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Ministero dello Sviluppo Economico

DIREZIONE GENERALE PER LE TECNOLOGIE DELLE COMUNICAZIONI E LA SICUREZZA INFORMATICA - ISTITUTO SUPERIORE DELLE COMUNICAZIONI E DELLE TECNOLOGIE DELL' INFORMAZIONE
DIVISIONE VI – *Controllo emissioni radioelettriche. Autorità di sorveglianza sugli apparati radio*

ELENCO INDIRIZZI - ALLEGATO

FAS:37573

Oggetto: interferenza elettromagnetica (EMI) dei sistemi di illuminazione a diodi ad emissione luminosa (LED) e di altre fonti di EMI verso i sistemi di comunicazione radio a bordo delle navi

Si fa riferimento alla segnalazione pervenuta dalla società Wamblee, con nota T01-260522 del 26/5/2022, allegata, (**All. 1**) con cui si porta all'attenzione la situazione di interferenza elettromagnetica (EMI) dei sistemi di illuminazione a diodi ad emissione luminosa (LED) e di altre fonti di EMI verso i sistemi di comunicazione radio a bordo delle navi.

Da un'analisi svolta, per quanto di limitata competenza, si è potuto verificare che tale tematica è tutt'ora in discussione presso diversi tavoli di organismi internazionali quali ITU (ITU-R WPs 1A, 4C e 5B), IMO (MSC e NCSR), CEPT (FM) e IEC sotto svariati aspetti.

In ambito *Joint IMO/ITU Experts Group*, si sta delineando la revisione della COMSAR/Circ.32, recante *Harmonization of GMDSS requirements for radio installations on board SOLAS ship,* considerando che tale modifica possa, "*al momento, fornire sufficienti informazioni e linee guida per l'individuare ed evitare le interferenze causate dai sistemi di illuminazione a diodi ad emissione luminosa (LED)"* (cfr. documento NCSR 9-12del 16-11-2021, allegato- **All. 2**)

A tale scopo, come riportato all'annesso n. 3 del citato documento, la circolare richiamata dovrebbe essere integrata con un opportuno paragrafo 6.1.2 *Interference from LED lighting and other unintentional emitters* con il quale vengono suggeriti criteri per individuare la presenza di interferenze dannose.

Secondo il processo decisionale dell'approvazione ed applicazione delle circolari IMO, la COMSAR/Circ.32 sarà discussa in ambito NCSR (*Navigation, Communications and Search and Rescue*) nel prossimo incontro del 21-30 giugno 2022 e, ad ogni modo, potrà essere effettiva dal 1 gennaio 2024.

Si precisa che agli incontri dei richiamato NCSR partecipa il *MIMS - Comando Generale delle Capitanerie di Porto*, in copia alla presente, che, nel corso della preveniva preparazione nazionale, acquisisce -ove necessario- il parere di questa Amministrazione per quanto di competenza.

Premesso quanto sopra e nelle more della risoluzione della problematica nella sua interezza nei diversi tavoli internazionali sopra richiamati, si invitano le Società in indirizzo e la DGSCERP, attraverso i suoi Ispettori radio, in sede di visite ispettive a tenere in debita considerazione tale aspetto, in quanto come comunicato dalla società Wamblee *"…. tali interferenze riducono fortemente la capacità di comunicazioni radio, in particolare l'impossibilità di ricevere segnali radio a bordo anche se provenienti da distanze inferiori alle 2 miglia.*".

Gli Uffici, qui per conoscenza, potranno, cortesemente, seguire gli sviluppi nell'ambito dei tavoli di rispettiva competenza.

IL DIRETTORE GENERALE
(dr.ssa Eva Spina)

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Eva Spina
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Documento sottoscritto con firma digitale ai sensi del D.Lgs. n. 82 del 7 marzo 2005 e s.m.i.

Allegato: 1 – Nota T01-260522 del 26/5/2022
2- NCSR 9-12 del 16 Novembre 2021

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ALLEGATO

ELENCO INDIRIZZI

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Spett.le MISE
Divisione VI - Controllo emissioni radioelettriche. Autorità di sorveglianza sugli apparati radio

Avv. Giacinto Padovani

Viale America, 201 144 Roma

Faenza, 26 Maggio 2022
Rif. T01-260522
Oggetto : Segnalazione

Egregi Signori

La società Wamblee progetta e realizza da oltre 10 anni apparati radioelettrici in diversi settori quali marittimo e aeronautico.

Desidero portarle alla Sua attenzione una situazione di potenziale interferenza radioelettrica da noi riscontrata in diverse occasioni su natanti dotati di lampade a LED o inverter.

A seguito di alcune segnalazioni di nostri clienti in merito alla difficoltà nell'utilizzo di apparati radioelettrici (anche di emergenza, come ad esempio apparati MOB AIS o apparati VHF e HF), siamo intervenuti per analizzare le cause di queste interferenze che si estendevano da pochi KHz fino ad oltre 200 MHz.

Come da immagine allegata, abbiamo riscontrato in diverse lampade LED contrassegnate CE una elevata emissione EMI nello spettro radioelettrico HF e VHF; l'immagine mostra una serie di segnali ricevuti ad una distanza di 1 metro dalla fonte interferente, utilizzando una antenna per EMI con guadagno unitario.

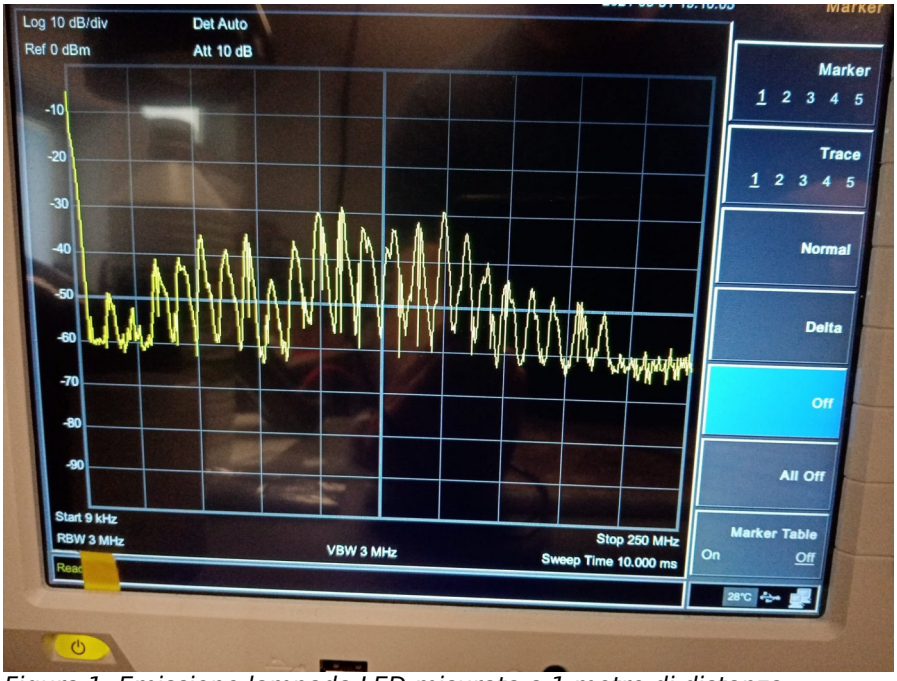

Figura 1: Emissione lampada LED misurata a 1 metro di distanza

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L'effetto pratico di queste interferenze è quello di ridurre fortemente la capacità di comunicazione radio , in particolare l'impossibilità di ricevere segnali radio a bordo anche se provenienti da distanze inferiori alle 2 miglia.

Molte di questi natanti, come ad esempio quelli utilizzati per la pesca professionale in sud Italia e Sardegna, mostrano queste tipologie di interferenze che, agendo sulle bande riservate a diversi servizi primari (come HF marittimo, VHF aeronautico e nautico), ne impediscono il corretto utilizzo oltre che cagionare gravi rischi di disservizio.

Pertanto con la presente desidero segnalare il problema riscontrato, certi che il Suo ufficio procederà ad analizzare e a porre adeguati correttivi a questa situazione.

A disposizione per qualsiasi chiarimento.

Distinti Saluti.

Daniele Banfi, Amm. Unico
Wamblee s.r.l.

Firmato digitalmente da: BANFI DANIELE
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INTERNATIONAL MARITIME ORGANIZATION

E

SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE
9th session
Agenda item 12

NCSR 9/12
16 November 2021
Original: ENGLISH
Pre-session public release: ☒

RESPONSE TO MATTERS RELATED TO THE ITU-R STUDY GROUPS AND ITU WORLD RADIOCOMMUNICATION CONFERENCE

Report of the seventeenth meeting of the Joint IMO/ITU Experts Group on Maritime Radiocommunication Matters

Including information on:

Development of revisions and amendments to existing instruments relating to the amendments to the 1974 SOLAS Convention for modernization of the GMDSS (agenda item 9)

Note by the Secretariat

SUMMARY

Executive summary:	This document contains in the annex the report of the seventeenth meeting of the Joint IMO/ITU Experts Group on Maritime Radiocommunication Matters, which was held remotely from 1 to 5 November 2021.
Strategic direction, if applicable:	2
Output:	2.1 and 2.10
Action to be taken:	Paragraph 2
Related documents:	NCSR 8/14/1, NCSR 8/6/1, NCSR 8/6/7, NCSR 8/6/16, NCSR 8/6/20, NCSR 8/7, NCSR 8/7/2, NCSR 8/7/3, NCSR 8/7/4, NCSR 8/7/5, NCSR 8/7/9, NCSR 8/7/10; Circular Letter No.4423 and other documents and circulars, as specified in the attached report

Introduction

1 The report of the seventeenth meeting of the Joint IMO/ITU Experts Group on Maritime Radiocommunication Matters, held remotely from Monday, 1 to Friday, 5 November 2021, is given in the annex.

