

GUIDELINES

ON THE APPLICATION OF PROVISIONS OF CHAPTER IV OF THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS 74)

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GUIDELINES ON THE APPLICATION OF PROVISIONS OF CHAPTER IV OF SOLAS 74

The Guidelines on the application of provisions of chapter IV of the International Convention for the Safety of Life at Sea (SOLAS 74) of Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established approval procedure and come into force on 1 January 2023.

The resolutions and circulars of the International Maritime Organization (IMO) and unified interpretations (UI) of the International Association of Classification Societies (IACS) have been taken into consideration.

For ships to which SOLAS 74 as amended is applicable, it is recommended to apply these Guidelines in addition to the mandatory and applicable provisions of SOLAS 74 as amended.

The Guidelines are intended for RS surveyors, designers, ship crews, shipowners and other interested parties.

The Guidelines are published in electronic format in Russian and English.

REVISION HISTORY

(purely editorial amendments are not included in the Revision History)

For this version, there are no amendments to be included in the Revision History.

1 GENERAL

These Guidelines are prepared based on the provisions of IMO Circular COMSAR/Circ. 32 "Harmonization of GMDSS Requirements for Radio Installations on Board SOLAS Ships" dated 16 August 2004, taking into account amendments to chapter IV of SOLAS 74 adopted by subsequent resolutions, including MSC.436(99) of 24 May 2018.

IMO COMSAR/Circ. 32 was developed in order to provide Administrations, ship owners and radio equipment manufacturers with an unambiguous interpretation of the radio installation requirements in SOLAS chapter IV and adopted IMO resolutions.

The Guidelines also make references to IMO resolutions and circulars, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers¹ and Radio Regulations of the International Telecommunication Union.

The core elements of this document give Guidelines on GMDSS installations on board ships.

The Guidelines use the terms, definitions and abbreviations adopted in the text of SOLAS, IMO publications, Radio Regulations, as well as in [Appendix 4](#).

¹ Hereinafter referred to as "STCW Convention".

1.1 APPLICATION

Radio equipment installed on ships that fall under SOLAS requirements (hereinafter referred to as SOLAS ships) shall meet the relevant IMO requirements and ITU recommendations and shall be of a type approved by the Administration of the ship's flag.

These Guidelines are applicable when installing GMDSS radio equipment on board ships, high-speed craft (as prescribed in the HSC Code) and mobile offshore drilling units (as prescribed in the MODU Code).

Cargo ships of less than 300 gross tonnage (gt) and fishing/catching vessels are not covered by SOLAS requirements. However, if such ships/vessels are going to install GMDSS radio equipment, these Guidelines shall be followed as far as practicable.

These Guidelines reflect, to a large extent, unambiguous requirements in accordance with the relevant rules and regulations ([refer to 1.2](#)). Other practical installation solutions than the ones emerging from these Guidelines may, however, be accepted as long as the international requirements, as laid down in the SOLAS Convention etc., are met and the installation is considered to be equivalent.

If the Maritime Administration (MA) of the ship's flag gives additional instructions on the application of the provisions of SOLAS chapter IV, then in case of discrepancy with the provisions of these Guidelines, the instructions of the MA of the ship's flag shall be applied.

N o t e . The recognized companies which install the radio equipment shall be responsible for giving the radio operators proper familiarisation in the use of the installed equipment before it is put into operation.

1.2 NORMATIVE DOCUMENTS

.1 These Guidelines are prepared in accordance with the following conventions, rules, instructions and regulations:

- .1 SOLAS 74;
- .2 IMO resolutions (Performance standards (PS)) and IMO circulars;
- .3 International Telecommunication Union (ITU) Radio Regulations (RR);
- .4 International Standard ISO 8468:2007, Appendix A;
- .5 STCW Convention, as amended.

1.3 DESIGN DOCUMENTATION

1.3.1 General.

Prior to building or reconstructing a ship, the following technical documentation shall be submitted to the Register for review:

- .1 antenna arrangement drawing (in three views);
- .2 arrangement drawing of all radio equipment units (at least in two views);
- .3 wiring diagram for all radio equipment units;
- .4 list of all radio equipment installed on the bridge indicating the name, type and manufacturer of the equipment;
- .5 calculation of the reserve power source capacity.

For new buildings the antenna and radio arrangement drawings shall at least be of size 1:50.

The above approved and corrected documents shall be kept available on board the ship for presentation during radio survey.

1.3.2 Antenna arrangement drawing.

The drawings in three views shall show:

- .1 all transmitting antennas including location of antenna tuners;
- .2 all receiving antennas including the antennas of Electronic Position Fixing System (EPFS);
- .3 radar antennas (indicating antenna rotation radius and vertical patterns);
- .4 satellite communication antennas;
- .5 the location of float-free EPIRBs.

1.3.3 Changes in the antenna arrangement.

When changes are made in the antenna arrangement, modified antenna drawings shall be prepared.

1.3.4 Radio equipment arrangement drawings (on bridge and in radioroom).

The drawings, made in at least two views, shall indicate (if applicable):

- .1 control panels (built-in and remote) for transmitting distress alarm;
- .2 VHF radio installations, including any control units;
- .3 MF or MF/HF radio installations, including any control units, printers, etc.;
- .4 satellite communication equipment, including terminals, printers, etc.;
- .5 receivers for keeping watch on VHF chs. 16, 70, MF 2187,5 kHz, and HF distress channels in 4, 6, 8, 12 and 16 MHz bands;
- .6 NAVTEX and EGC receivers;
- .7 radar SARTs, AIS SARTs and EPIRBs (if located on the navigating bridge);
- .8 portable two-way VHF radio-telephone apparatus and their chargers;
- .9 emergency light powered from a reserve source of energy to illuminate the GMDSS radio equipment;
- .10 charger (for the reserve source of energy); and
- .11 fuse or circuit breaker box (radio equipment panel).

1.3.5 Wiring diagrams.

The drawings shall show the following:

- .1 antenna connections;
- .2 connections of radio equipment to ship telephone exchange, fax machine, etc.;
- .3 connections to the ships mains, emergency source of energy, and the reserve source of energy (GMDSS batteries);
- .4 connection of radio equipment (including emergency light) to each power unit/source of energy;
- .5 fuses or circuit breakers for all radio equipment;
- .6 uninterruptable power supply (UPS) with all connections, circuit breakers and fuses, if installed as power for mandatory radio equipment (block diagram showing how the UPS operates, showing the circuit breakers, fuses and switch-over connections to alternative power supplies, by-pass switches, etc.);
- .7 data interface connections between the GMDSS radio equipment, radio communication and navigation aids;
- .8 battery chargers for the reserve source of energy;

- .9 connections to gyro (if applicable);
- .10 type of cables used in the installation;
- .11 connections to VDR (if applicable).

The above approved and corrected documents shall be kept available on board the ship for presentation during radio survey.

1.4 INSTRUCTION MANUALS AND PUBLICATIONS

The following instruction manuals and publications shall be available on board:

- .1 user's manual for all radio equipment and battery chargers to be provided by the equipment manufacturer (in English). Ship owners, operators and managers may, if considered necessary, also provide consistent versions of these manuals in the working language of the ship crew;
- .2 specifications and battery capacity calculations for the installed batteries; and
- .3 ITU publications according to requirements in the Radio Regulations.

Comment:

Refer to Radio Regulations, Volume 2, Appendix 16:

- 1) *List of ship stations and maritime mobile service identity assignments in either printed or electronic format;*
- 2) *List of coast stations and special service stations in either printed or electronic format;*
- 3) *Manual for use by the maritime mobile and maritime mobile-satellite services in either printed or electronic format.*

Note . The Administration may exempt the ship from the need to have the documents referred to in paragraphs 2 and 3 of the comment in certain circumstances (for example, when the ship has equivalent information on the ship's navigation area).

1.5 TOOLS AND SPARE PARTS

As a minimum requirement, the ship shall have the following tools and spare parts readily available on board:

- .1 spare fuses for all radio equipment, battery circuit and main fuses where safety fuse ("melting" fuse) are used;
- .2 reserve emergency lamps;
- .3 tools necessary for simple servicing (screwdrivers, wrenches, pliers, etc.);
- .4 acid specific density meter if the ship is fitted with serviceable accumulators; and
- .5 multi-meter.

If the ship makes use of the "at-sea electronic maintenance" method, it shall be equipped with adequate test equipment and spare parts, which enable maintenance and repairs of all mandatory radio equipment while at sea.

1.6 MAINTENANCE REQUIREMENTS

Ships equipped with GMDSS radio installation shall meet specific requirements as to maintenance methods for the radio installation. Irrespective of sea areas, the ship shall not leave harbour without being able to transmit distress alert ship-to-shore by at least two separate and independent radio communication systems.

(SOLAS 1974, regulation IV/4.1)

Ships in sea areas A1 and A2 are required to use at least one of the three specific specified maintenance methods, whereas ships in areas A3 and A4 shall use at least a combination of two methods.

(SOLAS 1974, regulation IV/15 and IMO resolution A.702(17))

1.6.1 SHORE-BASED MAINTENANCE

.1 The shipping company/ship may have a written agreement with a radio equipment maintenance company or be able to present a written declaration/plan showing how shore-based maintenance is to be carried out.

(IMO resolution A.702(17), Appendix, item 3)

.1.1 The radio equipment maintenance company shall have trained (authorized) personnel to work with this equipment (as specified in the relevant RS Recognition Certificate).

.2 A Radio Safety Certificate issued by an Administration shall be, in general, a sufficient proof that adequate maintenance arrangement has been made for GMDSS equipment.

(IMO resolution A.702(17) and COM/Circ.117)

1.6.2 AT-SEA ELECTRONIC MAINTENANCE

.1 If the ship owner chooses at-sea electronic maintenance, personnel with necessary qualifications and authorization for servicing the equipment shall be present on board. Adequate additional technical documentation, tools, test equipment and spare parts shall also be available on board the ship so that a specialist can test, locate and rectify faults in the radio equipment.

(IMO resolution A.702(17))

.2 The person designated to perform functions for at-sea electronic maintenance shall either hold an appropriate certificate as specified by the ITU Radio Regulations, as required, or have equivalent at-sea electronic maintenance qualifications, as may be approved by the Administration, taking into account the IMO recommendations on the training of such personnel.

(IMO resolution A.703(17))

1.6.3 DUPLICATION OF EQUIPMENT

.1 For sea area A1, an additional (duplicated) VHF radio capable of transmitting and receiving DSC and radiotelephony shall be installed, and for sea areas A1 and A2, in addition to the above equipment, an MF radio capable of transmitting and receiving DSC and radiotelephony or RMSS SES.

The following additional (duplicated) equipment shall be installed for sea areas A1, A2 and A3, as well as A1, A2, A3 and A4:

- .1** VHF radio capable of transmitting and receiving DSC and radiotelephony;
- .2** RMSS SES or MF/HF radio capable of transmitting and receiving DSC NBDP and radiotelephony (refer to note).

Note. In sea area A3, duplication may be provided with either MF/HF radio capable of transmitting and receiving DSC NBDP and radiotelephony or RMSS SES.

Ships in regular trade in sea area A4 shall duplicate using MF/HF radio capable of transmitting and receiving DSC NBDP and radiotelephony.

Ships operating in sea area A4 only occasionally may duplicate with RMSS SES, provided a MF/HF radio capable of transmitting and receiving DSC NBDP and radiotelephony is used as main station.

(IMO resolution A.702(17))

.2 Duplicated radio installations shall be installed and connected to a separate antenna each and be ready for immediate operation.

.3 It shall be possible to connect duplicated equipment to the reserve source or sources of energy required by regulation IV/13.2 in addition to the basic equipment. The capacity of the reserve source or sources of energy shall be sufficient to operate the radio installation with the highest power for the appropriate period specified in regulations IV/13.2.1 and IV/13.2.2. However, the arrangement for the reserve source or sources of energy shall be such that a single fault in this arrangement shall not be able to affect both the basic and the duplicated equipment.

1.7 SHIP STATION RADIO LICENCE

.1 A ship station radio licence in accordance with the ITU Radio Regulations shall be issued to the ship.

.2 The licensee (normally the ship owner) is responsible for applying for a radio licence in due time before the survey by the Register.

(Radio Regulations, Article 18)

N o t e . The Maritime Mobile Service Identity (MMSI) stipulated in the radio licence shall be coded into the DSC equipment and, if appropriate, also into the EPIRB. If the national authority accepts serial number or call sign for identification of EPIRBs, the correct serial number or call sign shall be coded into the EPIRB.

