code</td>
</tr>
</tbody>
</table>
EPIRB  Emergency Position Indicating Radio Beacon
ETA    Estimated Time of Arrival
ETE    Estimated Time Enroute
ETD    Estimated Time of Departure
F1B    digital frequency modulation
FEC    Forward Error Correction
FSK    Frequency Shift Keying
G2B    digital subcarrier phase modulation
G3E    analog phone phase modulation
GEOSAR Geostationary Earth Orbit Search And Rescue
GFR    Goldfranken
GHz    Giga Hz (1.000MHz)
GLAD   Global Administration Data System
GMDSS  Global Maritime Distress and Safety System
GOIC   General Operator Certification
GPS    Global Positioning System
GRT    Gross ton 1 GRT = 12 feet$^3$
HF     High Frequency
Hz     Hertz (cycles per seconds)
IAMSAR International Aeronautical and Maritime Search and Rescue
ICAO   International Civil Aviation Organisation
IHO    International Hydrographic Organisation
IMN    INMARSAT Mobile Number
IMO    International Maritime Organization
INMARSAT International Maritime Satellite
IOR    Indic Ocean Region
IP     Internet Protocol
ISDN   Integrated Services Digital Network
ITA    International Telegraph Alphabet
ITU    International Telecommunication Union
kHz  kilo Hz (1.000Hz)
kn  knots

LEOSAR  Low Earth Orbit Search And Rescue
LES  Land Earth Station (=CES)
LF  Low Frequency
LORAN  Long Range Navigation
LRC  Long Range Certification
LSB  Lower Side Band
LT  Local Time
LUT  Local User Terminal

MARS  Maritime mobile Access and Retrieval System
MAYDAY  RT distress signal
MCC  Mission Control Centre
MCA  Maritime and Coastguard Agency
MES  Mobile Earth Station (=SES)
MF  Medium Frequency
MHz  Mega Hz (1.000kHz)
MID  Maritime Identification Digit
MSN  Merchant Shipping Notice
MARS  Maritime mobile Access and Retrieval System
MOB  Man Over Board
MMSI  Maritime Mobile Service Identify
MODEM  Modulator Demodulator
MPDS  Mobile Packet Data Service
MRCC  Maritime Rescue Co-ordination Centre
MRSC  Maritime Rescue Sub Centre
MSN  Maritime Safety Note
MSI  Maritime Safety Information

NAVAREA  Navigational Area
NAVTEX  Naval Text
NBDP  Narrow Band Direct Printing
NOAA  National Oceanic & Atmospheric Administration
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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</thead>
<tbody>
<tr>
<td>OCC</td>
<td>Operation Control Centre</td>
</tr>
<tr>
<td>OFCOM</td>
<td>Office for communication (UK)</td>
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<tr>
<td>OSC</td>
<td>On-Scene Commander</td>
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<tr>
<td>PAN</td>
<td>RT urgency signal</td>
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<tr>
<td>PM</td>
<td>Phase Modulation</td>
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<tr>
<td>POB</td>
<td>Person Over Board</td>
</tr>
<tr>
<td>POR</td>
<td>Pacific Ocean Region</td>
</tr>
<tr>
<td>PSDN</td>
<td>Public Switched Data Network</td>
</tr>
<tr>
<td>PSTN</td>
<td>Public Switched Telephone Network</td>
</tr>
<tr>
<td>PTT</td>
<td>Push To Talk</td>
</tr>
<tr>
<td>RADAR</td>
<td>Radio Aided Detection And Ranging</td>
</tr>
<tr>
<td>RCC</td>
<td>Rescue Co-ordination Centre</td>
</tr>
<tr>
<td>RDF</td>
<td>Radio Direction Finding</td>
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<tr>
<td>ROC</td>
<td>Restricted Operator Certification</td>
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<tr>
<td>RR</td>
<td>Radio Regulations</td>
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<tr>
<td>RT</td>
<td>Radio Telephone</td>
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<tr>
<td>RTTY</td>
<td>Radio Tele Typing</td>
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<tr>
<td>RX</td>
<td>Receiver</td>
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<tr>
<td>SAC</td>
<td>Special Access Code</td>
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<tr>
<td>SAR</td>
<td>Search And Rescue</td>
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<tr>
<td>SARSAT</td>
<td>Search And Rescue Satellite Aided Tracking</td>
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<tr>
<td>SART</td>
<td>Search And Rescue Transponder</td>
</tr>
<tr>
<td>SATCOM</td>
<td>Satellite Communication</td>
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<tr>
<td>SDR</td>
<td>Special Drawing Right</td>
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<tr>
<td>SECURITE</td>
<td>RT safety signal</td>
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<tr>
<td>SES</td>
<td>Ship Earth Station (=MES)</td>
</tr>
<tr>
<td>SHF</td>
<td>Super High Frequency</td>
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<tr>
<td>SILENCE</td>
<td>RT radio silence</td>
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<tr>
<td>SMS</td>
<td>Short Message Service</td>
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<tr>
<td>SOG</td>
<td>Speed Over Ground</td>
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<tr>
<td>SOLAS</td>
<td>Safety Of Life At Sea</td>
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<tr>
<td>SQ</td>
<td>Squelch</td>
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<tr>
<td>SRC</td>
<td>Short Range Certificate</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>SRR</td>
<td>Search and Rescue Region</td>
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<tr>
<td>SS</td>
<td>Ship Station</td>
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<tr>
<td>SSB</td>
<td>Single Side Band</td>
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<tr>
<td>STCW</td>
<td>Standards of Training, Certification and Watchkeeping of seafarers</td>
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<tr>
<td>TCP</td>
<td>Transmission Control Protocol</td>
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<tr>
<td>TSS</td>
<td>Traffic Separation Scheme</td>
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<tr>
<td>TX</td>
<td>Transmitter</td>
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<tr>
<td>UHF</td>
<td>Ultra High Frequency</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>USB</td>
<td>Upper Side Band</td>
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<tr>
<td>UTC</td>
<td>Universal Time Coordinated</td>
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<tr>
<td>V</td>
<td>Volt</td>
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<tr>
<td>VC</td>
<td>Volume Control</td>
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<tr>
<td>VDU</td>
<td>Video Display Unit</td>
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<tr>
<td>VFO</td>
<td>Variable Frequency Oscillator</td>
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<tr>
<td>VHF</td>
<td>Very High Frequency</td>
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<tr>
<td>VLF</td>
<td>Very Low Frequency</td>
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<tr>
<td>VTS</td>
<td>Vessel Traffic Service</td>
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<td>W</td>
<td>Watt</td>
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<tr>
<td>WMO</td>
<td>World Meteorological Organisation</td>
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<td>WRC</td>
<td>World Radio Conference</td>
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<td>WWNWS</td>
<td>World Wide Navigational Warning Service</td>
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<tr>
<td>WX</td>
<td>weather information</td>
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