Action requested of the Sub-Committee

2 The Sub-Committee is invited to:

Agenda item 9:

.1 approve the draft revision of COMSAR/Circ.32 on *Harmonization of GMDSS requirements for radio installations on board SOLAS ships*, for dissemination as COMSAR.1/Circ.32/Rev.1 (paragraphs 6.1 to 6.4, and annex 3);

.2 agree to the consequential revocation of circulars COMSAR/Circ.16, COMSAR/Circ.17, COM/Circ.110, COM/Circ.110/Corr.1 and COM/Circ.117, as from the date of entry into force of the related amendments to the 1974 SOLAS Convention concerning the modernization of the GMDSS (paragraph 6.4);

.3 approve the draft revision of COMSAR/Circ.33 on *GMDSS coast station operator's certificate (CSOC) model course*, for dissemination as COMSAR.1/Circ.33/Rev.1, and agree to the new title of the circular (i.e. GMDSS Coast Station Operator's Certificate (CSOC) syllabus) (paragraphs 6.5 to 6.8, and annex 4);

.4 agree to the draft MSC circular on GMDSS operating guidance for ships in distress situations, superseding COM/Circ.108 (paragraphs 6.9 to 6.12, and annex 5);

.5 consider instructing the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue to effect any necessary consequential amendments to section 2 of the IAMSAR Manual, Volume III, when preparing amendments to its next edition, to update references to the GMDSS operating guidance for ships in distress situations (paragraph 6.13.1);

.6 consider requesting the Secretariat to effect any necessary consequential amendments to the GMDSS Manual and the GMDSS Operating Guidance Card (IMO publication No. I-969 E), when preparing their next editions, to update references to the GMDSS operating guidance for ships in distress situations (paragraph 6.13.2);

Agenda item 12:

.7 consider the draft IMO position on relevant WRC-23 agenda items concerning matters relating to maritime services and finalize it, with the exception of agenda item 10, with a view to approval by MSC 106 and subsequent submission to the ITU's Conference Preparatory Meeting for WRC-23 (CPM 23-2) (paragraphs 4.4 to 4.29 and annex 1);

.8 consider instructing EG 18 to develop the draft IMO position on WRC-23 agenda item 10 for consideration by NCSR 10 when finalizing the IMO position (paragraph 4.30);

.9 consider, if necessary due to the programme of IMO meetings in 2023, requesting MSC 106 to authorize NCSR 10 to finalize the IMO position and submit it directly to WRC-23 (paragraph 4.30);

.10 note the preliminary consideration of a liaison statement from ITU-R Working Party 5B (NCSR 9/12/3)* on issues concerning WRC-23 agenda item 1.11; and consider and finalize the draft reply liaison statement prepared by the Group (paragraphs 4.31 to 4.33 and annex 2);

.11 note the comments and proposals on electromagnetic interference (EMI) effects of light emitting diode (LED) lighting systems and other sources of EMI on board vessels, and take any necessary actions, as appropriate (paragraphs 7.1 to 7.4);

.12 note the comments and proposals on the proposed revisions to Recommendation ITU-R M.1371-5 on *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band*, and take any necessary actions, as appropriate (paragraphs 8.1 to 8.7);

.13 endorse the holding of the eighteenth meeting of the Group from 5 to 9 December 2022, at IMO Headquarters in London (paragraph 9.7); and

.14 note the report in general.

***

* Referred to as document IMO/ITU EG 17/3 in the annex.

ANNEX

SEVENTEENTH MEETING OF THE JOINT IMO/ITU EXPERTS GROUP ON MARITIME RADIOCOMMUNICATION MATTERS

REPORT TO THE NCSR SUB-COMMITTEE AND ITU

1 INTRODUCTION

1.1 The seventeenth meeting of the Joint IMO/ITU Experts Group on Maritime Radiocommunication Matters (the Group) was held remotely, from Monday, 1 to Friday, 5 November 2021, chaired by Mr. C. Rissone (France).

1.2 The Group was attended by delegations from the following Member States:

ARGENTINA
AUSTRALIA
CANADA
CHINA
DENMARK
FINLAND
FRANCE
GERMANY
IRELAND
JAPAN
MARSHALL ISLANDS
NETHERLANDS
NEW ZEALAND
NORWAY
PAKISTAN
PAPUA NEW GUINEA
PERU
REPUBLIC OF KOREA
ROMANIA
SOUTH AFRICA
SPAIN
TURKEY
UNITED KINGDOM
UNITED STATES
VIET NAM

1.3 The Group was also attended by representatives from the following United Nations specialized agency:

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

by observers from the following intergovernmental organizations:

INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)
INTERNATIONAL MOBILE SATELLITE ORGANIZATION (IMSO)

and from the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
INTERNATIONAL ASSOCIATION OF MARINE AIDS TO NAVIGATION AND LIGHTHOUSE AUTHORITIES (IALA)
COMITÉ INTERNATIONAL RADIO-MARITIME (CIRM)

2 ADOPTION OF THE AGENDA (AGENDA ITEM 1)

2.1 The Group noted that the Maritime Safety Committee (MSC), at its 102nd session (13 to 22 May 2020), authorized the convening of this meeting, and the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR), at its eighth session (19 to 23 April 2021), approved the terms of reference which were made available in Circular Letter No.4423.

2.2 The Group agreed on the provisional agenda for the meeting, as set out in document MO/ITU EG 17/1.

3 BRIEFING ON THE OUTCOME OF RELEVANT IMO AND ITU BODIES (AGENDA ITEM 2)

Outcome of NCSR 8 and MSC 104

3.1 The Group noted the information provided by the IMO Secretariat (IMO/ITU EG 17/2) on the outcome of NCSR 8 with regard to issues of relevance to the Group.

3.2 In addition, the Group noted the outcome of MSC 104 (4 to 8 October 2021), concerning the approval of draft amendments to the 1974 SOLAS Convention, the 1988 SOLAS Protocol and the 1994 and 2000 HSC Codes in connection to the modernization of the Global Maritime Distress and Safety System (GMDSS) and the approval, in principle, of consequential amendments to other existing instruments, with a view to final approval and/or adoption at MSC 105, as appropriate (MSC 104/18, paragraphs 12.5 to 12.10).

Outcome of ITU-R Working Parties 1A, 4C and 5B

3.3 The Group noted the information provided by the ITU Secretariat (IMO/ITU EG 17/2/1) on the outcomes of ITU-R Working Parties (WPs) 1A (25 May to 2 June 2021), 4C (20 to 26 October 2021) and 5B (10 to 21 May 2021) with regard to issues of relevance to the Group.

3.4 In particular, the Group noted an update by the ITU Secretariat concerning the current status of studies at ITU-R WP 1A relating to interference issues experienced by maritime communication systems caused by light emitting diode (LED) lighting systems. The information provided included a liaison statement (IMO/ITU EG 17/6/1) from ITU-R WP 1A and an update on the status of ongoing work at ITU-R WP 4C and WP 5B on developments relating to agenda item 1.11 under Resolution 361 (Rev.WRC-19) in preparation for WRC-23. The Group was also informed of the current ongoing revisions of the ITU-R Recommendations related to maritime services.

4 FURTHER DEVELOPMENT OF THE DRAFT IMO POSITION ON WRC-23 AGENDA ITEMS CONCERNING MATTERS RELATING TO MARITIME SERVICES (AGENDA ITEM 3)

Draft IMO position on relevant WRC-23 agenda items

4.1 The Group recalled the outcome of NCSR 8, and that it had noted the progress made by EG 16 (NCSR 8/7, annex, paragraphs 4.2 to 4.15 and annex 1) on the development of the preliminary draft IMO position on relevant WRC-23 agenda items and referred documents NCSR 8/7/3 (IMSO), NCSR 8/7/5 (IMSO and CIRM) and NCSR 8/7/9 (United States) to EG 17 for consideration during the further development of the draft IMO position.

4.2 In this context, the Group considered the proposals and relevant information on the further development of the draft IMO position submitted by China (IMO/ITU EG 17/3/2), the United States (IMO/ITU EG 17/3/7) and the Secretariat (IMO/ITU EG 17/3, IMO/ITU EG 17/3/1, IMO/ITU EG 17/3/3, IMO/ITU EG 17/3/4/Rev.1, IMO/ITU EG 17/3/5 and IMO/ITU EG 17/3/6/Rev.1), taking into account documents NCSR 8/7/3, NCSR 8/7/5 and NCSR 8/7/9.

4.3 The proposals and relevant information considered by the Group are summarized in paragraphs 4.4 to 4.30 below.

WRC-23 agenda item 1.1

4.4 The Group considered proposals on WRC-23 agenda item 1.1 submitted by:

.1 IMSO (NCSR 8/7/3), providing text on preventing interference on GMDSS terminals of recognized mobile satellite service providers in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz from International Mobile Telecommunications (IMT) systems; and

.2 the United States (NCSR 8/7/9), providing text concerning the protection of the frequency range 4 400-4 990 MHz, which could be required in the future by the maritime community for potential new technologies and applications (e.g. for Maritime Autonomous Surface Ships (MASS)).

4.5 During the ensuing discussion, the following views were expressed:

.1 the issue of interference in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz caused by IMT systems operating in the frequency band 1 492-1 518 MHz was outside the scope of agenda item 1.1;

.2 this agenda item addressed possible measures to ensure the protection of aeronautical and maritime mobile services, located either in international waters or airspace, from other stations located within national territories and operating in the frequency band 4 800-4 990 MHz;

.3 it was important to indicate the potential use of the frequency range 4 400-4 990 MHz by the maritime community; and

.4 the development of MASS was still under consideration at IMO and, as such, it would be premature to raise the potential use of the frequency range 4 400-4 990 MHz by the maritime community for MASS under this agenda item.

4.6 After discussion, the Group prepared a draft IMO position on WRC-23 agenda item 1.1, as set out in annex 1.

WRC-23 agenda items 1.2 and 1.3

4.7 The Group reviewed the text prepared by EG 16 on WRC-23 agenda items 1.2 and 1.3 and made minor modifications and improvements, as set out in annex 1.

WRC-23 agenda items 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.12, 1.13, 1.14, 1.18 and 1.19

4.8 In the absence of any proposals for WRC-23 agenda items 1.4, 1.5, 1.6, 1.8, 1.9, 1.10, 1.12, 1.13, 1.14, 1.18 and 1.19, the Group agreed to remove these agenda items from the draft IMO position, noting that they were not closely related to existing maritime services and were not of specific relevance to IMO.

WRC-23 agenda item 1.7

4.9 The Group considered a proposal by the Secretariat for inclusion in the draft IMO position under agenda item 1.7 concerning allocation for a new aeronautical mobile-satellite (R) service (AMS(R)S) in all or part of the frequency band 117.975-137 MHz.

4.10 The Group, taking into account the use of aeronautical frequencies 121.5 MHz and 123.1 MHz for the purposes of distress, urgency and search and rescue coordination communications in the GMDSS, prepared the draft IMO position on WRC-23 agenda item 1.7, as set out in annex 1.

WRC-23 agenda item 1.11

4.11 The Group considered the draft IMO position under agenda item 1.11, taking into account the proposals submitted by IMSO (NCSR 8/7/3), IMSO and CIRM (NCSR 8/7/5) and China (IMO/ITU EG 17/3/2), and the information provided by the Secretariat (IMO/ITU EG 17/3, IMO/ITU EG 17/3/3, IMO/ITU EG 17/3/4/Rev.1, IMO/ITU EG 17/3/5 and IMO/ITU EG 17/3/6/Rev.1).

4.12 On the issue of interference in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz caused by IMT systems operating in the frequency band 1 492-1 518 MHz, the Group noted the following views:

.1 this was a real problem that required addressing at an appropriate higher level (e.g. WRC);

.2 notwithstanding the importance of this issue, agenda item 1.11 was not considered to be an appropriate entry point to raise this issue at WRC-23; and

.3 alternatively, agenda items 4 or 10 could be utilized to raise this issue at WRC-23, as well as at WRC-27, respectively.