All these identities shall be changed when a ship is transferred to another flag, and appropriate steps shall be taken to ensure databases held ashore are kept current (refer also to [1.9](#)).

1.8 APPLICATION FOR ACTIVATION OF SATELLITE EQUIPMENT

The ship owner is responsible for registration and service activation of satellite ship earth station.

**1.9 DE-ACTIVATION OF SATELLITE EQUIPMENT WHEN TRANSFERRING A SHIP
TO ANOTHER FLAG**

When transferring a ship to foreign flag, the licensee/shipowner shall immediately inform the appropriate Licensing Authority concerning de-activation of satellite equipment.

1.10 RADIO SURVEYS FOR ISSUANCE, RENEWAL AND ENDORSEMENT OF SAFETY CERTIFICATES

Survey of radio installations shall be carried out in accordance with the rules laid down in IMO resolution A.1156(32) "Survey Guidelines under the harmonized system of survey and certification (HSSC), 2021" and SOLAS 1974, chapter I, part B. It is important to note the following:

.1 The survey of the radio installations, including those used in life-saving appliances, shall always be carried out by a qualified radio surveyor who has necessary knowledge of the requirements of SOLAS, ITU Radio Regulations and the associated IMO resolutions concerning performance standards for radio equipment. The radio survey shall be carried out using suitable test equipment capable of performing all the relevant measurements required by these guidelines.

.2 It is considered as very important that the responsible radio operators (holding a GOC or ROC certificate) are properly instructed and trained in how to use the GMDSS radio equipment.

.3 The STCW Convention requires that the radio operator performing watchkeeping duties shall:

.1 ensure that watch is maintained on the frequencies specified in the ITU Radio Regulations and the SOLAS Convention; and

.2 while on duty, regularly check the operation of the radio equipment and its sources of energy and report to the master any failure of this equipment.

.4 The radio licence and certificates for the radio operator/operators shall be checked during the radio survey.

2 FUNCTIONAL REQUIREMENTS

2.1 GENERAL

.1 The functional requirements of the GMDSS are detailed in SOLAS chapter IV, regulation 4. It is of great safety importance that all requirements laid down are fulfilled.

The most important requirement is that "Every ship, while at sea, shall be capable of transmitting ship-to-shore distress alerts by at least two separate and independent means each using a different radiocommunication service".

It shall be possible to initiate such alerts from the position from which the ship is normally navigated (bridge).

.2 Under certain conditions the satellite EPIRB may be used to meet this requirement if installed close to the navigation bridge or if it can be remotely activated from the bridge.

.3 In addition to the above-mentioned requirements, it shall be possible to initiate the transmission of DSC distress alerts from the navigation bridge on VHF, and also on MF or HF, provided that the MF or HF equipment is mandatory ship equipment according to the GMDSS sea areas.

(SOLAS 1974, regulations IV/8 and 9)

.4 All ships shall keep continuous watch on VHF channel 70 by use of a DSC receiver.

.5 Ships with MF radiotelephone station requirements shall in addition keep continuous watch on MF DSC 2187,5 kHz and on HF DSC distress and safety channels if required to have HF radiotelephone station installed.

.6 All ships shall keep continuous listening watch on VHF channel 16 whilst at sea by use of a VHF receiver.

The Maritime Safety Committee, at its seventy-eighth session (May 2004) agreed that listening watch on VHF channel 16 by SOLAS ships, while at sea, shall be required and kept for foreseeable future with a view to providing:

.1 a distress ability and communication channel for non-SOLAS vessels (that are not covered by SOLAS requirements);

.2 bridge-to-bridge communications for SOLAS ships.

.7 Watch shall also be kept with NAVTEX and/or with EGC receivers. The watch shall be kept at the position from which the ship is normally navigated.

(SOLAS 1974, regulations IV/8, 9 and 12)

Note. Use of GMDSS equipment for transmitting and receiving general radiocommunications is a requirement specified in SOLAS chapter IV, regulation 4.1.8. Regular use of GMDSS equipment helps to develop operator competency and ensure equipment availability. If ships use other radiocommunication systems for the bulk of their business communications, they shall adopt a regular programme of sending selected traffic or test messages via GMDSS equipment to ensure operator competency and equipment availability and to help reduce the incidence of false alerts. This policy extends to all GMDSS equipment suites including DSC on VHF, MF and HF, to SES, and to any duplicated VHF and long-range communications facilities.

2.2 SEA AREAS (DEFINITIONS)

- .1 Sea area A1 means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available.
- .2 Sea area A2 means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available.
- .3 Sea area A3 means an area, excluding sea areas A1 and A2, within the coverage of the INMARSAT geostationary satellites, in which continuous alerting is available (76 °N and 76 °S).
- .4 Sea area A4 means an area outside of sea areas A1, A2 and A3.

2.3 RADIO EQUIPMENT REQUIREMENTS (INCLUDING DUPLICATION OF EQUIPMENT) FOR SOLAS SHIPS

GMDSS equipment requirements in force for all passenger ships in international trade as well as cargo ships of 300 gt and upwards in international trade:

(SOLAS 1974, chapter IV and IMO resolution A.702(17))

Table 2.3

Nos.	Equipment	RS nomenclature code	A1	A1, A2	A1, A2, A3 SES	A1, A2, A3 HF	A1, A2, A3, A4
1	VHF telephony installation with DSC	04120000MK	x	x	x	x	x
2	DSC receiver on channel 70	04120100MK	x	x	x	x	x
3	MF telephony installation with DSC	04130000MK		x	x		
4	DSC receiver on 2187,5 kHz	04130100MK		x	x		
5	RMSS SES with EGC receiver	04150300MK or 04150000MK			x		
6	MF/HF telephony installation with DSC and NBDP	04140000MK				x	x
7	MF/HF DSC receiver	04140100MK				x	x
8	Duplicated VHF telephony installation with DSC	04120000MK	x	x	x	x	x
9	Duplicated MF telephony installation with DSC	04130000MK		x ⁵			
10	Duplicated RMSS SES	04150300MK		x ⁵	x ⁴	x ⁴	
11	Duplicated MF/HF telephony installation with DSC and NBDP	04140000MK		x ⁵	x ⁴	x ⁴	x
12	NAVTEX receiver	04180000MK	x	x	x	x	x
13	EGC receiver	04190000MK	x ¹	x ¹		x	x
14	Float-free satellite EPIRB	04160000MK	x	x	x	x	x
15	Radar SART or AIS SART	04220000MK or 04220100MK	x ²				
16	Portable GMDSS VHF transceivers	04230000MK	x ³				
17	Automatic updating of position to all relevant GMDSS equipment		x	x	x	x	x
	Extra requirements for passenger ships						
18	Distress panel		x	x	x	x	x
19	Distress alarm panel		x	x	x	x	x
20	VHF radio stations on aeronautical frequencies of 121,5 и 123,1 MHz	04021200MK	x	x	x	x	x

¹Outside NAVTEX coverage area.
²Cargo ships between 300 and 500 gt: 1 set. Cargo ships of 500 gt and upwards and passenger ships: 2 sets.
³Cargo ships between 300 and 500 gt: 2 sets. Cargo ships of 500 gt and upwards and passenger ships: 3 sets.
⁴One duplicated station is required: RMSS SES or MF/HF with DSC and NBDP.
⁵One duplicated station is required: MF with DSC or RMSS SES or MF/HF with DSC and NBDP.

3 REQUIREMENTS FOR BASIC EQUIPMENT

3.1 GENERAL REQUIREMENTS

Every radio installation shall:

- .1 be located in such a way that no harmful interference of mechanical, electrical or other origin affects its proper use;
- .2 be located in such a way that electromagnetic compatibility (EMC) is ensured and harmful interference avoided to other equipment and systems;
- .3 be so located as to ensure the greatest possible degree of safety and operational availability;
- .4 be protected against the harmful effects of water, extremes of temperature and other adverse environmental conditions;
- .5 be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation;
- .6 be clearly marked with the ship's call sign, MMSI number and other identities as appropriate; and
- .7 be so located that no magnetic compass lies within the stated Compass Safe Distance of the equipment.

(SOLAS 1974, regulation IV/6.2)

3.2 USE OF VHF FOR NAVIGATIONAL SAFETY

Control of the VHF used for navigational safety shall be available at the conning position, and where necessary, from the wings of the bridge.

Portable VHF equipment may be used to provide navigational safety from the wings of the bridge.

(SOLAS 1974, regulation IV.6.3)

3.3 MARKING OF RADIO EQUIPMENT AND NOTICES

.1 All radio equipment shall be duly marked with type designation. The marking shall be clearly visible when the equipment has been installed.

.2 The radio installation shall be duly marked with the ship's GMDSS identities including call sign, Maritime Mobile Service Identity (MMSI), EPIRB hexadecimal identity, recognized mobile satellite service identities and equipment serial numbers, which may be transmitted by the ship radio equipment and are used to identify the ship.

.3 DSC operation procedures shall be posted near the DSC equipment on the navigation bridge. Emergency procedure shall be posted near the relevant equipment on the bridge.

.4 "GMDSS operating guidance for ships in distress situations", procedure on false alerts and "Guidance on GMDSS distress alerts", drawn up by IMO, shall be posted on the navigation bridge.

3.4 EMERGENCY LIGHTS

.1 All mandatory radio equipment shall have reliable emergency lighting powered from a reserve source of energy, which normally is the GMDSS batteries. This light shall give adequate illumination of the controls for safe operation of the radio equipment, and the working table for reading and writing.

.2 Means shall be provided for dimming any light source on the equipment which is capable of interfering with navigation, i.e. by adjustable light or by use of a curtain etc. during night-time.

.3 For VHF transceivers located openly in the front of the bridge, a screened light concentrating on each single piece of equipment, shall be used. Scale illumination (powered from a reserve source of energy) may be accepted provided it is sufficient for the operation of call control devices both on the VHF transceivers and the DSC controllers.

.4 Ceiling light may be used for equipment located in a separate radio communication workstation, providing it is not dazzling the officer on watch.

(IMO resolution A.694 (17), Appendix, subsection 3.3)

.5 The emergency light shall have its own fuse circuit and fuses in each circuit. These fuses shall be connected before the main fuses in order to prevent blown main fuses to cause interruption of the emergency light.

.6 Switches for emergency lights shall be properly marked.

3.5 RECOMMENDED INSTALLATION

In order to meet all requirements and recommendations concerning the location of all units included in a GMDSS radio installation, it is recommended to establish either a "radio communication work station" in connection with the navigating bridge, or a separate "radio communication office" outside the navigation bridge with remote controls on the bridge. Subsections 3.5 — 3.7 below are to be considered as guidelines; other solutions are equally acceptable as long as the general requirements and recommendations are fulfilled.

(SOLAS 1974, chapter IV, COM/Circ.105 and ISO 8468: 2007 (E))

3.5.1 RADIO COMMUNICATION WORK STATION

.1 The work station shall be located in the aft of the navigation bridge so that the watch officer has an overall view of the navigation while operating the radio equipment.

If the work station and the rest of the navigation bridge are separated by a wall it shall be made of glass or fitted with windows. There shall be no lockable door between the work station and the navigation bridge.

.2 When the work station is being used during night-time, a curtain or other suitable light screen shall be provided in order to avoid dazzling effect from the lights on the navigation bridge.

.3 All mandatory radio equipment (except VHF radio station, [refer to 4.1.1](#)) shall be located in the radio communication work station. Watch receivers (VHF channel 70, DSC 2187,5 kHz, ...) may alternatively be located elsewhere on the navigation bridge.

Note. It is essential that satisfactory watch (clearly audible signals/visual alarms) can be maintained at the position from which the ship is normally navigated.

If it is not possible to maintain satisfactory watch, alarm indicators on MF, MF/HF and RMSS SES equipment, including EGC printer, shall be located outside this work station.

(IMO resolutions A.664(16); A.807(19), Appendix, item 3.2 regarding EGC; A.610(15), A.806(19), annex D, item 8 regarding MF and MF/HF DSC requirements, and SOLAS 1974, regulation IV.12 regarding watchkeeping requirements)

.4 MF/HF RF power amplifiers shall be located in a separate and screened cabinet or room.

Antenna tuners shall, as a general rule, be located outdoors below the antenna.

3.5.2 RADIO COMMUNICATION OFFICE

.1 The radio communication office may be located as required by the shipping company, e.g. in connection to the captain's office. It shall be possible to make public calls and perform general radiocommunications on MF or HF and/or through satellite from the radio communication office, if such calls cannot be made from a suitable location elsewhere on the ship.

.2 All equipment (excluding remote controllers) for written correspondence, as well as telephone services for MF/HF and recognized mobile satellite services, shall be located in the radio communication office.

.3 The remote operation panels for the mandatory equipment shall be located in a central position on the navigation bridge, in order to fulfil the requirements for transmitting distress alerts from the navigation bridge.

Note. Consideration shall also be given to the requirements for navigational safety communication and subsequent distress communications on MF or HF.

When MF/HF DSC controllers are included in the mandatory (basic) or duplicated radio equipment, it shall be possible to conduct distress and safety communications from the navigating position, and the MF/HF DSC controller shall be installed close to this position.

(IMO resolutions A.804(19), as amended, and A.806(19), as amended)

- .4** NAVTEX/EGC watch receivers shall be located on the navigation bridge.
- .5** VHF transceivers with DSC used for navigational safety shall be located at the conning position.

3.6 SHIPS WITH INTEGRATED BRIDGE SYSTEM (IBS)

.1 Ships constructed to satisfy the IBS requirements for single-manned navigating bridge shall have the operation panels for mandatory GMDSS equipment installed as close to the conning position as possible.

.2 Equipment for the transfer of radio telephone calls via radio (VHF, MF or MF/HF) or satellite to other areas of the ship shall be placed close to the other GMDSS equipment near the radio communication work station.

.3 It shall be possible also to operate printed communications (data communications via radio and/or satellite services) from other areas of the ship.

3.7 SHIPS WITH INTEGRATED RADIOCOMMUNICATION SYSTEMS (IRCS)

.1 The IRCS is a system in which individual radiocommunication equipment and installations are used as sensors, i.e. without the need for their own control units, providing outputs to and accepting inputs from the operator's position, called workstations. Such workstations are called "GMDSS workstations" if they include control and monitoring of all equipment and installations provided on a ship for the GMDSS which are also suitable for general radiocommunications. The IRCS workstation shall be installed in a console located in a central position on the navigation bridge.

Transmitting and receiving equipment may be located outside the navigation bridge.

.2 The IRCS shall comprise at least two GMDSS workstations each connected to each GMDSS radiocommunication sensor over a network or connection system. At least two printers shall be installed. All requirements laid down in SOLAS 1974, chapter IV, as amended, shall be fulfilled.

(IMO resolution A.811(19))

4 GMDSS RADIO EQUIPMENT

4.1 LOCATION OF VHF TRANSCEIVERS AND VHF DSC CONTROLLERS

.1 Control of the VHF radiotelephone channels, required for navigational safety shall be located on the navigation bridge at the conning position, and, if necessary, the possibility of radio communication on VHF channels shall be provided from the wings of the navigation bridge. For that purpose, remote control units may be installed on the wings of the navigation bridge or portable VHF radio stations may be used. If the remote control units are installed, the VHF radio station control from the navigation bridge shall have priority over the control from the wings. If such combined equipment is installed, it shall be possible to transmit DSC distress alert from the conning position.

.2 If extra VHF transceivers (without DSC) with channels required for navigational safety are located in the conning position, the mandatory DSC VHF equipment may be at another location on the navigation bridge.

(SOLAS 1974, regulations IV/4.1.5, 4.1.9 and 6.3.)

Note. With regard to the location of equipment and distress alerts, the same requirements also apply to the duplicated DSC VHF equipment for ships in sea areas A3 and A4. The duplicated VHF transceiver can be located in the navigating and maneuvering position instead of in the conning position.

(IMO resolution A.702(17), Appendix, item 2.1.)

In order to conduct periodic power measurements, easy access to the antenna output of each equipment shall be provided.

(SOLAS 1974, regulation IV/15.2 and IMO resolution A.948(23))

4.2 CONTINUOUS WATCH ON DSC VHF CHANNEL 70

Continuous watch on DSC VHF channel 70 can be met by:

- .1 a separate VHF channel 70 watch receiver. It shall not be muted or interrupted when using other radio equipment, or
- .2 a dedicated watch receiver combined with the VHF transceiver. It shall be installed so as to maintain watch even when the VHF equipment is used for telephony, or
- .3 VHF with DSC permanently locked on channel 70 for reception and transmission of DSC calls only. To deal with other correspondence on other channels, an additional VHF transceiver shall be installed, which may be without the DSC function.

(IMO resolutions A.694(17) and A.803(19), as amended; and COM/Circ.105)

4.3 LOCATION OF MF/HF TRANSCEIVERS

.1 If the MF/HF equipment is main or duplicated equipment, it shall be possible to activate the distress alert from the navigation bridge or in the case of passenger vessels, the conning position. If the equipment can be remote operated from other positions on board the ship, priority shall be given to the unit on the navigation bridge.

.2 With regard to an MF installation, the requirement for DSC distress alerts on 2187,5 kHz can also be fulfilled by a remote-activated MF control unit locked on 2187,5 kHz.

Note. DSC on MF is required in sea areas A2, A3 and A4. It shall therefore always be possible to activate the DSC distress alerts on 2187,5 kHz from the navigation bridge.

If combined MF/HF radio equipment is chosen as mandatory GMDSS equipment, it shall also be possible to activate the distress alert from the navigating bridge on the mandatory HF DSC frequencies.

If MF/HF installation is chosen as duplicated equipment for main RMSS SES equipment for sea area A3, there is no requirement for an extra DSC watch receiver.

(SOLAS 1974, regulations IV/9.2, 10.3 and COM/Circ.105)

.3 MF/HF transceivers shall, as a general rule, not be located in the navigation bridge area. Location in such area may, however, be accepted if it can be granted that the EMC requirements are fulfilled. The antenna tuner shall, as a general rule, be located in an outdoor position close to the antenna.

(IMO resolution A. 813(19))

.4 The MF or MF/HF transmitters shall be equipped with instruments or other provisions indicating antenna current or power delivered to the antenna.

(IMO resolutions A.804(19) and A.806(19), Annex, paragraph 6.1, as amended)

.5 If the antenna is not permanently connected to the transmitter, it shall be automatically connected before the distress alert is transmitted.

4.4 WATCHKEEPING RECEIVERS FOR DSC

.1 Depending on the sea area and mandatory radio equipment of the ship, continuous watch is required via separate receivers for DSC channel 70, DSC frequency 2187,5 kHz and HF DSC 8414,5 kHz, as well as minimum one of the frequencies 4207,5 kHz, 6312 kHz, 12577 kHz and 16804,5 kHz.

(SOLAS 1974, regulation IV/12)

.2 The watch receiver for VHF DSC channel 70, MF DSC 2187,5 kHz and HF DSC scanning receiver shall be located so that the alarm is clearly audible and visible all over the navigation bridge.

(IMO resolution A.804(19), as amended; and COM/Circ. 105)

.3 It shall be possible to read the DSC alert messages on the navigation bridge. The printer or display etc. may be common for all DSC watch receivers, provided that messages coming in simultaneously are arranged in queue and printed as soon as the printer/display is ready.

(IMO resolutions A.803(19), A.804(19) and A.806(19), as amended)

.4 Easy access to the antenna connector shall be possible in order to conduct test of the equipment by means of measuring instruments.

N o t e . There is no requirement for a duplicated MF/HF DSC watch receiver for ships in sea areas A3 or A4 when maintenance method "duplication of equipment" is used.

(IMO resolution A.702(17), Appendix, item 2.1)

4.5 WATCHKEEPING ON MF/HF DSC

4.5.1 Continuous watch on the MF DSC distress frequency 2187,5 kHz shall be kept by:

- .1** a separate DSC watch receiver locked on 2187,5 kHz; or
- .2** a dedicated watch receiver combined with the MF radiotelephone.

Note. If DSC operation is desirable on other frequencies, an additional scanning receiver shall be provided. Other frequencies than those used for distress and safety shall not be included in the receiver dedicated for DSC emergency watchkeeping. A single DSC decoder may be used to serve both the DSC watch and the additional scanning receiver.

(COM/Circ. 105)

4.5.2 Continuous watch on MF/HF DSC distress and safety frequencies shall be kept by:

- .1** a separate MF/HF DSC scanning receiver for distress and safety frequencies only; or
- .2** a dedicated MF/HF DSC scanning watch receiver for distress and safety frequencies only combined with the MF/HF radiotelephone.

(COM/Circ. 105)

Note. If DSC operation is desirable on other frequencies, an additional scanning receiver shall be provided. The receiver may be combined with the watch receiver for MF DSC. A single DSC decoder may be used to serve both the DSC distress and safety frequency receiver and the additional scanning receiver only if continuous watch for distress and safety calls can be maintained.

(SOLAS 1974, regulations IV/2.1.2, 10.2.2, 12.1.3 and COM/Circ.105)

4.5.3 Watchkeeping on DSC calling frequencies.

- .1** For watchkeeping on other frequencies than distress and safety frequencies (national and international DSC calling frequencies), a separate scanning receiver shall be provided.

Note. According to SOLAS regulation IV/4.1.8, there is a general requirement for transmitting and receiving general radio communications. Ships in sea areas A2 shall, according to this requirement and according to SOLAS regulation IV/9.3, be able to transmit and receive general radiocommunications on MF or MF/HF telephony or NBDP or recognized mobile satellite service SES. Ships in sea area A2, which are equipped in accordance with the minimum SOLAS requirements (i.e. VHF and MF with DSC), shall be provided with equipment for listening and calling on national and international MF DSC calling frequencies. Alternatively, they may be provided with RMSS SES in order to fulfil the requirements for common radiocommunications.

According to the requirements of IMO resolutions A.804(19) and A.806(19), as amended, it is required that the DSC equipment shall have possibilities as to be used also for general radio communications. For ships in sea areas A3 and A4 the installed equipment (MF/HF or SES) shall also be used for common radiocommunications. In these sea areas the requirements for common radiocommunications are normally fulfilled either by using the HF or recognized mobile satellite service equipment.

(SOLAS 1974, regulations IV/10 and 11)

4.6 RECOGNIZED MOBILE SATELLITE SERVICE SHIP EARTH STATION (RMSS SES)

.1 If the equipment is the main station or duplicated equipment, it shall be possible to activate the distress alert from the navigation bridge.

(SOLAS 1974, regulation IV/10.3)

.2 The SES terminal and telephone equipment, if any, may be placed in a radio communication work station in connection with the navigation bridge or in a separate room (radio communication office).

.3 The SES terminal and/or external printers may also be located elsewhere in the ship.

Note. Attention shall be made to IMO resolution MSC.434(98), item 3.3.2 regarding SES:

"It shall be possible to initiate and make distress calls from the position from which the ship is normally navigated and from at least one other position designated for distress alerting".

The words "one other position designated for distress alerting" are only actual for ships which have defined an additional place (radio communication office) on board to be such "other position". Normally SES is installed in the radio communication work station if it is provided with facilities for conducting distress alerts from the navigation bridge. It is recommended that the SES terminal, including additional equipment, shall be located on the navigation bridge in order to make it possible to conduct follow-up distress communication from this position.

Ships that operate exclusively within range of NAVTEX stations and which can be alerted by individual calling shall not need to carry a separate EGC receiver in order to comply with SOLAS 1974, regulation IV/10.1.1.3.

4.7 CONNECTION OF EXTERNAL LOCATED DATA TERMINAL TO MANDATORY GMDSS RMSS SES

If the ship owner wants to connect the mandatory RMSS SES terminal to the ship's PC-network or to an outside located data terminal, all mandatory GMDSS requirements in accordance with SOLAS 1974 shall always be fulfilled.

In that case, the dedicated printer shall be connected permanently to the output of the mandatory SES terminals printer output. A manually operated and duly marked switch, located near the SES terminal, shall be installed to disconnect the SES terminal from the external equipment.

4.8 EXTRA REQUIREMENTS FOR PASSENGER SHIPS

.1 A distress panel shall be installed at the conning position, i.e. within the range of the maneuvering console in the front of the navigation bridge.

.2 This panel shall contain either one single button which, when pressed, indicates a distress alert using all radiocommunication installation required on board for that purpose; or

.3 one button for each individual radio installation which are installed.

.4 The distress alert panel shall clearly and visually indicate whenever any button or buttons have been pressed. Means shall be provided to prevent inadvertent activation of the button or buttons.

Note. The buttons shall be protected against inadvertent activation by use of a spring loaded lid or cover permanently attached by hinges in order to fulfil the requirement of carrying out "at least two independent actions" when transmitting distress alert. The button or buttons shall be pressed for at least 3 seconds before the alarm is activated.