4.13 Following consideration, the Group agreed that the protection of GMDSS terminals from IMT-caused interference was not within the scope of resolution 361 (Rev.WRC-19). However, the Group noted the view expressed by China, suggesting that studies to avoid interference to GMDSS terminals operating in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz from IMT systems could be carried out and included in one or more ITU-R Recommendations and Reports, as appropriate.

4.14 The Group considered the proposal by China (IMO/ITU EG 17/3/2) to modify the draft IMO position under agenda item 1.11, as prepared by EG 16, by deleting a specific text referring to the ITU satellite coordination status of potential additional GMDSS mobile satellite service providers.

4.15 Although it was noted that both resolution A.1001(25) and MSC.1/Circ.1414 referred to compliance with relevant ITU rules and regulations in general, the Group was of the view that the issue of the coordination of satellite networks was remaining within the competency of ITU.

4.16 After consideration, the Group updated the draft IMO position for WRC-23 agenda item 1.11, as set out in annex 1.

4.17 Also concerning this agenda item, the Group considered a liaison statement from ITU-R WP 5B (IMO/ITU EG 17/3) (see paragraphs 4.31 to 4.33).

WRC-23 agenda items 1.15, 1.16 and 1.17

4.18 The Group considered proposals by IMSO (NCSR 8/7/3), also supported by CIRM (NCSR 8/7/5), providing text for inclusion in the draft IMO position under WRC-23 agenda items 1.15, 1.16 and 1.17 regarding the current use of the frequency band 26-40 GHz (Ka-band) by the NGSO GMDSS mobile satellite service and the potential future use of the frequency band 12-18 GHz (Ku-band) for safety related services, such as MASS. In addition, the Group considered a proposal by the United States (IMO/ITU EG 17/3/7) concerning agenda item 1.17, providing text for inclusion in the draft IMO position to protect the Ka-band feeder links used by Iridium for the GMDSS from potential interference that could be caused by the provision of inter-satellite links.

4.19 Noting the above proposals and referring to the earlier comments made under agenda item 1.1 concerning references to MASS (paragraph 4.10.3 refers), the Group updated the draft IMO position on WRC-23 agenda items 1.15, 1.16 and 1.17, as set out in annex 1.

WRC-23 agenda item 2

4.20 The Group reviewed and updated the draft IMO position for WRC-23 agenda item 2, including annex 1.

WRC-23 agenda item 4

4.21 The Group considered an alternative proposal by IMSO (NCSR 8/7/3), also supported by CIRM (NCSR 8/7/5), providing text for inclusion in the draft IMO position under WRC-23 agenda item 4 for amending Resolution 223 (Rev.WRC-19) to facilitate inclusion of the interference issue in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz on the agenda of WRC-27.

4.22 The Group noted the information provided by the ITU Secretariat that, in accordance with the provisions of Resolution 95, agenda item 4 was limited to editorial changes only. Therefore, Resolution 223 (Rev.WRC-19) could not be changed in substance through agenda item 4.

4.23 After consideration, the Group agreed not to include the interference issue in the frequency band 1 518-1 525 MHz and beyond to 1 559 MHz under agenda item 4 and instead, inserted a reference to Resolution 223 (Rev.WRC-19) in annex 2 to the draft IMO position with a proposal to retain this resolution. Accordingly, the Group updated the draft IMO position on WRC-23 agenda item 4, as set out in annex 1.

WRC-23 agenda item 9

4.24 The Group reviewed and updated the draft IMO position for WRC-23 agenda item 9, including annex 2 to the draft IMO position.

WRC-23 agenda item 10

4.25 The Group noted some initial suggestions that could be included in the draft IMO position for WRC-23 agenda item 10, such as digitalization of voice communication in the VHF band, R-mode for VDES, interference to SESs used for the GMDSS, etc. Interested Member States and organizations were invited to submit proposals to NCSR 9, as appropriate.

Work plan for the further development of the draft IMO position

4.26 The Group considered the information provided by the Secretariat (IMO/ITU EG 17/3/1) concerning the schedule of IMO and ITU meetings that were directly related to the development, approval and submission of the IMO position to WRC-23 (scheduled from 20 November to 15 December 2023).

4.27 In this context, the Group noted that the second session of the ITU's Conference Preparatory Meeting for WRC-23 (CPM 23-2) had been scheduled from 27 March to 6 April 2023. Therefore, the draft IMO position, with the exception of agenda item 10 (agenda for WRC-27), was expected to be finalized by NCSR 9, with a view to subsequent approval by MSC 106 (November 2022) and submission to CPM 23-2 at least 14 days before the start of the meeting, as per Resolution ITU-R 1-8.

4.28 The Group noted also that the final IMO position, including agenda item 10, was expected to be finalized by NCSR 10, taking into account the outcomes of EG 18 and CPM 23-2, and that, subject to the programme of IMO meetings for 2023, NCSR 10 could be authorized to submit the final IMO position directly to WRC-23 (unless NCSR 10 could report for approval to MSC 107). The Group noted that the dates for NCSR 10 and MSC 107 were yet to be confirmed.

4.29 The Group invited NCSR 9 to note the proposals, comments and progress made on the further development of the draft IMO position on relevant WRC-23 agenda items concerning matters relating to maritime services; consider the draft IMO position, as set out in annex 1, and finalize it, with the exception of agenda item 10, with a view to approval by MSC 106 and subsequent submission to CPM 23-2.

4.30 The Group invited also NCSR 9 to consider instructing EG 18 to develop the draft IMO position on WRC-23 agenda item 10 for consideration by NCSR 10 when finalizing the IMO position. In addition, the Group invited NCSR 9 to consider, if necessary, requesting MSC 106 to authorize NCSR 10 to finalize the IMO position and submit it directly to WRC-23.

Preliminary consideration of a liaison statement from ITU-R WP 5B

4.31 The Group considered a liaison statement from ITU-R WP 5B (IMO/ITU EG 17/3), providing information on the status of work in progress at ITU-R WP 5B and WP 4C under WRC-23 agenda item 1.11 and requesting guidance and comments from IMO concerning modernization of the GMDSS, e-navigation and the introduction of a new mobile satellite service provider into the GMDSS.

4.32 During the consideration, the Group took into account comments made, in particular by the delegation of China on the need for inclusion of an appropriate message format for Maritime Safety Information (MSI) using HF NBDP in Recommendation ITU-R M.493-15 and by the observer from CIRM concerning full protection of the spectrum used by the new and existing GMDSS mobile satellite service providers. After consideration, the Group prepared a draft reply liaison statement to ITU-R WP 5B, with copy to WP 4C, as set out in annex 2, for consideration and approval by NCSR 9.

4.33 Regarding the comment by the delegation of China relating to the need for revision of Recommendation ITU-R M.493-15, the Group invited the delegation to consider raising this issue at ITU-R WP 5B, and also to provide further information to NCSR 9, as appropriate.

5 CONSIDERATION OF RELEVANT WORK IN ITU-R (AGENDA ITEM 4)

No documents were submitted under this agenda item.

6 MODERNIZATION OF THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) - CONSEQUENTIAL AMENDMENTS TO EXISTING INSTRUMENTS RELATING TO THE DRAFT AMENDMENTS TO THE 1974 SOLAS CONVENTION (AGENDA ITEM 5)

Revision of COMSAR/Circ.32

6.1 The Group considered the draft revision of *Harmonization of GMDSS requirements for radio installations on board SOLAS ships* (COMSAR/Circ.32) based on proposals and comments submitted by CIRM (IMO/ITU EG 17/5), the United States (IMO/ITU EG 17/5/2) and the Netherlands (IMO/ITU EG 17/5/6), taking into account the related proposals and comments at NCSR 8 (NCSR 8/6/1 (CIRM), NCSR 8/6/16 (United States), NCSR 8/6/20 (Canada) and NCSR 8/WP.3, paragraphs 87 to 89).

6.2 During the review process, the Group updated the draft text of the revision of COMSAR/Circ.32, in particular, with regard to:

.1 updates in the contents list;

.2 introduction of radio equipment user's manual in the working language of the ship in section 1.4;

.3 updates to the table in section 2.3 relating to GMDSS equipment requirements;

.4 updates to the table in section 4.8 relating to the connection of equipment to the distress panel;

.5 insertion of section 6.1.2 "Interference from LED lighting and other unintentional emitters";

.6 correction of the note in appendix 1, section 1.4.2;

.7 incorporation of relevant text from resolution A.702(17) and circulars COMSAR/Circ.16, COMSAR/Circ.17, COM/Circ.110, COM/Circ.110/Corr.1 and COM/Circ.117 to facilitate revocation of these circulars; and

.8 editorial corrections, improvements and updates to other references.

6.3 The Group noted that, according to the entry into force date of the SOLAS amendments to be adopted by MSC 105, the revision of COMSAR/Circ.32 should become effective on 1 January 2024.

6.4 The Group invited NCSR 9 to approve the draft revision of COMSAR/Circ.32, as set out in annex 3, to be disseminated as COMSAR.1/Circ.32/Rev.1. In addition, the Group invited NCSR 9 to agree to the consequential revocation of circulars COMSAR/Circ.16, COMSAR/Circ.17, COM/Circ.110, COM/Circ.110/Corr.1 and COM/Circ.117, as from the date of entry into force of the related SOLAS amendments concerning the modernization of the GMDSS (i.e. 1 January 2024).

Revision of COMSAR/Circ.33

6.5 The Group considered the revision of *GMDSS coast station operator's certificate (CSOC) model course* (COMSAR/Circ.33) based on proposals submitted by France and ITF (IMO/ITU EG 17/5/3) and the United Kingdom (IMO/ITU EG 17/5/4), taking into account the comments by France and ITF (IMO/ITU EG 17/5/5) and other related proposals and comments at NCSR 8 (NCSR 8/6/7 (France and ITF) and NCSR 8/WP.3, paragraphs 90 to 92).

6.6 The Group reviewed the proposals for the draft revision of COMSAR/Circ.33 and agreed to maintain the status of the document as a syllabus rather than turning it into a model course which could be implemented directly by administrations. Thus, the Group agreed that the title of the circular should be modified accordingly.

6.7 The Group made additional modifications to the draft document to clarify the aim, objective and target audience of the circular, improve the text and update the references and terminology used.

6.8 The Group invited NCSR 9 to approve the draft revision of COMSAR/Circ.33, as set out in annex 4, for dissemination as COMSAR.1/Circ.33/Rev.1, and agree to the new title of the circular (i.e. GMDSS Coast Station Operator's Certificate (CSOC) syllabus).

Revision of COM/Circ.108

6.9 The Group considered a proposal by the Secretariat (IMO/ITU EG 17/5/1) on the consequential revision of *GMDSS operating guidance for masters of ships in distress situations* (COM/Circ.108) as a result of the modernization of the GMDSS.

6.10 Noting general support for the proposal, the Group prepared a revision to COM/Circ.108, in particular, with respect to:

.1 the deletion of radiotelex from the table of frequencies for distress communications;

.2 the replacement of references to "Inmarsat" with "RMSS" in the flow diagram; and

.3 amendments to the title of the Guidance.

6.11 The Group noted that the new circular should become effective on 1 January 2024 in conjunction with the entry into force date of the SOLAS amendments expected to be adopted by MSC 105.

6.12 The Group invited NCSR 9 to agree to the draft MSC circular, as set out in annex 5, superseding COM/Circ.108.

6.13 In addition, noting that the guidance in COM/Circ.108 was reproduced in the IAMSAR Manual, Volume III (2019 edition, section 2, page 6), the GMDSS Manual (2019 edition, page 43) and the GMDSS Operating Guidance Card (IMO publication No. I-969 E), the Group invited also NCSR 9 to consider:

.1 instructing the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue to effect any necessary consequential amendments to section 2 of the IAMSAR Manual, Volume III, when preparing amendments to its next edition; and

.2 requesting the Secretariat to effect any necessary consequential amendments to the GMDSS Manual and the GMDSS Operating Guidance Card (IMO publication No. I-969 E), when preparing their next editions.

6.14 The Group requested the Secretariat, when preparing the final report of the Experts Group and the annexes containing the draft revisions of COMSAR/Circ.32, COMSAR/Circ.33 and COM/Circ.108, to make any editorial modifications that may be identified, including updating references to renumbered paragraphs or correcting any other errors or omissions, in consultation with the Chair of the Experts Group, as appropriate.

7 CONSIDERATION OF MATTERS RELATED TO ELECTROMAGNETIC INTERFERENCE (EMI) EFFECTS OF LIGHT EMITTING DIODE (LED) LIGHTING SYSTEMS AND OTHER SOURCES OF EMI ON BOARD VESSELS (AGENDA ITEM 6)

7.1 The Group recalled that NCSR 8, noting that the electromagnetic interference (EMI) effects of LED lighting systems and other sources of EMI on board vessels was an issue that would still require further consideration and that related amendments to COMSAR/Circ.32 would be considered by EG 17, had referred the matter back to the Experts Group, including documents NCSR 8/7/2 (Secretariat) and NCSR 8/7/4 (CIRM), for further consideration and to advise NCSR 9, as appropriate (NCSR 8/14/1, paragraph 7.11).

7.2 In this context, the Group had for its consideration the following documents submitted by:

.1 the Secretariat (IMO/ITU EG 17/6), containing in the annex a liaison statement from ITU-R WP 5B to ITU-R WPs 1A and 4C on concerns about the appropriate resolution bandwidth considered in testing for LEDs in order to protect VHF;

.2 the Secretariat (IMO/ITU EG 17/6/1), containing in the annex a liaison statement from ITU-R WP 1A to CISPR F, CISPR A and ITU-R WPs 4C and 5B on the test and measurement program in progress on LED lighting systems, with emphasis on ways of adapting measurement bandwidths to the particular spectral characteristics of the equipment under test (e.g. VHF and AIS receivers);

.3 the United States (IMO/ITU EG 17/6/2), providing information on the results of electromagnetic compatibility (EMC) tests of 21 LED shipboard lights performed by the United States Coast Guard and the Radio Technical Commission for Maritime Services (RTCM) in May 2021 and progress made by RTCM Special Committee 137 in developing an EMC standard applicable to LED lighting and other unintentional emitters located above decks near antennas; and

.4 the Netherlands (IMO/ITU EG 17/6/3 and IMO/ITU EG 17/6/4), providing comments on documents IMO/ITU EG 17/6/2 and IMO/ITU EG 17/2, respectively, concerning EMI effects of LED lighting systems and other sources of EMI on board vessels.

7.3 The Group, having noted the information provided in the above documents, was of the view that the additional amendments incorporated into the draft revision of COMSAR/Circ.32, in particular sections 5 and 6, provided sufficient information and guidance at this stage for the detection and avoidance of interference caused by LED lighting systems and other sources of EMI on board vessels. The Group noted that work on this subject was in progress at ITU, IEC, RTCM and CISPR.

7.4 The Group recalled a proposal by the United States (IMO/ITU EG 16/7/1) for IMSO to be invited to make protection criteria available for recognized mobile satellite ship earth stations and reiterated its view that IMSO could consider taking appropriate action on this matter.

8 CONSIDERATION OF THE PROPOSED REVISIONS TO RECOMMENDATION ITU-R M.1371-5 (AGENDA ITEM 7)

8.1 The Group recalled that NCSR 8, having considered the proposed revisions to Recommendation ITU-R M.1371-5 on *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band*, referred documents NCSR 8/7/1 (Secretariat) and NCSR 8/7/10 (United Kingdom) to EG 17 for consideration and to advise NCSR 9, as appropriate, whilst approving a liaison statement to ITU-R Working Party 5B, indicating that more time would be needed by IMO to perform a thorough evaluation of the proposed changes to Recommendation ITU-R M.1371-5 (NCSR 8/14/1, paragraph 7.14 and annex 28).

8.2 In this context, the Group had for its consideration the following documents submitted by:

.1 the Secretariat (IMO/ITU EG 17/7), containing in the annex a liaison statement from ITU-R WP 5B, inviting IALA and CIRM to liaise closely with IMO to progress the work on the revision of Recommendation ITU-R M.1371-5;

.2 the United States (IMO/ITU EG 17/7/1), proposing the adoption of a deactivation or cancellation protocol in Recommendation ITU-R M.1371-5 for distress alerting devices broadcasting Automatic Identification System (AIS) locating signals, such as EPIRB-AIS, MOB-AIS, and certain Personal Locator Beacons (PLB), following an inadvertent activation or for post-recovery deactivation; and

.3 IALA and CIRM (IMO/ITU EG 17/7/2), providing, as recommended by ITU-R WP 5B, copies of their responses to ITU-R WP 5B on the revision of Recommendation ITU-R M.1371-5.

8.3 During the ensuing discussion, the following views were expressed concerning the revision of Recommendation ITU-R M.1371-5:

.1 the proposed revisions presented a mixture of issues related to AIS and Application Specific Messages (ASMs) that were developed long time ago by IMO;

.2 this issue would require consideration by a wider group within IMO involving, at least, communication and navigation experts and possibly other bodies within IMO; and

.3 a consolidated view should be developed by IMO on the future capability and requirements of AIS.

8.4 After discussion, the Group agreed that this issue would require further consideration by the NCSR Sub-Committee and invited interested Member States and organizations to submit proposals to NCSR 9, as appropriate.

8.5 During the consideration of the proposal by the United States for adoption of a deactivation or cancellation protocol for AIS-enabled locating devices, some delegations raised questions concerning the operation of the device, presentation of the cancellation message on navigational displays (e.g. AIS, ECDIS, radar, etc.) on board and ashore, implications on other AIS messages (e.g. position message) and the type of equipment it would apply to.

8.6 The Group noted the request by the United States to delegations that expressed concerns or raised questions about the proposed deactivation or cancellation protocol to contact the United States to obtain further information and clarification before NCSR 9.

8.7 Noting the above, the Group encouraged interested Member States and organizations to work together and submit their proposals concerning the revision of Recommendation ITU-R M.1371-5, including the proposal on deactivation or cancellation protocol for AIS-enabled locating devices to NCSR 9, as appropriate.

9 ANY OTHER BUSINESS (AGENDA ITEM 8)

Developments on International Mobile Telecommunications (IMT)

9.1 The Group noted the information provided by IALA (IMO/ITU EG 17/INF.2), containing an update on IALA's considerations with respect to the developments on IMT systems, previously updated as 3GPP, in the maritime domains.

9.2 While recognizing the increasing use of 5G in all aspects of life, some delegations raised questions concerning the capabilities of 5G technology for maritime use, including its range, safety measures and potential applications, indicating also that caution was necessary when considering the potential use of IMT systems in the maritime domain. The Group noted that Member States conducting tests and experiments for use of IMT systems in the maritime domain could share their findings in due course.

Digitalization of the VHF maritime band

9.3 The Group noted the comments made by some delegations concerning the digitalization of voice communication in the VHF maritime band, which was included in the preliminary agenda of WRC-27, expressing the view that IMO would need to give careful consideration to this subject taking into account all implications for its use in the maritime domain. In this connection, the Group noted that CEPT had published ECC Report 329 on "Implementation of digital voice radio telephony in the VHF maritime mobile band" in October 2021, which could provide further information and facilitate the preparation of discussions of agenda item 10 of WRC-23 at NCSR 9.

ITU-R meeting schedule

9.4 The Group noted that the ITU website contains information on the schedule of all ITU meetings, including those listed below that are relevant to maritime matters:

.1 WP 4A, from 27 October to 4 November 2021 (e-Meeting);

.2 WP 1A, from 3 to 12 November 2021 (e-Meeting);

.3 SG 4, on 5 November 2021 (e-Meeting);

.4 WP 5A, from 15 to 26 November 2021 (e-Meeting);

.5 WP 5B, from 29 November to 10 December 2021 (e-Meeting);

.6 SG 5, on 16 December 2021 (e-Meeting);

.7 WP 5D, from 7 to 23 February 2022 (e-Meeting);

.8 WP 5D from 19 to 22 April 2022 (Geneva, Switzerland);

.9 WP 4C, from 4 to 10 May 2022 (Geneva, Switzerland);

.10 WP 4A, from 11 to 20 May 2022 (Geneva, Switzerland);

.11 WP 5A, from 23 May to 3 June 2022 (Geneva, Switzerland);

.12 WP 5D, from 13 to 24 June 2022 (Geneva, Switzerland);

.13 WP 1A, from 28 June to 7 July 2022 (Geneva, Switzerland);

.14 WP 5B, from 11 to 22 July 2022 (Geneva, Switzerland);

.15 WP 4C, from 7 to 13 September 2022 (Geneva, Switzerland);

.16 WP 4A, from 14 to 22 September 2022 (Geneva, Switzerland);

.17 SG 4, on 23 September 2022 (Geneva, Switzerland);

.18 WP 5D, from 10 to 21 October 2022 (Geneva, Switzerland);

.19 WP 5A, from 14 to 25 November 2022 (Geneva, Switzerland);

.20 WP 5B, from 14 to 25 November 2022 (Geneva, Switzerland);

.21 SG 5, from 28 to 29 November 2022 (Geneva, Switzerland); and

.22 WP 1A, from 5 to 9 December 2022 (Geneva, Switzerland).

IMO meeting schedule

9.5 The Group noted that the following relevant IMO meetings were scheduled:

.1 105th session of the Maritime Safety Committee (from 20 to 29 April 2022);

.2 the ninth session of the Sub-Committee on Navigation, Communications and Search and Rescue (from 21 to 30 June 2022);

.3 106th session of the Maritime Safety Committee (from 2 to 11 November 2022); and

.4 the twenty-ninth meeting of the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue (from 17 to 21 October 2022).