.5 If the installed satellite EPIRB is used as the secondary (mandatory) means of distress alerting and is not remotely activated, an additional EPIRB (float-free or manually activated) installed on the navigation bridge near the conning position shall be provided.

.6 Information on the ship's position shall be continuously and automatically provided to all relevant radiocommunication equipment to be included in the initial distress alert when the button or buttons on the distress panel is pressed (i.e. interface connection from the ship's EPFS receiver shall be provided, where EPFS is not integrated).

(SOLAS 1974, regulation IV/6.4)

.7 The distress alarm panel is normally included in the distress panel and shall provide visual and aural indication of any distress alert or alerts received on board and shall also indicate through which radiocommunication service the distress alerts have been received.

(SOLAS 1974, regulation IV/6.6)

Note. The following guidelines (table) shall apply with regards to the connection of equipment to the distress panel in order to fulfil the requirements concerning ship-to shore distress alerts by at least two separate and independent means:

Sea areas	Equipment
A1	VHF DSC, EPIRB
A1+A2	VHF DSC, MF DSC, EPIRB
A1+A2+A3 (SES)	VHF DSC, MF DSC, RMSS SES, EPIRB 406
A1+A2+A3 (MF/HF)	VHF DSC, MF/HF DSC, EPIRB
A1+A2+A3+A4	VHF DSC, MF/HF DSC, RMSS SES, EPIRB

Note. Only radio equipment which is required according to SOLAS 1974, chapter IV shall be connected to the distress panel to fulfil the requirement for ship-to-shore distress alerts by means of at least two separate and independent means. The duplicated equipment, as required by IMO resolution A.702(17) for ships in sea areas A3 and A4, is, in general, not required to be connected to the distress panel if it is granted that distress alert can be transmitted from the duplicated equipment in a position close to the position from which the ship is navigated.

4.9 NAVTEX AND EGC RECEIVERS

.1 The printer or display for NAVTEX and EGC receivers shall be located on the navigation bridge. These receivers shall also, as a general rule, have their own permanent installed power supplies with fuses in the power supply circuits ([refer to Section 7](#)). Antenna and antenna cable shall also be permanently installed.

.2 EGC receiver may be included in SES. It is recommended that this EGC receiver shall enable continuous reception of MSI (Maritime Safety Information) messages independent of whether the SES equipment is being used or not.

(SOLAS 1974, regulations IV/7.1.4 and 7.1.5 and IMO resolution A.701(17))

4.10 FLOAT-FREE SATELLITE EPIRB

The satellite float-free EPIRB shall be located/installed so that the following requirements are fulfilled:

.1 The EPIRB shall, with greatest possible probability, float-free. It shall not be caught in railings, superstructure, etc., if the ship sinks.

.2 The EPIRB shall be located so that it may be easily released manually and brought to the survival craft by one person. It shall therefore not be located in a radar mast or any other places which can only be reached by vertical ladder.

(SOLAS 1974, regulations IV/7.1.6, 8.1.5.2, 9.1.3.1, 10.1.4.1, 10.2.3.1 and IMO resolutions A.763(18), A.810(19), as amended, A.812(19) and MSC.471(101))

Note. A float-free satellite EPIRB may also be used as one of the means of distress alert to fulfil functional requirement V/4.1.1 (for transmitting the ship-to-shore distress alerts by at least two separate and independent means from the ship's conning position). Under such conditions the float-free satellite EPIRB shall fulfil the following additional requirements with regards to location/installation:

.3 The EPIRB shall be installed in the vicinity of the navigation bridge, i.e. on the wings of the navigation bridge. Access via vertical ladder shall not be accepted. A location on the top of the wheelhouse may be accepted to fulfil the requirement if EPIRB is accessible by stairs (free hands); or

(SOLAS 1974, regulation IV/7 and COM/Circ. 105)

.4 it may be possible to activate the EPIRB remotely from the bridge. If remote activation is used, it shall be possible to have unobstructed hemispherical line of sight to the satellites from the EPIRB location.

(COM/Circ. 105)

Note. It shall be considered that the main function of the EPIRB is float-free activation. If the additional requirements mentioned above cannot be met without reducing the reliability of the float-free activation, priority shall be given to this requirement. Alternatively, two float-free EPIRBs shall be installed or one float-free and one manually activated.

.5 The EPIRB shall be equipped with a buoyant lanyard suitable for use as a tether to life raft etc. Such buoyant lanyard shall be so arranged as to prevent its being trapped in the ship's structure.

(IMO resolution MSC.471(101))

.6 The EPIRB shall be marked with the ship's call sign, serial number of EPIRB, MMSI number (if applicable), 16 Hex ID, and battery expiry date.

4.11 SEARCH AND RESCUE TRANSPONDERS OR TRANSMITTERS (RADAR SARTs OR AIS SARTs)

.1 The search and rescue transponders or transmitters shall be placed in brackets on both sides of the ship and preferably visible from the navigation bridge. It shall be easy to bring the transponders to the lifeboats or life-rafts. A visible location inside the navigation bridge, close to the outer doors, is recommended.

Alternatively, radar SARTs or AIR-SARTs may be placed in brackets in each survival craft (normally covered lifeboats) if such location permits rapidly replacing them into any survival crafts which may be used in emergency situations.

The radar SARTs or AIR-SARTs shall be provided with a pole or other arrangement compatible with the antenna pocket in the survival craft in order to fulfil the required height of at least 1 metre above sea level.

.2 On ships carrying at least two radar SARTs or AIS-SARTs and equipped with free-fall lifeboats one of them shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so it can be utilized on board and ready for transfer to any of the other survival craft.

(SOLAS 1974, regulation III/6.2.2 and IMO resolution A.802(19))

.3 The radar SARTs or AIS-SARTs shall have waterproof marking with operational instructions, battery expiry date and the ship's name and call sign.

4.12 PORTABLE GMDSS TWO-WAY VHF RADIO-TELEPHONE APPARATUS

.1 Portable GMDSS two-way VHF radio-telephone apparatus including their emergency batteries (primary batteries normally of Lithium type) shall be located in a central and easily accessible position on the navigation bridge. If such equipment is placed in a lockable cabinet, it shall be possible to get easy access to the portable two-way VHF radio-telephone apparatus without the use of tools.

.2 Primary batteries shall be sealed for use only in emergency situations and marked by the supplier with battery expiry date. The battery will be considered as exhausted and used if its seal is broken, and a new battery will be requested during radio survey to provide the 8-hours operation. Use of a new battery shall not be required for operational tests of equipment or for surveys of radio equipment/ship.

.3 If portable VHF radio-telephone apparatus with re-chargeable batteries (secondary batteries) are used for on-board communications, chargers for these batteries shall be provided.

(SOLAS 1974, regulation III/6.2.1 and IMO resolutions A.762(18), A.809(19) and MSC.149(77))

.4 Portable VHF radio-telephone apparatus shall have waterproof marking with the ship's name and call sign. The primary battery shall be marked with expiry date. The radio-telephone apparatus shall have an indicator for the VHF channel used.

4.13 PORTABLE VHF TRANSCEIVERS AND COMMUNICATIONS FROM THE WINGS OF THE NAVIGATION BRIDGE

Requirements for radiocommunications from the wings of the navigation bridge are laid down in the SOLAS Convention. In order to fulfil this requirement, mandatory portable GMDSS VHF can be used ([refer to 4.12](#)). Alternatively, a simplex VHF transceiver (single frequency only) or remote controlled units (RCU) with channel selector, loudspeaker and microphone may be installed in these positions. These RCUs shall be controlled by a VHF installed at the conning position.

(SOLAS 1974, regulation IV/6.3 and COM/Circ.105)

4.14 ON SCENE (AERONAUTICAL) EMERGENCY VHF RADIOCOMMUNICATION EQUIPMENT

.1 All passenger ships shall be provided with means for two-way on-scene radiocommunications for search and rescue purposes using the aeronautical frequencies 121.5 MHz and 123.1 MHz from the navigation bridge.

Such equipment shall be marked with the ships name and call sign. The primary battery shall be marked with expiry date.

(SOLAS 1974, regulation IV/7.2)

.2 Approved equipment may be of a fixed type or a portable type. The equipment shall operate using the frequencies of 121.5 MHz and 123.1 MHz.

(IMO resolution MSC.80(70))

4.15 EQUIPMENT OF ELECTRONIC POSITION FIXING SYSTEM (EPFS)

.1 Information on the ship's position shall be continuously and automatically provided to all relevant radiocommunication equipment. With such connections the ship's position will be included in the initial distress alerts.

(SOLAS 1974, regulations IV/18 and V/19.2.1.6)

.2 Automatic updating of the ship's position into the DSC equipment and RMSS SES equipment shall be possible from the equipment (normally GNSS receiver) installed on board the ship in accordance with regulation V/19.2.1.6. If such automatic updating is interrupted, it is required to enter the ship's position manually into relevant GMDSS equipment at intervals not exceeding 4 hours whenever the ship is under way.

(SOLAS 1974, regulation IV/18)

If such equipment is connected to the GMDSS equipment, it shall be supplied with energy from the reserve source of energy (GMDSS batteries).

(SOLAS 1974, regulation IV/13.8)

4.16 CONNECTIONS OF NAVIGATIONAL SENSORS

4.16.1 EPFS Receiver.

An EPFS receiver shall be connected to the relevant radio communication equipment (DSC controllers, GMDSS satellite equipment) in order to provide information on the ship's position continuously and automatically.

The EPFS receiver shall (similar to the mandatory GMDSS equipment) also be supplied with energy from the reserve source of energy (GMDSS batteries).

4.16.2 Heading sensor.

The GMDSS satellite equipment, which requires automatic antenna adjustment according to ship's heading, shall receive information from a heading sensor.

In this case the heading sensor shall also be supplied with energy from the reserve source of energy (GMDSS batteries).

5 ANTENNA INSTALLATION

5.1 GENERAL

Special attention shall be paid to the location and installation of the different antennas on a ship in order to ensure effective and efficient communication. Incorrect installed antennas will degrade the performance of the radio equipment and will reduce the range of radiocommunications.

When selecting the antenna location, provisions of [5.2 — 5.7](#) shall be followed unless otherwise provided by the equipment manufacturer.

5.2 LOCATION OF VHF ANTENNAS

.1 VHF antennas shall be placed in a position which is as elevated and free as possible, with at least 2 metres horizontal separation from constructions made by conductive materials. Antennas shall be sufficiently separated from potential sources of electromagnetic interference (EMI) such as LED navigation lights to avoid harmful degradation of the receiver performance. Vertical separation can be an effective mitigation measure.

.2 VHF antennas shall have a vertical polarisation.

.3 Where possible, there shall not be more than one antenna on the same level.

.4 The location of mandatory VHF antennas shall be given priority compared with mobile telephone antennas. If they are located on the same level, the distance between them shall be at least 5 metres.

.5 It is recommended to use double screened cable with a maximum loss of 3 dB.

.6 All outdoor installed connectors on the coaxial cables shall be watertight by design in order to give protection against water penetration into the antenna cable.

.7 AIS VHF antenna shall be installed safely away from interfering high-power energy sources like radar and other transmitting radio antennas, preferably at least 3 metres away from and out of the transmitting beam. Antennas shall be sufficiently separated from potential sources of EMI such as LED navigation lights to avoid harmful degradation of the receiver performance. Vertical separation can be an effective mitigation measure.

.8 The AIS VHF antenna shall be mounted directly above or below the ship's primary VHF radiotelephone antenna, with no horizontal separation and with minimum 2 metres vertical separation. If it is located on the same level as other antennas, the distance apart shall be at least 5 metres.

5.3 LOCATION AND CHOICE OF MF/HF ANTENNAS

- .1 The mounting arrangement of the antenna or pedestal shall be constructed in order to withstand the strain from swaying and vibration.
The transmitting whip antenna shall be installed as vertical as possible.
- .2 Wire antennas shall be protected against breakage by having a weak link installed.
- .3 Whip antennas shall be installed vertically and located in an elevated position on the ship at least 1 metre away from conductive structures.
- .4 Attention shall be paid to self-supportive vertical antennas and their swaying radius.
- .5 The recommended minimum length of the antenna is 8 metres.
- .6 The down lead from the base of the antenna to the antenna tuner shall be insulated and run as vertically as possible (not less than 45° towards the horizontal plane).
- .7 The transmitting antenna shall have an insulation resistance to earth which is recommended to be of more than 50 MΩ in dry weather and of no less than 5 MΩ in humid weather (transmitter to be disconnected when measuring).