9.6 The Group noted also that the modality of the above meetings (e.g. physical, remote or hybrid) would be determined in due course taking into account developments on the COVID-19 pandemic and would be announced to all parties well in advance.

Planning for the eighteenth meeting of the Group

9.7 The Group noted that MSC 104 had authorized, subject to endorsement by the Council, the holding of a meeting of the Experts Group in the second half of 2022. Furthermore, the Group noted that the eighteenth meeting of the Experts Group had been provisionally scheduled to take place at IMO Headquarters in London from 5 to 9 December 2022.

10 REPORTS TO THE NCSR SUB-COMMITTEE AND ITU (AGENDA ITEM 9)

Consideration of the report of EG 17

10.1 The draft report of the meeting was reviewed during the virtual meeting held on Friday, 5 November 2021. Upon conclusion of the virtual meeting, delegations were given an opportunity to comment on the draft report by correspondence until Friday, 12 November 2021.

10.2 Noting that no comments were received during the period of consideration by correspondence, the report of EG 17 was finalized by the Secretariat in consultation with the Chair. The Experts Group agreed on its report to ITU-R and the NCSR Sub-Committee on Friday, 12 November 2021.

Action requested of the NCSR Sub-Committee

10.3 NCSR 9 is invited to:

.1 consider the draft IMO position on relevant WRC-23 agenda items concerning matters relating to maritime services and finalize it, with the exception of agenda item 10, with a view to approval by MSC 106 and subsequent submission to the ITU's Conference Preparatory Meeting for WRC-23 (CPM 23-2) (paragraphs 4.4 to 4.29 and annex 1);

.2 consider instructing EG 18 to develop the draft IMO position on WRC-23 agenda item 10 for consideration by NCSR 10 when finalizing the IMO position (paragraph 4.30);

.3 consider, if necessary due to the programme of IMO meetings in 2023, requesting MSC 106 to authorize NCSR 10 to finalize the IMO position and submit it directly to WRC-23 (paragraph 4.30);

.4 note the preliminary consideration of a liaison statement from ITU-R WP 5B (IMO/ITU EG 17/3) on issues concerning WRC-23 agenda item 1.11; and consider and finalize the draft reply liaison statement prepared by the Group (paragraphs 4.31 to 4.33 and annex 2);

.5 approve the draft revision of COMSAR/Circ.32 on *Harmonization of GMDSS requirements for radio installations on board SOLAS ships*, for dissemination as COMSAR.1/Circ.32/Rev.1 (paragraphs 6.1 to 6.4, and annex 3);

.6 agree to the consequential revocation of circulars COMSAR/Circ.16, COMSAR/Circ.17, COM/Circ.110, COM/Circ.110/Corr.1 and COM/Circ.117, as from the date of entry into force of the related amendments to the 1974 SOLAS Convention concerning the modernization of the GMDSS (paragraph 6.4);

.7 approve the draft revision of COMSAR/Circ.33 on *GMDSS coast station operator's certificate (CSOC) model course*, for dissemination as COMSAR.1/Circ.33/Rev.1, and agree to the new title of the circular (i.e. GMDSS Coast Station Operator's Certificate (CSOC) syllabus) (paragraphs 6.5 to 6.8, and annex 4);

.8 agree to the draft MSC circular on GMDSS operating guidance for ships in distress situations, superseding COM/Circ.108 (paragraphs 6.9 to 6.12, and annex 5);

.9 consider instructing the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue to effect any necessary consequential amendments to section 2 of the IAMSAR Manual, Volume III, when preparing amendments to its next edition, to update references to the GMDSS operating guidance for ships in distress situations (paragraph 6.13.1);

.10 consider requesting the Secretariat to effect any necessary consequential amendments to the GMDSS Manual and the GMDSS Operating Guidance Card (IMO publication No. I-969 E), when preparing their next editions, to update references to the GMDSS operating guidance for ships in distress situations (paragraph 6.13.2);

.11 note the comments and proposals on electromagnetic interference (EMI) effects of light emitting diode (LED) lighting systems and other sources of EMI on board vessels, and take any necessary actions, as appropriate (paragraphs 7.1 to 7.4);

.12 note the comments and proposals on the proposed revisions to Recommendation ITU-R M.1371-5 on *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band*, and take any necessary actions, as appropriate (paragraphs 8.1 to 8.7);

.13 endorse the holding of the eighteenth meeting of the Group from 5 to 9 December 2022, at IMO Headquarters in London (paragraph 9.7); and

.14 note the report in general.

Action requested of ITU-R

10.4 ITU-R WP 4C is invited to note the comments and progress made on the development of the draft IMO position on WRC-23 agenda item 1.11, as well as the preliminary consideration of a liaison statement from ITU-R WP 5B, subject to further consideration by NCSR 9 (paragraphs 4.11 to 4.17 and 4.31 to 4.33, and annexes 1 and 2).

10.5 ITU-R WP 5A is invited to note the comments and progress made on the development of the draft IMO position on WRC-23 agenda item 1.3, subject to further consideration by NCSR 9 (paragraph 4.7 and annex 1).

10.6 ITU-R WP 5B is invited to note:

.1 the comments and progress made on the development of the draft IMO position on WRC-23 agenda item 1.11, as well as the preliminary consideration of the liaison statement from ITU-R WP 5B, subject to further consideration by NCSR 9 (paragraphs 4.11 to 4.17 and 4.31 to 4.33, and annexes 1 and 2);

.2 the comments and proposals on electromagnetic interference (EMI) effects of light emitting diode (LED) lighting systems and other sources of EMI on board vessels, and take any necessary actions, as appropriate (paragraphs 7.1 to 7.4); and

.3 the comments and proposals on the proposed revisions to Recommendation ITU-R M.1371-5 on *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band*, and that NCSR 9 was invited to take any necessary actions, as appropriate (paragraphs 8.1 to 8.7).

10.7 ITU-R WP 5D is invited to note the comments and progress made on the development of the draft IMO position on WRC-23 agenda items 1.1 and 1.2, subject to further consideration by NCSR 9 (paragraphs 4.4 to 4.7, and annex 1).

10.8 ITU-R WP 1A is invited to note the comments and proposals on electromagnetic interference (EMI) effects of light emitting diode (LED) lighting systems and other sources of EMI on board vessels, and take any necessary actions, as appropriate (paragraphs 7.1 to 7.4).

ANNEX 1

DRAFT IMO POSITION ON WRC-23 AGENDA ITEMS CONCERNING MATTERS RELATING TO MARITIME SERVICES

General

[Over 80% of world trade is transported by sea. This totals some 10 billion tonnes (53,600 billion tonne miles), of which about 29% is oil and gas, 30% is bulk (ore, coal, grain and phosphates), the remaining 41% being general cargo. Operating these merchant ships generates an estimated annual income of $380 billion in freight rates within the global economy, amounting to 5% of total world trade. The industry employs over 1.5 million seafarers.]

Agenda item 1.1

1.1 to consider, based on the results of the ITU-R studies, possible measures to address, in the frequency band 4 800-4 990 MHz, protection of stations of the aeronautical and maritime mobile services located in international airspace and waters from other stations located within national territories, and to review the pfd criteria in No.**5.441B** in accordance with resolution **223 (Rev.WRC-19)**;

Background

This agenda item addresses possible measures to ensure the protection of aeronautical and maritime mobile services, located either in international waters or airspace, from other stations located within national territories and operating in the frequency band 4 800-4 990 MHz. Additionally, the agenda item calls for the review of the pfd criteria contained in No.**5.441B**.

The frequency bands 4 800-4 990 MHz is allocated to the maritime mobile service worldwide, as a subset of the mobile service, in accordance with the Table of Frequency Allocations.

Within the mobile services this band could be used for some maritime applications.

Actions to be taken:

To monitor studies (the responsible groups are ITU-R WP 5B and WP 5D).

Draft IMO position

To ensure that any change to the regulatory provisions and technical conditions resulting from this agenda item do not adversely impact maritime communications.

Agenda item 1.2

1.2 to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with resolution **245 (WRC-19)**;

Background

Parts of the frequency bands 3 600-3 800 MHz (space-to-Earth) and 6 425-7 025 MHz (Earth-to-space) are used by one of the recognized mobile satellite service operators for the feeder links to support L-band maritime services, including those parts of the frequency bands which are used for the communications inside the Global Maritime Distress and Safety System (GMDSS). There is potential for interference from terrestrial IMT systems to receiving land earth stations using the frequency band 3 600-3 800 MHz, and to receiving space stations of one of the recognized mobile satellite service operators using the band 6 425-7 025 MHz. Interference to the space station could be received from multiple base stations deployed in many countries, and hence would be particularly challenging to resolve. Interference could harm the reliability of L-band services used daily on thousands of vessels for operational and welfare communications and could harm the reliability of GMDSS services to vessels.

Actions to be taken:

Actively contribute to studies (ITU-R WP 5D)

Draft IMO position

To ensure that any use of the frequency bands 3 600-3 800 MHz in Region 2 and 6 425-7 075 MHz in Region 1 by IMT would not affect the satellites and earth station receivers for the provision of mobile satellite service feeder links used by the GMDSS.

Agenda item 1.3

1.3 to consider primary allocation of the band 3 600-3 800 MHz to mobile service within Region 1 and take appropriate regulatory actions, in accordance with resolution **246 (WRC-19)**;

Background

Part of the frequency band 3 600-3 800 MHz (space-to-Earth) is used in MSS by a recognized mobile satellite service operator for the feeder links to support L-band maritime services, including the services used for the GMDSS. There is potential for interference from new mobile systems to receiving land earth stations using the frequency band 3 600-3 800 MHz. Interference could harm the reliability of L-band services used daily on thousands of vessels for operational and welfare communications and could harm the reliability of GMDSS services to vessels.

Inmarsat provides distress and safety satellite services as part of the GMDSS and has C-band feeder links in the frequency bands 3 550-3 700 MHz in all regions.

Actions to be taken:

Actively contribute studies (ITU-R WP 5A)

Draft IMO position

To ensure that any use of the frequency band 3 600-3 800 MHz by the mobile service in Region 1 would not affect land earth stations using the same band for the provision of mobile satellite service feeder links used by the GMDSS.

To ensure protection of those services within the frequency band 3 600-3 800 MHz to which the frequency band is allocated on a primary basis and not to impose undue constraints on the existing services and their future development.

Agenda item 1.7

1.7 to consider a new aeronautical mobile-satellite (R) service (AMS(R)S) allocation in accordance with resolution **428 (WRC-19)** for both the Earth-to-space and space-to-Earth directions of aeronautical VHF communications in all or part of the frequency band 117.975-137 MHz, while preventing any undue constraints on existing VHF systems operating in the AM(R)S, the ARNS, and in adjacent frequency bands;

Background

In the band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies, based on the conditions in Article 31 of the Radio Regulations, for distress and safety purposes with stations of the aeronautical mobile service. These frequencies are listed in Appendix 15 to the Radio Regulations.