5.4 LOCATION OF ANTENNA TUNER FOR MF/HF TRANSCEIVER

The antenna tuner shall normally be located externally (outdoor) and as close to the antenna as possible, and so that the down lead wire/cable from the antenna shall be as vertical as possible.

If the antenna tuner is installed in an easily accessible place, measures shall be taken to eliminate the possibility of accidentally touching the antenna wire.

5.5 RECEIVING ANTENNAS

.1 As a general rule, all receivers including watchkeeping receivers shall have their own separate antenna.

.2 Antennas for watchkeeping receivers shall be located as far away as possible from MF/HF transmitting antennas in order to minimise receiver blocking.

5.6 SATELLITE COMMUNICATION ANTENNAS

The installation requirements of recognized mobile satellite service antennas are included in appendices [1](#) and [2](#). In case of multiple ship earth stations operating on adjacent frequency bands, the antennas shall be installed such as to ensure electromagnetic compatibility.

(IMO resolution MSC.434(98))

5.6.1 ANTENNAS FOR VOLUNTARY RADIO EQUIPMENT

Antennas for voluntary radio equipment may be located on deck, provided their use does not interfere with antennas of mandatory radio equipment. When mobile telephone is installed on board ships, special attention shall be made to the facts that some types of mobile telephones (especially GSM telephone equipment) may interfere with the ship's navigational equipment (especially EPFS) and other electronic equipment.

5.7 INSTALLATION OF COAXIAL CABLES

Coaxial cables shall be installed in separate ducting and at least 10 cm away from power supply cables.

Incorrect installation of cables may change their characteristic impedance resulting in power reflections, which will attenuate the RF signal and reduce the efficiency of the radio equipment.

In VHF antennas the reflected power shall not be greater than 10 % of the measured output power.

The following guidelines shall be applied when bending coaxial cables:

- .1** cables shall be crossed at right angles;
- .2** where there is one bend in a permanent fixture the bending radius shall be 5 times the cable outside diameter;
- .3** where there are several bends, the bending radius shall be 10 times the outside diameter of the cable;
- .4** when using flexible cable the bending radius shall be 20 times the outside diameter of the cable.

6 EMC, EARTHING AND SCREENING

6.1 ELECTROMAGNETIC COMPATIBILITY (EMC)

6.1.1 GENERAL REQUIREMENTS

All reasonable and practical steps shall be taken to ensure EMC compatibility between the equipment concerned and other radio communication and navigational equipment carried on board in compliance with the relevant requirements of chapters IV and V of the SOLAS Convention.

In order to avoid interference the following rules apply:

- .1 radio installations shall not cause harmful interference to the other electronic, electrical or navigation systems on board the ship.
- .2 other systems shall not cause harmful interference to the radio installation;
- .3 in order to avoid electromagnetic noise interference it is essential that manufacturers guidelines relating to EMC, screening and earthing are correctly followed.

(SOLAS 1974, regulations IV/6.2.1 and V/17 and IMO resolution A.694(17) and A.813 (19))

6.1.2 INTERFERENCE FROM LED LIGHTING AND OTHER UNINTENTIONAL EMITTERS

Navigation lights and other deck and mast-mounted lighting equipped with light emitting diodes (LEDs) or other systems mounted near antennas, including those certified to recognized EMC standards, have been found to cause debilitating interference to radio receiving equipment without operator awareness. Interference to EPFS receivers is also possible. Periodic EMC checks are therefore essential, especially after installation of LED-equipped lighting or other systems mounted near antennas susceptible to unintentional interference.

Before the initial acceptance of the ship, or after any modifications that may have an impact on radio equipment, the following procedure shall take place to ensure that no harmful EMI is experienced by a radio system. If EMI has been identified, either the identified interferer has to be removed, the interference has to be suppressed or the antenna has to be relocated to an area without harmful interference.

A spectrum analyzer with appropriate pre-amplifier is the most appropriate instrument for detecting, identifying and isolating such interference. The presence of harmful interference is to be measured using the spectrum analyzer on all radio reception antennas of equipment mentioned in SOLAS chapters IV and V fitted, in all maritime frequency bands supported by that equipment. For example, the presence of VHF interference may be accurately measured by connecting a spectrum analyzer with low noise pre-amplifier to a VHF radiotelephone antenna, and checking for noise in the 155 to 165 MHz band. Interference detected in this way could then be isolated by turning power to the suspected interferers on and then off.

Suggested approaches for use by crew, shore-based maintainer or radio surveyors to indicate the presence of harmful interference are as follows:

- .1 The presence of interference to VHF radiotelephones equipped with a received signal strength indicator (RSSI) may be indicated by selecting a free channel and observing that the RSSI level does not change when suspected interfering devices are activated and deactivated. This shall be repeated on several channels across the VHF band.
- .2 If no RSSI is provided, the presence of interference to a VHF radiotelephone may be indicated by deactivating suspected sources of interference, selecting a broadcasting station, and then reactivating those devices and listening for a change in signal quality. This shall be repeated on several channels across the VHF band.
- .3 Harmful interference to shipborne AIS may be indicated by swapping the antenna cable connections between the AIS and VHF radio and then performing the VHF radiotelephone check as set out above. If the cabling configuration does not allow this check to be performed, the VHF radiotelephone check can be performed using a portable VHF

transceiver held near the AIS antenna using the procedures set out in [6.1.2.1](#), noting that this is an even less sensitive approach. All antennas shall be returned to their original configuration, and tested to ensure normal operation.

.4 The presence of interference to GNSS may be indicated by switching the unit to the signal-to-noise (SNR) or integrity display mode, and ensuring SNR levels are not affected when suspected interfering devices are activated or deactivated.

If any interference is suspected, but cannot be eliminated, then a full evaluation using a spectrum analyser, as set out in [6.1.2](#), is advised.

6.1.3 VOLUNTARY RADIO EQUIPMENT

Additional, voluntarily carried non-GMDSS radio equipment may be as follows:

mobile telephone, smartphone or tablet;

radio amateur stations;

Wi-Fi, Bluetooth or similar networks; and

satellite stations.

Operation of such equipment is at the discretion of the master. It is possible to operate such equipment on the navigation bridge provided that the EMC requirements are fulfilled and also navigation and radio communication is not degraded.

6.2 SCREENING OF CABLES

In order to avoid interference the following guidelines shall apply with regards to screening of cables:

- .1 coaxial down leads shall be used for all receiving antennas and the coax screen shall be connected to ground on at least one end;
- .2 all cables within a distance of 2 metres from a transmitting antenna shall be screened and the screen properly earthed in a metal tube or duct.

6.3 EARTHING

Earthing of radio equipment shall be carried out in accordance with appropriate guidelines for earthing in maritime installations required in international standards. Great care shall be taken in order to fulfil the following rules:

- .1** Each unit of radio equipment shall have a separated earth connection.
- .2** MF/HF antenna tuners shall be earthed with either a copper bar or copper band.
- .3** The earthing bar or strap shall be as short as possible, shall not be more than one metre in length, and shall be at least 60 mm in width.
- .4** For earthing straps up to 5 metres in length the width shall be at least 100 mm (may be relevant on board vessels made of wood or synthetic materials).
- .5** It shall be noted that a long earthing strap or bar will act as an antenna and radiate energy.
- .6** Copper bars and straps shall be brazed to the steel bulkhead in order to eliminate corrosion and vibration and make a good earth connection.
- .7** Great care shall be taken when earthing radio equipment on ships with aluminium superstructures in order to avoid galvanic corrosion. An approved and acceptable method of earthing shall be used on such ships.

Note. Insufficient earthing of the power amplifier may lead to capacitive and inductive connections between power cables and cause interference to fire alarms, navigational equipment, inter-communication and other equipment. The transmitter output power may also be reduced.

7 SOURCES OF ENERGY

7.1 MAIN SOURCE OF ELECTRICAL POWER

The main source of electrical power is defined as the ship's mains. All the basic and duplicated equipment shall have an independent power supply from the ship's mains. The battery charging arrangement used to charge any batteries associated with the reserve source of energy shall also have an independent supply from the ship's mains.

It is not advisable to provide the main source of electrical power to the GMDSS communication equipment through the battery charger. If a fault occurs in the battery charger, which renders it defective, it may not be possible to operate the equipment from the ship's mains.

Batteries used in the reserve source of energy will become discharged eventually leading to loss of all power supplies.

Provision shall be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating an interruption of the ship's supply main source of electrical power. It shall not be possible to disable this alarm and indication. It shall only be possible to acknowledge and silence the alarm manually. Both the sound alarm and the visual indication shall reset automatically when the ship's supply main source of electrical power has been restored.

(SOLAS 1974, chapter II and IMO resolution A.702(17), Appendix, item 2.3)

7.2 EMERGENCY SOURCE OF ELECTRICAL POWER

The emergency source of electrical power is defined as the emergency supply and is usually taken from the ship's emergency diesel generator. SOLAS requirements for the emergency source do not apply to cargo ships of less than 500 gross tonnage (gt). All other SOLAS ships constructed on or after 1 July 1986 are required to have an emergency source of electrical power. It shall be observed that the GMDSS requirements concerning the emergency source have been made compulsory only for ships constructed later than 1 February 1995.

The emergency source shall be adequate to operate both the basic and duplicated equipment (if applicable) for the duration as specified in SOLAS chapter II, i.e. 18 hours on cargo ship and for 36 hours on passenger ship.

(SOLAS 1974, regulations II-1/42 and 43)

7.3 RESERVE SOURCE OF ENERGY

.1 The radio reserve source or sources of energy shall meet the requirements set out in regulation IV/13 of SOLAS 1974 and in IMO resolution A.694(17). It usually consists of rechargeable batteries and is used to supply the communication equipment in the event of failure of the ship's mains and emergency source of electrical power.

All passenger ships irrespective of size and cargo ships of 300 gt and upwards shall have a reserve source or sources of energy for the operation of the basic equipment, and the duplicated equipment if such equipment is required.

.2 Only equipment specified in regulation IV/13 of SOLAS 1974 and means of duplication in accordance with regulation IV/15 as applicable may be connected to the reserve source or sources of energy.

.3 Any ship's navigational or other equipment providing to the radio installation an input of information, which is needed to ensure its proper performance, shall be connected to the ship's main and emergency supply and to the reserve source of energy to ensure an uninterruptable input of information.

.4 To determine the electrical load to be supplied by the reserve source or sources of energy for each radio installation required for distress conditions, the following formula shall be applied:

1/2 of the current consumption necessary for transmission;

the current consumption for reception;

the current consumption of any additional loads (lighting, EPFS receiver, heading sensor (if applicable)).

.5 Where the reserve source or sources of energy consists of rechargeable accumulator batteries, the arrangement may consist either of batteries used solely in the absence of ship's supply of electrical energy or of batteries used in an uninterruptable power supply (UPS) configuration.

.6 The changeover from the ship's mains or emergency supply to the reserve source of energy shall be done automatically and in such a manner that both the basic and duplicated communication equipment will be connected simultaneously. Where the changeover is done manually, the switch shall be readily accessible to the radio operator, clearly labelled and located on the navigation bridge. Such changeover shall not require any of the equipment connected to it to be re-initialized manually and shall not result in the loss of data stored in memories.

.7 One bank of batteries may be acceptable if the capacity is sufficient to operate both the basic and duplicated radio equipment simultaneously. The battery capacity shall also be sufficient to operate the heading sensor (if applicable), EPFS and emergency light.

.8 Any fault in the radio batteries or the battery charger shall not affect both the basic and duplicated radio equipment and shall not prevent the operation of the radio equipment from the ship's mains or emergency supply.

.9 The reserve source of energy shall be capable of operating the radio installation for at least:

.1 one (1) hour on ships provided with an emergency supply which is adequate to operate the radiocommunication equipment for a period of 18 hours on cargo ships and 36 hours on passenger ships; or

.2 six (6) hours on ships not provided with an emergency supply as outlined in .1 above.

(SOLAS 1974, regulations IV/13.2, 13.4, 13.5, 13.8 and IMO resolutions A.694(17), A.702(17), Appendix, item 2.3 and COMSAR/Circ.16)

7.4 GMDSS BATTERY CAPACITY

When defining the minimum required battery capacity, consideration shall be given to the expected extreme temperatures for the location of the battery and reduction of its capacity during its lifetime in addition to the loads which are to be connected to it. The temperature range of the battery shall be wider than the expected temperature range of the location where the battery is to be installed.

.1 The batteries shall have enough capacity to operate all the GMDSS radio equipment for the specific times outlined in [7.3.9](#) above. The required capacity shall be calculated prior to the installation of GMDSS batteries.

.2 Where the basic and duplicated radio equipment cannot be operated simultaneously, the battery capacity shall be sufficient to operate the equipment with the highest power consumption.

.3 Where the basic and duplicated radio equipment are connected simultaneously the battery capacity shall be sufficient to meet the average consumption of all connected equipment including any additional loads such as printers, displays etc.

.4 If the capacity requirement of radio batteries is to be maintained over their normal life cycle, an extra 40 % capacity shall be added to the minimum calculated capacity.

.5 When calculating discharge time the following guidelines may be of assistance:

.1 the capacity of a lead acid battery is normally quoted at 20 hours of discharge at an operational temperature of 20 °C;

.2 the capacity at 1 hour discharge is approximately 50 % of the capacity at 20 hours discharge;

.3 the capacity at 6 hours discharge is approximately 80 % of the capacity at 20 hours discharge; and

.4 for batteries other than the lead acid type the capacity at 1 hour discharge is approximately 60 % of the capacity at 10 hours discharge and 6 hours discharge will be approximately 92 % of the capacity at 10 hours discharge.

.6 The capacity of the GMDSS batteries shall be checked at intervals not exceeding 12 months when the ship is not at sea. One method of checking the capacity is to fully discharge and recharge the batteries using rated operation current over a period of 10 hours. Assessment of the charge condition can be made at any time, but it shall be done without significant discharge of the battery when the ship is at sea.

Another method could be to check the capacity by means of a battery tester, e.g. in connection with an annual radio survey.

(SOLAS 1974, regulation IV/13, IMO resolution A.702(17) and COMSAR/Circ. 16)

N o t e . When determining the battery capacity the following shall also be taken into consideration:
the battery is normally not fully charged;
reduction of capacity due to ageing;
reduction of capacity due to high or low temperatures; and
reduction of capacity due to rapid discharge.

7.5 GMDSS BATTERIES

The batteries shall be properly marked with type or construction, rated capacity (capacity for 1 hour discharge C_1 and capacity for 5 hours discharge C_5) and installation date. The marking shall be visible when the batteries have been installed and during their lifetime. A label warning of explosion danger shall be displayed near the installed batteries.

.1 Any type or construction of batteries (e.g. lead acid, alkaline, maintenance free, traction, semi-traction, etc.) may be used as reserve source or sources of energy, taking into consideration the environmental conditions of the location where they are installed.

.2 The battery shall maintain its rated capacity when inclined at any angle up to 22,5° in any orientation.

.3 All battery units shall be securely braced so that they will not be dislocated by movement of the ship.

.4 An instruction manual which contains all necessary specifications of the batteries shall be available on board. The information shall include at least:

.1 capacity and temperature range within which the stated capacity is maintained for the specific operation period i.e. 1 hour or 6 hours;

.2 charging voltage and current limits in order to keep batteries fully charged while preventing overcharging;

.3 actual specific gravity of the electrolyte and/or cell voltages or the voltage of the fully charged battery;

.4 guidelines on how to carry out a controlled discharge test including the location and identification of all breakers (or similar) that are required to be switched off, to ensure that the main and emergency supplies are disconnected from all GMDSS equipment, including the reserve battery charger. Thus, ensuring that the "controlled discharge" is carried out using the reserve battery only;

.5 methods of determining the condition of charge of the battery, e.g. check of specific gravity of electrolyte (acid density) or check of battery cell voltage/battery voltages by using an accurate measuring instrument in accordance with the battery manufacturer's specifications;

.6 requirements for ventilation;

.7 maintenance requirements.

.5 Equipment requiring a lower voltage than the total voltage of the battery bank shall not be connected to a part of the battery bank.

.6 The batteries shall be installed in the upper part of the ship, in an elevated position of at least 100 mm from the deck and as close to the radio equipment as possible.

.7 An outdoor located GMDSS battery case shall be avoided due to considerable temperature variation.

Note. Ideal location for the GMDSS batteries is in a battery room with a constant temperature of approx. 20 °C.

The location shall in general satisfy the manufacturers' specifications with regards to temperature tolerance and environmental strain in accordance with IEC 60945 or other equivalent standards.

.8 Batteries of different types, different cell constructions, different capacities or different manufacturers shall not be mixed in a battery bank.

.9 Batteries of different types and different cell construction shall not be installed in the same location if they can affect each other.

.10 Sufficient ventilation for batteries shall be provided, as required by the battery manufacturer.

.11 Electrical installations including battery chargers, located in the battery room, shall be intrinsically safe.

.12 Sufficient space between batteries or battery banks shall be provided in order to enable inspections and maintenance.

.13 The cabling from the batteries shall be protected against earth and short-circuits and be appropriately fused and installed according to recognized international standards (IEC 60092-101 and IEC 60533). Battery cables shall have sufficient dimensions to prevent voltage reduction at peak current consumption.

(SOLAS 1974, regulation V/13 and COMSAR/Circ.16)

7.6 UNINTERRUPTABLE POWER SUPPLIES (UPS)

A UPS is defined as a device which for a specific period of time supplies continuous power to radio equipment independent of any power failures in the ship's main or emergency source of electric energy. The UPS, installed as the reserve source or sources of energy, shall comply with the load determined in 7.4 and meet the general requirements set out in regulation IV/13 of the SOLAS 1974 and in resolution A.694(17), and shall also comply with the following requirements:

.1 Comprise an automatic charger, complying with requirements set out in SOLAS regulation IV/13.

.2 Comprise rechargeable accumulator batteries, complying with the guidelines regarding automatic chargers.

.3 Provisions shall be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating any failure in the UPS which is not monitored by the alarm and indicators required by the guidelines regarding automatic chargers.

.4 The UPS shall be operational within 5 seconds of switching on.

.5 The UPS shall be so designed and constructed that it is protected against damage resulting from disconnecting the batteries or, with the battery disconnected, short-circuiting the UPS battery connections. If this protection is provided by electronic means it shall automatically reset following removal of the open or short-circuit conditions.

.6 To provide for a failure of a single UPS, a second UPS or means for directly supplying the radio installation from the ship's main or emergency supply shall be installed and be available permanently.

.7 The change-over to the second UPS or to the ship's supplies may be manual or automatic. Such changeover shall not require any of the equipment connected to it to be re-initialized manually and shall not result in the loss of data stored in memories.

(COMSAR/Circ. 16)

N o t e . If the UPS does not fulfil the requirements in accordance with SOLAS regulation IV/13, two separate UPS systems shall be installed: one for the basic radio equipment and one for the duplicated equipment.

The capacity of batteries used in UPS systems is normally stated at a discharge time of 10 hours. When discharging such batteries at shorter time, i.e. 1 hour in accordance with the GMDSS requirements, it will only be possible to utilize approx. 60 % of the battery capacity. It is therefore recommended to dimension such batteries to be one and a half times larger than the total load.

7.7 AUTOMATIC BATTERY CHARGERS

Automatic chargers for GMDSS batteries shall meet the general requirements set out in regulation IV/13 of SOLAS 1974 and IMO resolution A.694(17) and shall also comply with the following requirements:

.1 The charger shall be capable of recharging the completely discharged accumulator batteries to the minimum required capacity within 10 hours.

.2 The charger shall be capable of keeping the batteries appropriately charged as prescribed by the manufacturer for permanent charging.

.3 The supplied voltage and current shall always be within the tolerance limits prescribed by the battery manufacturer, taking into account the environmental temperature of the battery, likely to be experienced in ship. A protection shall be provided against over charging or discharging of batteries from a possible fault in the charger.

.4 The automatic charger shall be provided with a visual indication that it is switched on. An indication of the battery voltage and charge/discharge current shall be available on the navigation bridge.

.5 Provisions shall be made for an aural alarm and visual indication at the position from which the ship is normally navigated, indicating when the charging voltage or current is outside the limits given by the manufacturer. It shall not be possible to disable this alarm and indication. When the alarm comes into operation, it shall only be possible to silence the alarm manually. Both the alarm condition and indication shall reset automatically when normal charging condition has been restored. Failure of the alarm system shall not interrupt the charging or discharging of batteries.

.6 The automatic charger shall be operational within 5 seconds of switching on or after a power supply interruption.

.7 The automatic charger shall be so designed and constructed that it is protected against damage resulting from disconnection the batteries or, with the battery disconnected, short-circuiting the battery connection. If this protection is provided by electronic means it shall automatically reset following removal of the open or short-circuit conditions.

(SOLAS 1974, regulation IV/13.6.1 and COMSAR/Circ.16)

Note. As said in [7.1](#), it is not advisable to provide the main source of electrical power to the GMDSS communication equipment through the battery charger. However, if the battery charger is used to supply parts of the GMDSS installation directly, i.e. the MF/HF transceiver, the capacity of the charger shall be dimensioned for simultaneous supply of connected equipment and maintaining a sufficient charging of the batteries in accordance with SOLAS 1974, regulation IV/13.2.

7.8 PROTECTION OF CIRCUITS FOR ACCUMULATOR BATTERIES

.1 Battery circuits (i.e. the cables from battery case/room) shall be protected against short-circuit and overload. The protection device shall be installed as near as possible to the batteries.

.2 When conductors from the batteries are not protected against short-circuit and overload, they are to be installed so as to be proof against short circuit and earth faults. The requirements for short-circuit protection also apply to charge current circuits.

N o t e . For certain applications it may be necessary to establish measures, which may conflict with these requirements. As an example, screening of battery cables can be required to avoid electro-magnetic interference, e.g. by using single-core insulated cables without screening installed in separate metal pipes which are properly earthed. Special measures shall then be established to reduce the possibility of mechanical damage to the cables.

Equivalent solutions may be accepted, e.g. by using double-screened cables in the battery room with explosion-proof fuses. The inner screen shall be treated according to Ex-rules, but the outer screen can be treated according to what is necessary to achieve good EMC-screening. The outer screen can e.g. be earthed at both ends to protect against High Frequency EMC-fields.

8 CABLING AND WIRING

.1 The cabling and wiring in the radio installation shall be designed so as to prevent electrical interference to radio and navigational equipment.

.2 Cables shall have the correct dimension to prevent voltage reduction to radio equipment when full load. The voltage reduction in copper conductors is calculated as follows:
Voltage drop = $0,035 \times \text{length (m)} \times \text{total load (A)}$ divided by the cross section in squared mm.

.3 In order to reduce interference it is essential to have good separation between signal cables and those cables carrying higher voltages.

.4 All cabling and wiring shall be of a type approved and suitable for use on board ships.

8.1 BATTERY CIRCUITS FUSES AND BREAKERS

.1 Each radio system shall have separate fuses for both AC and DC voltages to which it is connected. AC and DC fuse boards shall be located on the bridge or in close proximity to the bridge.

.2 A single fault in one of the power units shall not affect both the basic and duplicated radio equipment.

.3 All fuses and breakers shall be clearly marked and labelled to clearly indicate which equipment is being protected.

.4 The supply lines from the battery distribution panel to each radio installation of both the basic and the duplication equipment shall be independent and fused separately.

Note. VHF with DSC, a MF/HF DSC transceiver, a NBDP with printer and RMSS SES with a display and printer are each considered as a "radio system".

INMARSAT RECOGNIZED MOBILE SATELLITE SERVICES

1 SATELLITE COMMUNICATION ANTENNAS

1.1 GENERAL PROVISIONS

.1 In general, satellite antennas shall be located so that they have a 360° free view for the satellite at all times. In practice terms this can be difficult to achieve due to shadow sectors from nearby structures.

.2 For Inmarsat-C (omni-directional antenna) and Fleet Safety (BGAN antenna) it is recommended that communication shall be maintained with the satellite down to an elevation of minus 5° in the fore and aft direction and minus 15° in the port and starboard direction.

1.2 SATELLITE COMMUNICATION ANTENNA INSTALLATION

The following guidelines shall be observed in order to fulfil the above recommendations:

.1 The antenna shall be located at the top of the radar mast or on a pedestal, in the radar mast, or on the top deck so that:

for directive antennas: shadows from constructions, especially within a distance of 10 metres, shall be maximum 6°;

for omnidirectional antennas: shadows from constructions, especially within a distance of 1 metre, shall be maximum 2°;

.2 Antennas shall be installed in a readily accessible location;

.3 Satellite antennas shall not be located in an area where they can be damaged by heat and smoke;

.4 The satellite antenna shall not be located on the same plane as the ships' radar antenna;

.5 EPFS antennas shall not be located close to or on the same horizontal plane as the Inmarsat antenna.