Actions to be taken:

To monitor studies (the responsible group is ITU-R WP 5B).

Draft IMO position

To ensure that any change to the regulatory provisions and spectrum allocation resulting from this agenda item do not adversely impact the use of the frequencies 123.1 MHz and 121.5 MHz for distress and safety communications for the GMDSS.

Agenda item 1.11

1.11 to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e-navigation, in accordance with resolution **361 (Rev.WRC-19)**;

Background

IMO efforts to implement the GMDSS modernization and e-navigation may result in consequential modifications of the relevant parts in the Radio Regulations to accommodate advanced maritime communication systems.

The Maritime Safety Committee, [at its one hundred and fifth session], completed the modernization of the GMDSS by adopting amendments to the 1974

SOLAS Convention, including consequential and related amendments to existing instruments, for their entry into force on 1 January 2024. In this regard, the use of HF NBDP and VHF EPIRB for distress communications is removed from SOLAS chapter IV and necessary flexibility for using new systems in the future (e.g. NAVDAT) is inserted into chapter IV.

The Maritime Safety Committee, at its ninety-ninth session, considered an application by China for the recognition of the BeiDou Message Service System (BDMSS) for use in the GMDSS, and consequently referred the application to the NCSR Sub-Committee for evaluation of the detailed information to be provided in due course and authorized the Sub-Committee to invite IMSO to conduct the technical and operational assessment, as appropriate. NCSR 7 considered information provided by China on pre-assessment of BDMSS and invited IMSO to conduct the technical and operational assessment of BDMSS.

Note: The NCSR Sub-Committee is awaiting the outcome of the technical and operational assessment of BDMSS.

Actions to be taken:

Actively contribute to studies (ITU-R WP 5B and WP 4C)

ITU is invited to:

.1 consider the activities of IMO and other relevant international organizations and take regulatory actions, as appropriate, to facilitate GMDSS modernization;

.2 review the Radio Regulations and, taking into consideration the activities of IMO, IHO and IALA, as well as information and requirements provided by IMO, to consider possible regulatory actions to support the implementation of e-navigation; and

.3 conduct studies and consider possible regulatory actions, to support the introduction of additional satellite systems into the GMDSS and ensure the availability and full protection of the spectrum used by GMDSS satellite service providers.

Draft IMO position

To support regulatory actions that assist in the modernization of GMDSS and implementation of e-navigation.

To support the introduction of additional satellite systems into the GMDSS and to safeguard the availability and full protection of the spectrum used by new and existing GMDSS satellite service providers.

Agenda item 1.15

1.15 to harmonize the use of the frequency band 12.75-13.25 GHz (Earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service globally, in accordance with resolution **172 (WRC-19)**;

Background

This band is increasingly being used for maritime communications and expected to be used for safety-related communications.

Actions to be taken:

To monitor studies (ITU-R WP 4A)

Draft IMO position

To support the development of regulations to avoid any interferences to this band.

Agenda item 1.16

1.16 to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-GSO FSS earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with resolution **173 (WRC-19)**;

Background

Earth stations in motion (ESIMs) operating in these bands are used by large numbers of vessels for broadband connectivity at sea. Regulations exist to facilitate ESIMs operating in geostationary FSS networks in these bands. This agenda item aims to facilitate ESIMs operating in non-GSO FSS systems, which would benefit the provision of broadband services on ships, including those operating in the polar regions which may have no connection to GSO FSS satellites.

ESIMs are expected to be used for safety-related services such as the Fleet Data Automated Safety (FADS).

Actions to be taken:

To monitor studies (the responsible group is ITU-R WP 4A)

Draft IMO position

To support the development of regulations for ESIMs operating in non-GSO systems while maintaining compatibility with GSO networks in the same bands.

Agenda item 1.17

1.17 to determine and carry out, on the basis of the ITU-R studies in accordance with resolution **773 (WRC-19)**, the appropriate regulatory actions for the provision of inter-satellite links in specific frequency bands, or portions thereof, by adding an inter-satellite service allocation where appropriate;

Background

This agenda item addresses possible use of the bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz for inter-satellite links. The bands 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz are used by ESIMs to provide broadband connectivity at sea to large numbers of vessels.

The frequency bands 19.3-19.7 GHz (space-to-Earth) and 29.1-29.5 GHz (Earth-to-space) are used by a recognized mobile-satellite service operator for the feeder links to support L-band maritime services, including the services used for the GMDSS. The ITU-R is studying whether inter-satellite service use, if permitted in the bands 19.3-19.7 GHz and 29.1-29.5 GHz, would cause interference to mobile-satellite service feeder links operations.

Iridium provides L-band distress and safety satellite services as part of the GMDSS. To support its L-band GMDSS and maritime mobile-satellite services (MMSS), Iridium operates Ka-band feeder links in the frequency bands 19.1-19.3 GHz and 29.1-29.5 GHz in all three ITU regions. Interference to mobile-satellite service (MSS) feeder links from inter-satellite service space stations communicating with fixed-satellite service systems in the Ka-band could harm the reliability of L-band GMDSS and MMSS to vessels.

Actions to be taken:

To monitor studies (the responsible group is ITU-R WP 4A).

Draft IMO position

To ensure that systems providing service to maritime ESIMs and the inter-satellite link are not impacted by the use of the bands 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz for inter-satellite links.

To ensure that if the frequency bands 19.3-19.7 GHz and 29.1-29.5 GHz are identified for inter-satellite links, the use of the bands for inter-satellite links would not affect the satellites and earth station receivers for the provision of mobile-satellite service feeder links used to support the GMDSS and other maritime mobile-satellite services.

Agenda item 2

2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with further resolves of resolution **27 (Rev.WRC-19)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in resolves of that resolution;

Background

There are a number of Recommendations incorporated by reference in the Radio Regulations. IMO has reviewed all these Recommendations.

Actions to be taken:

None identified

Draft IMO position

1 IMO has studied the Recommendations of relevance and commented on each as given at annex 1.

2 Incorporation by reference is of importance to IMO because of the close relationship between many of the ITU-R Recommendations related to GMDSS equipment and its operation, to IMO performance standards.

3 IMO requests early indication of any changes proposed by ITU to the mechanism of incorporation by reference and to the list of incorporated Recommendations.

Agenda item 4

4 in accordance with resolution **95 (Rev.WRC-19)**, to review the resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

Background

There are number of Resolutions and Recommendations in the Radio Regulations. IMO has reviewed all these Resolutions and Recommendations.

Actions to be taken:

TBD

Draft IMO position

IMO has studied the Resolutions and Recommendations of relevance and commented on each as given in Annex 2.

Agenda item 9

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with article 7 of the Convention:

.1 on the activities of the Radiocommunication Sector since WRC-19;

.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

.3 on action in response to resolution **80 (Rev.WRC-07)**.

Agenda item 9.1, topic b)

Background

Under agenda item 9.1, topic b ITU-R is invited to review the amateur service and the amateur-satellite service allocations in the frequency band 1 240-1 300 MHz to

determine if additional measures are required to ensure protection of the radionavigation-satellite (space-to-Earth) service (RNSS) operating in the same band in accordance with Resolution **774 (WRC-19)**. The frequency band 1 240-1 300 MHz is used by the Global Navigation Satellite Systems (GNSS), recognized by IMO as components of the World-Wide Radio Navigation System (WWRNS) that provide World-wide Position, Navigation and Timing (PNT) determination services for ships.

Actions to be taken:

To monitor studies (ITU-R WP 5A and WP 4C)

Draft IMO position

To ensure that the protection of RNSS (space-to-Earth) receivers is guaranteed after the possible technical and operational measures envisaged under this agenda item.

Agenda item 10

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with article 7 of the Convention and resolution **804 (Rev.WRC-19)**,

Background

TBD

Actions to be taken:

TBD

Draft IMO position

TBD

Annex 1

RECOMMENDATION ITU-R M.476-5
Direct-printing telegraph equipment in the maritime mobile service
(Question ITU-R 5/8)
(1970-1974-1978-1982-1986-1995)

Required by the maritime community.

RECOMMENDATION ITU-R M.489-2
Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz
(1974-1978-1995)

Needed by IMO to support the carriage requirements of SOLAS chapter IV and needed by the maritime community in general. Will likely be needed into the foreseeable future.

RECOMMENDATION ITU-R M.492-6
Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service
(Question ITU-R 5/8)
(1974-1978-1982-1986-1990-1992-1995)

Currently needed by IMO to support the NBDP carriage requirement in SOLAS chapter IV, although the system is little used.

RECOMMENDATION ITU-R M.541-10
Operational procedures for the use of digital selective-calling equipment in the maritime mobile service
(Question ITU-R 9/8)
(1978-1982-1986-1990-1992-1994-1995-1996-1997-2004-2015)

Needed by IMO. Likely to be needed into the foreseeable future.

RECOMMENDATION ITU-R M.585-8
Assignment and use of identities in the maritime mobile service
(1982-1986-1990-2003-2007-2009-2012-2015)

Required by the maritime community and useful to IMO.

RECOMMENDATION ITU-R M.625-4
Direct-printing telegraph equipment employing automatic identification in the maritime mobile service
(1986-1990-1992-1995-2012)

Currently needed by IMO to support the NBDP carriage requirement in SOLAS chapter IV, although the system is little used.

RECOMMENDATION ITU-R M.633-4
Transmission characteristics of a satellite emergency position-indicating radio beacon (satellite EPIRB) system operating through a satellite system in the 406 MHz band
(1986-1990-2000-2004-2010)

Used by IMO to support the Performance standards for EPIRBs.

RECOMMENDATION ITU-R M.690-3

Technical characteristics of emergency position-indicating radio beacons (EPIRBs) operating on the carrier frequencies of 121.5 MHz and 243 MHz

(1990-1995-2012-2015)

Required by IMO to define the homing signal characteristics for the satellite EPIRB required by SOLAS chapter IV. Likely to be used by the maritime community for some time to come for EPIRBs and man overboard devices.

RECOMMENDATION ITU-R M.1084-5

Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service

(1994-1995-1997-1998-2001-2012)

Used by IMO for the description of VHF channels.

RECOMMENDATION ITU-R M.1171-0

Radiotelephony procedures in the maritime mobile service

(1995)

Required by IMO and the maritime community as long as coast stations offer a public correspondence service. The number of such coast stations is however declining.

RECOMMENDATION ITU-R M.1172-0

Miscellaneous abbreviations and signals to be used for radiocommunications in the maritime mobile service

(1995)

Required by the maritime community.

RECOMMENDATION ITU-R M.1173-1

Technical characteristics of single-sideband transmitters used in the maritime mobile service for radiotelephony in the bands between 1 606.5 kHz (1 605 kHz Region 2) and 4 000 kHz and between 4 000 kHz and 27 500 kHz

(1995 -2012)

Required by IMO and the maritime community and likely to be required into the foreseeable future.

RECOMMENDATION ITU-R M.1174-4

Technical characteristics of equipment used for onboard vessel communications in the bands between 450 and 470 MHz

(1995-1998- 2004-2015-2019)

Required by the maritime community and useful to IMO.

RECOMMENDATION ITU-R M.1638-1

Characteristics of and protection criteria for sharing studies for radiolocation, aeronautical radionavigation and meteorological radars operating in the frequency bands between 5 250 and 5 850 MHz

(2003-2015)

Not required by IMO, but may be required by the maritime community where radars in this band are used.

Annex 2

RESOLUTION 13 (REV.WRC-97)
Formation of call signs and allocation of new international series

Retain.

RESOLUTION 18 (REV.WRC-15)
Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict

Retain.

RESOLUTION 205 (REV.WRC-19)
Protection of the systems operating in the mobile-satellite service in the frequency band 406-406.1 MHz

Retain.

RESOLUTION 207 (REV.WRC-15)
Measures to address unauthorized use of and interference to frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service

Retain.

RESOLUTION 222 (REV.WRC-12)
Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service, and procedures to ensure long-term spectrum access for the aeronautical mobile-satellite (R) service

Retain.

RESOLUTION 223 (REV.WRC-19)
Additional frequency bands identified for International Mobile Telecommunications

Retain.

RESOLUTION 331 (REV.WRC-12)
Operation of the Global Maritime Distress and Safety System

Retain.

RESOLUTION 339 (REV.WRC-07)
Coordination of NAVTEX services

Retain.

RESOLUTION 343 (REV.WRC-12)
Maritime certification for personnel of ship stations and ship earth stations for which a radio installation is not compulsory

Retain to ensure common operations between convention and non-convention ships.

RESOLUTION 344 (REV.WRC-19)
Management of the maritime identity numbering resource

Retain.

RESOLUTION 349 (REV.WRC-19)
Operational procedures for cancelling false distress alerts in the Global Maritime Distress and Safety System

Retain.

RESOLUTION 352 (WRC-03)
Use of the carrier frequencies 12 290 kHz and 16 420 kHz for safety-related calling to and from rescue coordination centres

Retain.

RESOLUTION 354 (WRC-07)
Distress and safety radiotelephony procedures for 2 182 kHz

Retain.

RESOLUTION 356 (REV. WRC-19)
ITU maritime service information registration

Retain.

RESOLUTION 361 (REV. WRC-19)
Consideration of regulatory provisions for modernization of the Global Maritime Distress and Safety System and related to the implementation of e-navigation

Subject of agenda item 1.11.

RESOLUTION 363 (WRC-19)
Considerations to improve utilization of the VHF maritime frequencies in Appendix 18

In the preliminary agenda for WRC-27.

RESOLUTION 612 (REV.WRC-12)
Use of the radiolocation service between 3 and 50 MHz to support oceanographic radar operations

Retain.

RECOMMENDATION 7 (REV.WRC-97)
Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences

Retain.

RECOMMENDATION 37 (WRC-03)
Operational procedures for earth stations on board vessels (ESVs) use

Retain.

RECOMMENDATION 316 (REV. WRC-19)
Use of ship earth stations within harbours and other waters under national jurisdiction

Retain.

ANNEX 2

DRAFT LIAISON STATEMENT TO ITU-R WORKING PARTY 5B (COPY TO WORKING PARTY 4C)

WRC-23 agenda item 1.11

1 The IMO's Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) would like to thank ITU-R Working Party 5B (WP 5B) for its liaison statement of 9 June 2021, containing information about the status of ongoing work of WP 5B relating to the preparation of WRC-23 on agenda item 1.11.

2 The NCSR Sub-Committee, at its ninth session from 21 to 30 June 2022 (NCSR 9), considered the issues presented in the liaison statement and provided the following comments:

.1 issue 1 (modernization of the GMDSS): NCSR 9 agrees with the actions of ITU-R WP 5B for removal of NBDP for distress and safety purposes from the Radio Regulations, introduction of a new Automatic Connection System (ACS) for MF and selected HF Bands and removal of VHF-DSC EPIRB from Recommendation ITU-R M.493-15. With regard to NBDP, it may be helpful to note that the technology of HF-NBDP for the promulgation of Maritime Safety Information remains unchanged by the modernization of the GMDSS.

.2 issue 2 (implementation of e-navigation): NCSR 9 would like to inform ITU-R that various existing satellite networks already support the e-navigation concept, and usability studies have been conducted. The VDES and NAVDAT systems, for which IMO is developing performance standards, would also support e-navigation by means of enabling broadcasting (by NAVDAT) and exchange of digital files (by VDES). From a spectrum regulatory view, the requirements for e-navigation are thus covered.

.3 issue 3 (introduction of additional satellite systems into the GMDSS): NCSR 9 would like to inform ITU-R that IMO supports the introduction of additional satellite systems into the GMDSS and to safeguard the availability and protection of the spectrum used by all GMDSS satellite service providers. IMO expects that related protection requirements will be sufficiently addressed by the request that ITU-R ensures full protection of the spectrum used by new and existing GMDSS satellite service providers.

[3 Concerning the process of assessing the new satellite system for GMDSS, NCSR 9 is expected to consider the report from IMSO on the technical and operational assessment of BeiDou Message Service System (BDMSS) and provide the outcome of its consideration to the Maritime Safety Committee, at its 106th session (31 October to 4 November 2022)].*

* This paragraph will be updated at NCSR 9 based on developments.

ANNEX 3

DRAFT REVISION OF COMSAR/CIRC.32

HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIPS

1 The Sub-Committee on Navigation, Radiocommunications, and Search and Rescue (NCSR), at its […] session ([…]), approved the revised *Harmonization of GMDSS requirements for radio installations on board SOLAS ships*, as set out in the annex.

2 Member States are invited to bring the annexed Guidelines to the attention of all concerned, in particular, shipowners, ship operators, shipping managers, manufacturers and surveyors.

3 This circular supersedes COMSAR/Circ.32, COMSAR/Circ.17, COM/Circ.110, COM/Circ.110/Corr.1 and COM/Circ.117 as from [1 January 2024].

Annex

GUIDELINES FOR THE HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIPS

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1 GENERAL

These guidelines were developed in order to provide Administrations, ship owners and marine electronics companies with an unambiguous interpretation of the radio installation requirements in SOLAS chapter IV, as amended, and adopted IMO resolutions. References are also made to IMO circulars, the STCW Convention and ITU Radio Regulations.

The core elements of this document give Guidelines on GMDSS installations on board ships. However, additional useful information is included from other bodies which are involved when maritime radio equipment is installed.

1.1 Application

Radio equipment installed on SOLAS ships should meet the relevant IMO requirements and ITU recommendations and should be of a type approved by the Administration.

These Guidelines are applicable when installing GMDSS radio equipment on board SOLAS ships.

The rules in these Guidelines also apply to radio installations on High Speed Craft as prescribed in the HSC Codes. (*See chapter 14 regarding Radiocommunications)*

The rules in these Guidelines also apply to radio installations on mobile offshore drilling units as prescribed in the MODU Code.

(*See chapter 11 regarding GMDSS requirements offshore)*

Cargo ships of less than 300 gross tonnage (gt) and fishing/catching vessels are, as a general rule, not covered by SOLAS requirements. However, if such ships/vessels are going to install GMDSS radio equipment on a voluntary basis or mandatory basis according to national laws, these Guidelines should be followed as far as practicable.

These Guidelines reflect, to a large extent, unambiguous requirements in accordance with the relevant rules and regulations, see subsection 1.2. below. 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.

Note: The marine electronics company which installs the radio equipment should be responsible for giving the radio operators proper familiarisation in the use of the installed radio equipment before it is put into operation.

1.2 Rules and regulations

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

.1 the International Convention for Safety of Life at Sea~~,~~ (SOLAS), 1974~~, as amended~~;

.2 IMO resolutions (Performance standards) and IMO circulars

.3 ITU (International Telecommunication Union) Radio Regulations (RR);

.4 International Standards - ISO 8468 ~~1990 (E)~~ 2007, annex A; and

.5 the International Convention on Standards of Training, Certification and Watchkeeping (STCW) 1978, as amended.

1.3 Drawings

1.3.1 General

Specified drawings (plans of the radio installation) should be prepared out well before the work on a new building or reconstruction of ships or offshore units is started. Insufficient or missing drawings may result in deficiencies during radio survey and could lead to expensive repair costs later ~~(resolution A.746(18), section 8)~~ (resolution A.~~1120(30)~~ 1140(31)).

For the radio installation the following drawings should be prepared:

.1 antenna drawing;

.2 radio arrangement drawing; and

.3 wiring diagram.

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

Approved “as installed” wiring diagram, radio arrangement, as well as antenna drawings, should be kept available on board the ship for presentation during radio survey, etc.

1.3.2 Antenna drawings

Antenna drawings should show all antennas seen from fore or aft position, the port or starboard position and from above. This applies to the following antennas:

.1 all transmitting antennas including location of antenna tuner;

.2 all receiving antennas including ~~GNSS~~ electronic position fixing system (EPFS) antennas;

.3 radar antennas;

.4 satellite communication antennas; and

.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 should be prepared.

1.3.4 Radio arrangement drawings (~~Lay-out~~ Layout of bridge and communication room)

These drawings should show the location of the following equipment:

.1 controllers for transmitting distress alarm;

.2 VHF radio installations, including any control units;

.3 MF or MF/HF installation, including any control units, ~~telex~~ printers, etc.;

.4 satellite communication equipment, including terminals, printers, etc.;

.5 ~~watchkeeping~~ 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 for MSI and SAR related information recognized by IMO;

.7 ~~transponders~~ 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 mandatory radio equipment;

.10 battery charger (for the reserve source of energy); and

.11 fuse or circuit breaker box.

1.3.5 Wiring diagram

These drawings should show the following connections etc.:

.1 antenna connections;

.2 connections to telephone exchange (PABX), fax machine, etc.;

.3 connections to the ships mains, emergency source of energy, and the reserve source of energy (batteries), and switching systems for all radio- and radio navigation equipment;

.4 which radio equipment (including emergency light) being connected to each power unit/source;

.5 fuses or circuit breaker 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 any connections (interface connections) between ~~GNSS~~ EPFS and GMDSS radio equipment;

.8 battery chargers for the reserve source of energy;

.9 connections to gyro (if applicable);

.10 type of cables used in the installation; and

.11 connections to VDR (if applicable).

1.4 Instruction manuals and publications

The following instruction manuals and publications should 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 ~~for all radio equipment and battery chargers~~;

.2 specifications and battery capacity calculations for the installed batteries; and

.3 ITU ~~(International Telecommunication Union)~~ publications according to requirements in the Radio Regulations.