.6 Consideration shall be given to installing the Inmarsat antenna on a suitable pedestal.

(IMO resolutions A.663(16), A.698(17), A.807(19), as amended, A.808(19) and MSC.130 (75); and Inmarsat Design and Installation Guidelines)

Note. The mast or pedestal shall be constructed so that vibrations are reduced as much as possible.

1.3 SAFE ANTENNA DISTANCES

The following "safe distance" from Inmarsat antennas to other antennas and to the compass are recommended:

.1 distance to the HF antenna shall be more than 5 metres;

.2 distance to VHF antenna shall be more than 4 metres;

.3 distance to the magnetic compass shall be more than 3 metres.

(The installation manual for the equipment and Inmarsat guidelines)

1.4 INMARSAT-C

1.4.1 ANTENNA

The antenna shall be constructed so as to function up to 15° pitch and roll. In order to obtain this result, the antenna shall be located in such position that no objects or constructions down to 15° below the horizon are degrading the performance of the equipment.

Note. As it may be difficult to fulfil this recommendation in fore-and-aft, the free area in this direction may be reduced to 5° below the horizon.

(IMO resolutions A.663(16) and A.807(19), as amended)

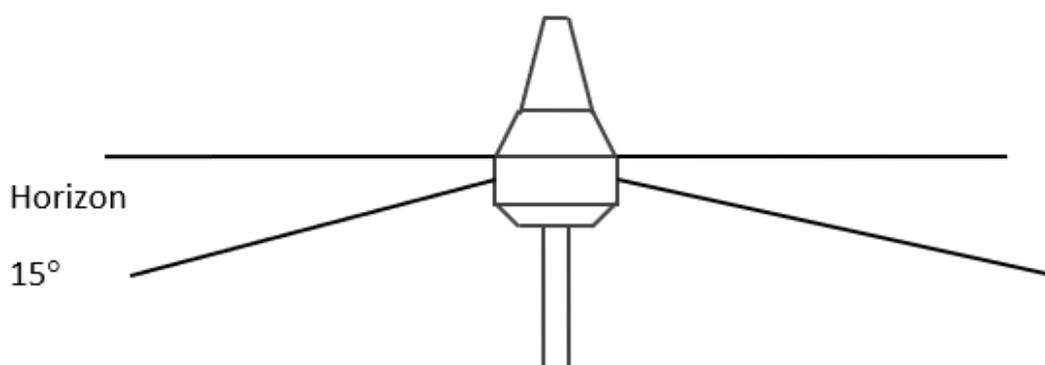


Fig. 1.4.1

Position of SES antenna relative to horizon with reference to longitudinal and lateral tilt (refer also to the note above)

1.4.2 CALCULATION OF DISTANCE TO OBSTRUCTIONS

The Antenna Unit shall be installed with a 360° clear view of the sky. However, minor obstructions such as a mast will not degrade the antenna performance severely, if a separation distance larger than 20 times the diameter of the obstruction is kept.

If two Inmarsat-C antennas are installed, the vertical distance between them shall be at least 1 metre to eliminate interference. The antennas shall be installed such as to ensure electromagnetic compatibility.

1.4.3 ANTENNA CABLE

The manufacturers specifications regarding total attenuation and maximum DC resistance (short-circuit in one end) shall be complied with. Only double-screened cable shall be used.

1.5 FLEET SAFETY

1.5.1 ANTENNAS

Fleet Safety antennas are 2-axis stabilized BGAN antennas varying in size and throughput: FleetBroadband 150, FleetBroadband 250, FleetBroadband 500 and Fleet One.

All antennas rotate 360° horizontally and down to -25° vertically for the FleetBroadband 500 and -60° vertically for the FleetBroadband 150, 250 and Fleet One in pitch and roll, to allow for continuous pointing even in heavy sea conditions. Any obstructions within this volume can cause signal degradation.

1.5.2 OBSTRUCTIONS

The antenna shall be mounted as far away as possible from the ship's radars and high power radio transmitters (including other Inmarsat based systems), because they may compromise the antenna performance. RF emission from radars might actually damage the antenna. Since a radar radiates a fan beam with a horizontal beam width of a few degrees and a vertical beam width of up to +/- 15°, the worst interference can be avoided by mounting the antenna at a different level – meaning that the antenna is installed minimum 15° above or below the radar antenna.

The FleetBroadband antenna may also interfere with other radio systems. Especially other Inmarsat systems and EPFS receivers with poor frequency discrimination are vulnerable to the radiation generated by the FleetBroadband antennas.

1.5.3 ANTENNA CABLE

A coaxial cable for connection between the antenna and terminal is delivered with the system. The manufacturers specifications regarding total attenuation and maximum DC resistance (short-circuit in one end) shall be complied with. The maximum allowed RF-loss in the antenna cable is 20 dB at 1660 MHz. This is to ensure the performance of the system.

IRIDIUM RECOGNIZED MOBILE SATELLITE SERVICES

SYSTEM-SPECIFIC GUIDELINES – OMNIDIRECTIONAL ANTENNA

Personnel installing or servicing the system shall be professionals with technical expertise, properly trained, and likewise authorized. All safety instructions and guidelines in the manufacturer's manual shall be observed.

1 ANTENNA UNIT

The Antenna Unit is designed for outdoor mounting and connected to the Control Unit via a coaxial cable. The Antenna Unit specifications are as described in the manufacturer's manual. In general terms, it will be expected that the Antenna Unit has a downwards-facing "female" connector, while the antenna cable has an upwards-facing "male" connector.

1.1 MOUNTING AND INSTALLATION CONSIDERATIONS

Compass safe distance: the compass safe distance for standard and steering compasses is 0,85 m (2,8 ft) and 0,65 m (2,1 ft) respectively. Observe these distances to prevent interference to a magnetic compass.

The Antenna Unit shall be installed outside the radar main beam. Typically, this is in the order of 20 degrees. To avoid near field antenna coupling, a minimum distance of 2,5 m (8 ft) between the radar antenna and the Antenna Unit shall be obeyed. The figure below illustrates how the Antenna Unit shall be mounted to avoid interference from radars. However, depending on the specific radar frequency and power level, the separation distance between the radar and the Antenna Unit may be reduced, with no impact on the antenna performance. The performance of the Antenna Unit shall be validated when the system is installed.

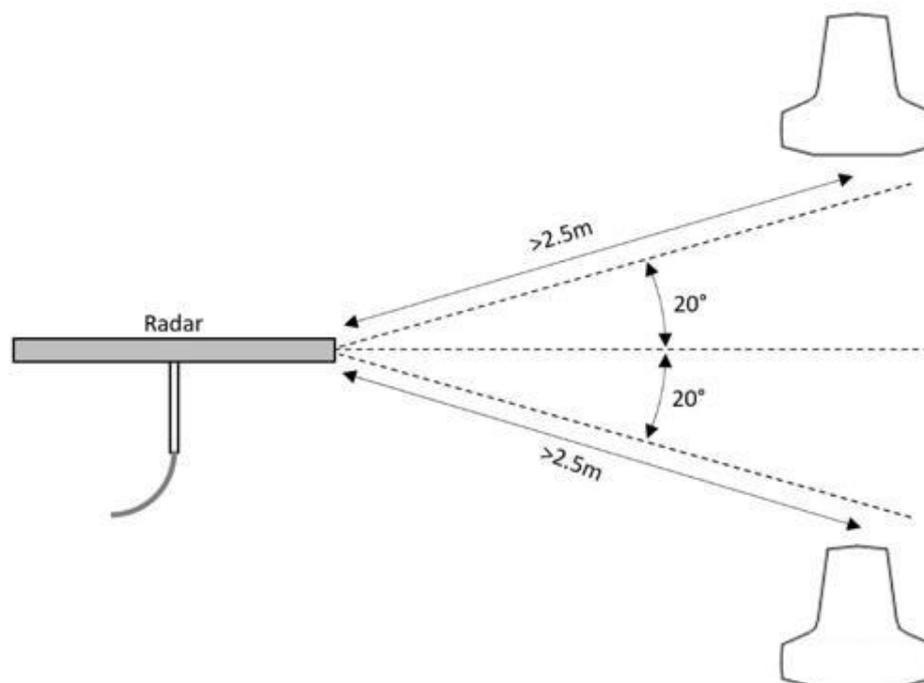


Fig. 1.1-1

Position of SES antenna units relative to radar antenna

The Antenna Unit shall be mounted minimum 1 m from MF-HF, VHF, and UHF transmitting antennas.

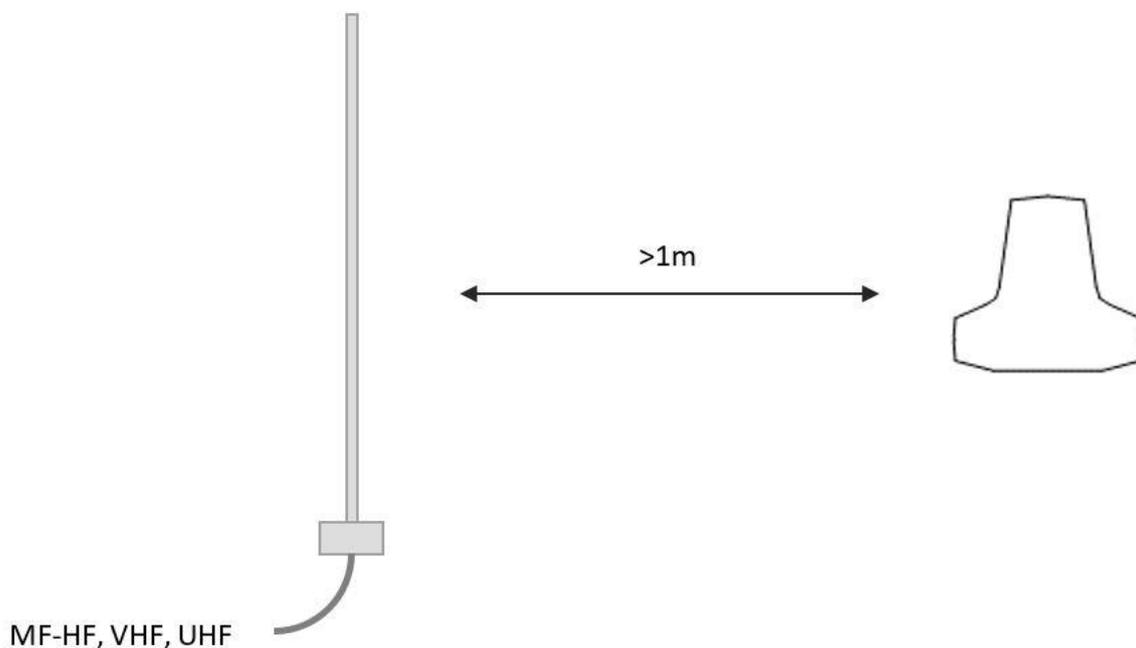


Fig. 1.1-2
Position of SES antenna unit relative to MF-HF, VHF and UHF transmitting antennas

The Antenna Unit shall be installed with a 360° clear view of the sky. However, minor obstructions such as a mast will not degrade the antenna performance severely, if a separation distance larger than 15 times the diameter of the obstruction is kept.



Fig. 1.1-3
Position of SES antenna unit relative to obstruction

The equipment shall be installed and mounted in accordance with the manufacturer's requirements in the technical documentation. If two Iridium antennas are installed, the antennas shall be installed such as to ensure electromagnetic compatibility.

LIST OF IMO RESOLUTIONS AND CIRCULARS, ITU RECOMMENDATIONS, IEC AND ISO STANDARDS, OTHER EXTERNAL DOCUMENTS APPLICABLE IN THE PERFORMANCE OF WORK ON TYPE APPROVAL OF SHIP RADIO EQUIPMENT

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
Radio Equipment				
04120000MK	VHF radio capable of transmitting and receiving DSC and radiotelephony IV/7.1.1	SOLAS 74 Reg. IV/7.1.1, 2 SOLAS 74 Reg. X/3 A.694(17) A.803(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 A.524(13) IMO MSC.68(68) IMO MSC/Circ.862 IMO MSC.1/Circ.1460 rev.3 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.489-2 (1995) ITU-R M.493-15 (2019) ITU-R M.541-10 (2015)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-3, Ed. 2.0 (2017-10) IEC 61097-7, Ed. 1.1 (2018-01) IEC 61162 series: -IEC 61162-1 Ed. 5.0 (2016-08) -IEC 61162-2 Ed. 1.0 (1998-09) -IEC 61162-3 Ed. 1.2 (2014-07) -IEC 61162-450 Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04120100MK	VHF DSC watch-keeping receiver IV/7.1.2	SOLAS 74 Reg. IV/7.1.2 SOLAS 74 Reg. X/3 A.694(17) A.803(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.489-2 (1995) ITU-R M.493-15 (2019) ITU-R M.541-10 (2015)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-8, Ed. 1.0 (1998-09) IEC 61097-3, Ed. 2.0 (2017-10) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04130000MK	MF radio capable of transmitting and receiving DSC and radiotelephony IV/9.1.1	SOLAS 74 Reg. IV/9.1.1, 2 SOLAS 74 Reg. X/3 A.694(17) A.804(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO MSC/Circ.862 IMO COMSAR/Circ.32 IMO MSC.68(68) Radio Regulations 2020 ITU-R M.493-15 (2019) ITU-R M.541-10 (2015) ITU-R M.1173-1 (2012)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-8, Ed. 1.0 (1998-09) IEC 61097-9, Ed. 1.0 (1997-11) IEC 61097-3, Ed. 2.0 (2017-10) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04130100MK	MF DSC watch-keeping receiver IV/9.1.2	SOLAS 74 Reg. IV/9.1.2 SOLAS 74 Reg. X/3 A.694(17) A.804(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.493-15 (2019) ITU-R M.541-10 (2015) ITU-R M.1173-1 (2012)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-8, Ed. 1.0 (1998-09) IEC 61097-3, Ed. 2.0 (2017-10) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04140000MK	MF/HF radio capable of transmitting and receiving DSC NBDP and radiotelephony IV/10.2.1	SOLAS 74 Reg. IV/10.2.1, 2 SOLAS 74 Reg. X/3 A.694(17) A.806(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO MSC/Circ.862 IMO COMSAR/Circ.32 IMO MSC.68(68) Radio Regulations 2020 ITU-R M.493-15 (2019) ITU-R M.541-10 (2015) ITU-R M.476-5 (1995) ITU-R M.492-6 (1995) ITU-R M.625-4 (2012) ITU-R M.1173-1 (2012)	IEC 60945 series: - IEC 60945 Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-8, Ed. 1.0 (1998-09) IEC 61097-9, Ed. 1.0 (1997-11) IEC 61097-3, Ed. 2.0 (2017-10) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) ETS 300 067 (1993-10)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04140100MK	MF/HF DSC scanning watch keeping receiver IV/10.2.2	SOLAS 74 Reg. IV/10.2.2 SOLAS 74 Reg. X/3 A.694(17) A.806(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.493-15 (2019) ITU-R M.541-10 (2015) ITU-R M.1173-1 (2012)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-8, Ed. 1.0 (1998-09) IEC 61097-3, Ed. 2.0 (2017-10) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04150000MK	Inmarsat-C SES IV/10.1.1	SOLAS 74 Reg. IV/10.1.1 SOLAS 74 Reg. X/3 A.570(14) A.664(16) A.694(17) A.807(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14. MSC.306(87) MSC.431(98) MSC.302(87) IMO MSC/Circ.862 IMO COMSAR/Circ.32	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-4, Ed. 3.2 (2019-06) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) IEC 62923-1, Ed. 1.0 (2018-08) IEC 62923-2, Ed. 1.0 (2018-08)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04150300MK	A ship earth station for use in the GMDSS IV/10.1.1	SOLAS 74 Reg. IV/10/ amendment MSC.436(99) A.694(17) A.813(19) A.1001(25) MSC.434(98) MSC.36(63)-(1994 HSC Code) 14/ amendment MSC.438(99) MSC.97(73)-(2000 HSC Code) 14/ amendment MSC.439(99) MSC.191(79) MSC.302(87) IMO MSC/Circ.862 IMO COMSAR/Circ.32	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-16, Ed. 1.0 (2019-08) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) IEC 62288, Ed. 2.0 (2014-07) IEC 62923-1, Ed. 1.0 (2018-08) IEC 62923-2, Ed. 1.0 (2018-08)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04180000MK	NAVTEX receiver IV/7.1.4	SOLAS 74 Reg. IV/7 A.694(17) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 MSC.148(77) MSC.430(98) MSC.302(87) IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.540-2 (1990) ITU-R M.625-4 (2012)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-6, Ed. 2.2 (2019-07) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) IEC 62923-1, Ed. 1.0 (2018-08) IEC 62923-2, Ed. 1.0 (2018-08)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04190000MK	EGC receiver IV/7.1.5	SOLAS 74 Reg. IV/7.1.5 A.694(17) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 MSC.306(87) MSC.431(98) MSC.302(87) IMO COMSAR/Circ.32	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-4, Ed. 3.2 (2019-06) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) IEC 62923-1, Ed. 1.0 (2018-08) IEC 62923-2, Ed. 1.0 (2018-08)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04140010MK	HF marine safety information (MSI) equipment (HF NBDP receiver) IV/7.1.5	SOLAS 74 Reg. IV/7.1.5 A.694(17) A.700(17) A.806(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.492-6 (1995) ITU-R M.540-2 (1990) ITU-R M.625-4 (2012) ITU-R M.688 (1990)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-9, Ed. 1.0 (1997-11) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05) ETS 300 067 (1993-10)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04220100MK	Search and rescue locating devices (SRLD): AIS-SART III/6.2.2 IV/7.1.3	SOLAS 74 Reg. III/6 SOLAS 74 Reg. III/26 SOLAS 74 Reg. IV/7.1.3 MSC.246(83) ITU-R M.1371-5 (2014)	IEC 60945 series: - IEC 60945 Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-14, Ed. 1.0 (2010-04)	SOLAS 74 Reg. III/4 SOLAS 74 Reg. IV/14
0430000MK	Integrated communication system (ICS)	A.694(17) A.811(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 MSC.191(79) MSC.302(87)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 62940 Ed. 1.0 (2016-10) IEC 62288 Ed. 2.0 (2014-07) IEC 61162 series: - IEC 61162-1, Ed. 5.0 (2016-08) - IEC 61162-2, Ed. 1.0 (1998-09) - IEC 61162-3, Ed. 1.2 (2014-07) - IEC 61162-450, Ed. 2.0 (2018-05)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04160000MK	406 MHz EPIRB (COSPAS-SARSAT) installed before 1 July 2022 IV/7.1.6	SOLAS 74 Reg. IV/7.1.6 A.662(16) A.694(17) A.696(17) A.810(19) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO MSC/Circ.862 IMO COMSAR/Circ.32 Radio Regulations 2020 ITU-R M.633-4 (2010) ITU-R M.690-3 (2015)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-2, Ed. 3.0 (2008-03)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04160000MK	406 MHz EPIRB (COSPAS-SARSAT) installed on 1 July 2022 or after IV/7.1.6	SOLAS 74 Reg. IV/7.1.6 A.662(16) A.694(17) A.696(17) MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14 IMO MSC/Circ.862 IMO COMSAR/Circ.32 MSC.471(101) Radio Regulations 2020 ITU-R M.633-4 (2010) ITU-R M.690-3 (2015) ITU-R M.1371-5 (2014)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-2, Ed. 4.0 (2021-06)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04230000MK	Two-way VHF radiotelephone apparatus III/6.2.1	A.694(17) MSC.149(77) Radio Regulations 2020 ITU-R M.489-2 (1995)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-12, Ed. 1.1 (2017-07)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04230001MK	Fixed survival craft two-way VHF radiotelephone apparatus III/6.2.1	A.694(17) A.809(19) Radio Regulations 2020 ITU-R M.489-2 (1995)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 ETSI EN 301 466 V1.2.1 (2015-12)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

RS nomenclature code	Item designation, SOLAS 74 regulation which determines ship's equipment	SOLAS 74 regulations, IMO resolutions and circulars, ITU recommendations which the item shall comply with	List of documents in the field of standardization and other documents, whose application, on a voluntary basis, provides compliance with the requirements that the item shall meet (testing standards)	Requirements for type approval of the item
04021200MK	Aeronautical two way VHF radio telephone apparatus IV/7.2	SOLAS 74 Reg. IV/7.2 A.694(17) MSC.80(70) IMO COMSAR/Circ.32 Radio Regulations 2020 ICAO Convention on International Civil Aviation, annex 10	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 ETSI EN 301 688 V1.2.1 (2016-03)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14
04220000MK	Search and rescue locating devices (SRLD): Radar SART IV/7.1.3 III/6.2.2	SOLAS 74 Reg. IV/7.1.3 A.694(17) A.802(19) ITU-R M.628-5 (2012)	IEC 60945 series: - IEC 60945, Ed. 4.0/Cor.1 (2008-04) - GOST R IEC 60945-2007 IEC 61097-1, Ed. 2.0 (2007-06)	SOLAS 74 Reg. IV/14 SOLAS 74 Reg. X/3 MSC.36(63)-(1994 HSC Code) 14 MSC.97(73)-(2000 HSC Code) 14

DEFINITIONS AND ABBREVIATIONS

1 DEFINITIONS

A dedicated distress button is a unique clearly indicated button physically separated from the controls (buttons, keys of keyboards) used for normal operation of equipment and not intended for any other purposes except distress alert initiation. This button shall be red in colour and marked "DISTRESS". If the button is protected from the unintended activation by opaque cap or cover, an inscription "DISTRESS" shall be also made on it.

AIS-SART means a search and rescue locating device: AIS search and rescue transmitter.

Bridge-to-bridge communications are safety communications between ships from the position from which the ships are normally navigated.

Continuous watch means that the radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the radio equipment is under periodical maintenance, repair or checks.

Enhanced Group Call (EGC) means the system for broadcasting of urgency, distress and safety messages through a recognized mobile satellite service.

Fishing vessel means a vessel used directly for catching or for catching and processing the catch (fish, whales, seals, walrus or other living resources of the sea).

General radio communication means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.

Interference means the influence of unwanted energy on reception in the radio communication system resulting in impaired quality, errors or loss of information that could have been avoided in the absence of influence of such unwanted energy.

International NAVTEX Service means coordinated broadcast and automatic reception on 518 kHz of maritime safety information using narrow-band direct-printing (NBDP) telegraphy in English.

Interruption (termination) of the distress alert initiation at any time means the interruption of the retry of the distress alert. This action shall not interrupt the distress alert transmission or distress message during its transmission but shall preclude the retry of the distress alert.

Locating is the finding of ships, aircraft, units or persons in distress.

Maritime safety information (MSI) means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages transmitted to ships.

MF radio installation — MF radiotelephone station with DSC and a DSC radio watch receiver on a frequency of 2187,5 kHz.

MF/HF radio installation — MF/HF radiotelephone station with DSC, NBDP and MF/HF radio watch receiver.

Mobile service means a radiocommunication service between mobile and land stations or between mobile stations.

Position from which the ship is normally navigated is navigation bridge.

Radio Regulations are the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time.

Recognized mobile satellite service (RMSS) is any service which operates through a satellite system and is recognized by IMO for use in the global maritime distress and safety system (GMDSS).

VHF radio installation — VHF radiotelephone station with DSC and a DSC radio watch receiver on channel 70.

2 ABBREVIATIONS

- DSC** — digital selective call;
EGC — enhanced group call;
EMC — electromagnetic compatibility;
EMI — electromagnetic interference;
EPFS — electronic positioning fixing system that can be either global GNSS-based or local, covering a certain area;
EPIRB — emergency position-indicating radio beacon for marine use (COSPAS-SARSAT systems);
GNSS — global navigation satellite system;
MSI — maritime safety information;
PS — performance standards;
Radar SART — search and rescue locating device: radar transponder;
RMSS SES — Recognized Mobile Satellite Service Ship Earth Station;
SOLAS 74 — International Convention for the Safety of Life at Sea, 1974, as amended.
- Frequencies:*
- MF** — medium frequencies, 300 — 3000 kHz;
HF — high frequencies, 3 — 30 MHz;
VHF — very high frequencies, 30 — 300 MHz;
UHF — ultrahigh frequencies, 300 — 3000 MHz.

Russian Maritime Register of Shipping

**Guidelines on the Application of Provisions of Chapter IV
of the International Convention for the Safety of Life at Sea
(SOLAS 74)**

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