1.5 Tools and spare parts

As a minimum requirement, the ship should 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;

.4 acid specific density meter if the ship is fitted with lead acid accumulators; and

.5 multi-meter.

If the ship makes use of the ~~"on board maintenance"~~ "at-sea electronic maintenance" method, it should 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 should meet specific requirements as to maintenance methods for the radio installation. ~~Irrespective of sea areas, the ship should not leave harbour without being able to transmit distress alert ship-to-shore by at least two separate and independent radio communication systems.~~ Irrespective of the methods used to ensure the availability of the functional requirements specified in SOLAS regulation IV/4.1.1, and as specified in regulation IV/15.8, a ship should not depart from any port unless and until the ship is capable of performing all distress, urgency and safety functions, as set out in regulation IV/4.1.1.

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

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

1.6.1 Shore-based maintenance

If availability is ensured by using a combination of methods which includes shore-based maintenance, an arrangement acceptable to the Administration should be established to ensure adequate support of the ship for the maintenance and repair of its radio installations. For example, the following arrangements, among others, may be suitable:

.1 ~~The shipping company/ship may have a written agreement with a marine electronic company or be able to present a written declaration/plan showing how shore-based maintenance is to be carried out.~~an agreement with a company known to cover the trading area of the ship to provide maintenance and repair facilities on a call-out basis;

~~*(IMO resolution A.702(17), Annex, item 3)*~~

Note: Production of a valid SOLAS certificate by an Administration is sufficient proof that the Administration is satisfied that adequate shore-based maintenance arrangements have been made by the shipowner.

.2 ~~A Radio Safety Certificate issued by an Administration should be, in general, a sufficient proof that satisfied adequate maintenance arrangement has been made.~~provision of facilities at the main base of ships engaged on a regular trading pattern. Records of Equipment (Form P, R or C) should include an indication of the types of arrangements for shore-based maintenance.

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

1.6.2 At-sea electronic maintenance

~~If the shipowner chooses at-sea electronic maintenance, personnel with necessary qualifications and authorization for servicing the equipment should be present on board. All necessary instruments and spare parts for repair of all radio equipment should also be available when the ship is at sea.~~

~~*(IMO resolution A.702(17))*~~

.1 If availability is ensured by using a combination of methods which includes at-sea electronic maintenance capability, adequate additional technical documentation, tools, test equipment and spare parts should be carried on board in order to enable the maintainer to perform tests and localize and repair faults in the radio equipment. The extent of this additional technical documentation, tools, measuring equipment and spare parts to be carried on board should be consistent with the equipment installed and should be approved by the Administration. An indication of such approval should be entered in the Records of Equipment (Form P, R or C).

.2 The person designated to perform functions for at-sea electronic maintenance should 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 recommendations* of the Organization on the training of such personnel.

1.6.3 Duplication of equipment

~~The following additional equipment should be installed for sea areas A3 and A4:~~

~~.1 VHF with DSC controller~~

~~.2 approved satellite ship earth station or complete MF/HF radio telephony station with DSC and NBDP (see note).~~

~~*(IMO resolution A.702(17))*~~

~~Note: - Ships in sea areas A3 may choose between duplication with either complete MF/HF transceiver or approved satellite ship earth station. Ships in regular trade in sea areas A4 should duplicate with a complete MF/HF installation. Ships in sea area A4 which are not in regular trade in that area may duplicate with approved satellite ship earth station, provided a MF/HF installation is used as main station.~~

.1 If availability is ensured by using a combination of methods which includes duplication of equipment, in addition to the radio installations required by regulations IV/7, IV/10 and IV/11, as appropriate, the following radio installations complying with regulation IV/14 should be available on board ships engaged on voyages in:

.1 <u>sea area A3</u> - a VHF radio installation complying with the requirements of regulations IV/7.1.1 and IV/7.1.2, and either an MF/HF radio installation complying with the requirements of regulation IV/11.1.1 and being able to comply fully with the watch requirements of IV/12.1.3 or a recognized mobile satellite service SES complying with the requirements of regulation IV/10.1.1. The MF/HF installation or recognized mobile satellite service SES installed for duplication should also comply with regulations IV/10.2 and IV/10.3;

.2 <u>sea areas A3 and A4</u> - a VHF radio installation complying with the requirements of regulations IV/7.1.1 and IV/7.1.2, and an MF/HF radio installation complying with the requirements of regulation IV/11.1.1 and being able to comply fully with the watch requirements of IV/12.1.3.

Ships operating in sea area A4 only occasionally and having originally installed an MF/HF radio installation, may, instead of the additional MF/HF radio installation, install a recognized mobile satellite service SES complying with the requirements of regulation IV/10.1.1.

* Reference is made to resolution A.703(17) on *Training of radio personnel in the Global Maritime Distress and Safety System (GMDSS)*.

The MF/HF radio installation or recognized mobile satellite service Ship Earth Station (RMSS-SES) installed for duplication should also comply with regulation IV/10.2.

.2 The additional radio installations specified in 1.6.3.1.1 and 1.6.3.1.2 of these Guidelines should each be connected to a separate antenna and be installed and ready for immediate operation.

.3 It should be possible to connect the additional radio installations specified in 1.6.3.1.1 and 1.6.3.1.2 (hereinafter referred to as “duplicated equipment”) to the reserve source or sources of energy required by regulation IV/13.2, in addition to the appropriate radio equipment specified in that regulation (hereinafter referred to as “basic equipment”). The capacity of the reserve source or sources of energy should be sufficient to operate the particular installation (i.e. the “basic equipment” or the “duplicated equipment”) with the highest power consumption, 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 should be such that a single fault in this arrangement should 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 should be issued to the ship.

.2 The licensee (normally the shipowner) is responsible for applying for a radio licence in due time before the installation take place.

(RR. Article 18)

Note: - The Maritime Mobile Service Identity (MMSI) ~~number~~ stipulated in the radio licence should be coded into the DSC equipment and, if appropriate, also into the ~~satellite~~ EPIRB. If the national authority accepts serial number or call sign for identification of EPIRBs, the correct serial number or call sign should be coded into the EPIRB.

All these identities should be changed when a ship is transferred to another flag~~, and appropriate steps should be taken to ensure databases held ashore are kept current~~ - see Section 1.9.

1.8 Application for activation of satellite equipment

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

1.9 ~~De-activation of satellite~~ Process for radio equipment when transferring a ship to ~~foreign~~ another flag

~~When transferring a ship to foreign flag,~~ When ships move from the flag of registration of one administration to that of another administration, the licensee/shipowner should immediately inform the appropriate Licensing ~~Authority~~ Authorities ~~immediately~~ concerning ~~de-activation of satellite equipment~~ the status of the ship station radio licence and update the identities programmed into radio equipment, and ensure that international databases, such as ITU MARS, and COSPAS-SARSAT IBRD are appropriately updated.

1.10 Initial and annual radio survey, issuance, renewal and endorsement of Safety Radio Certificates

Survey of radio installations on SOLAS ships should be carried out in accordance with the rules laid down in IMO resolution ~~A.948(23)~~ A.1140(31)"~~Revised~~ Survey Guidelines under the harmonized system of survey and certification (HSSC), 2019" ~~R 4~~ (as amended and adopted by IMO), and SOLAS 1974~~, as amended~~, chapter I, part B. It is important to note the following text:

.1 The survey of the radio installations, including those used in life-saving appliances, should always be carried out by a qualified radio surveyor who has necessary knowledge of the requirements of SOLAS 1974, ITU Radio Regulations and the associated performance standards for radio equipment. The radio survey should be carried out using suitable test equipment capable of performing all the relevant measurements required by these guidelines ~~The radio survey should always be performed by a fully qualified radio surveyor who has adequate knowledge of the IMO's relevant Convention, particularly SOLAS and associated performance standards, and appropriate ITU Radio Regulations. The radio survey should be carried out using suitable test equipment capable of performing all relevant measurements required by these Guidelines.~~

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

.3 The STCW ~~International~~ Convention ~~on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995~~ requires that the radio operator performing watchkeeping duties should:

.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 certificate for the radio operator/operators should be checked during the survey.

2 FUNCTIONAL REQUIREMENTS

2.1 General

.1 The functional requirements of the GMDSS are detailed in SOLAS chapter IV, regulation 4.1.1.

It is of great safety importance that all requirements laid down are fulfilled. The most important requirement is that "Every ship, while at sea, should be capable of transmitting ship-to-shore distress alerts by at least two separate and independent means each using a different radiocommunication service". It should be possible to initiate such alerts from the position from which the ship is normally navigated.

.2 ~~Under certain conditions the~~ 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 should 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 ~~obligatory~~ mandatory in the trade area of the ship.

(SOLAS 1974~~, as amended~~, regulations IV/8 and 9)

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

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

.6 All ships should keep continuous listening watch on VHF channel 16 whilst at sea by use of a VHF receiver. ~~By resolution MSC.131(75) the Organization has decided to require all ships to maintain, when practical, a continuous listening watch on VHF channel 16 until such time as the Maritime Safety Committee may determine the cessation of this requirement, taking into account that a re-assessment will be undertaken by the Organization no later than 2005. 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, should be required and kept for foreseeable future with a view to providing:~~

~~.1 a distress ability and communication channel for non-SOLAS vessels; and~~

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

.7 Watch should also be kept with ~~NAVTEX and/or with EGC~~ MSI and SAR related information receiver. The watch should be kept at the position from which the ship is normally navigated.

(SOLAS 1974~~, as amended~~, 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 4.1.2. 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 should 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 RMSS-SESs, 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, as may be defined by a Contracting Government.

.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, as may be defined by a Contracting Government.

.3 Sea area A3 means an area, excluding sea areas A1 and A2, within the coverage of a recognized mobile satellite service supported by the ship earth station carried on board in which continuous alerting is available.

.4 Sea area A4 means an area outside of sea areas A1, A2 and A3.

2.3 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~~ ships to which SOLAS applies:

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

~~Equipment~~	~~A1~~	~~A2~~	~~A3 Inmarsat solution~~	~~A3 HF solution~~	~~A4~~
~~VHF with DSC~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
~~DSC watch receiver channel 70~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
~~MF telephony with MF DSC~~		~~x~~	~~x~~		
~~DSC watch receiver MF 2187,5 kHz~~		~~x~~	~~x~~		
~~Inmarsat Ship earth station with EGC receiver~~			~~x~~		
~~MF/HF telephony with DSC and NBDP~~				~~x~~	~~x~~
~~DSC watch receiver MF/HF~~				~~x~~	~~x~~
~~Duplicated VHF with DSC~~			~~x~~	~~x~~	~~x~~
~~Duplicated Inmarsat SES~~			~~x~~	~~x~~	
~~Duplicated MF/HF telephony with DSC and NBDP~~					~~x~~
~~NAVTEX receiver 518 kHz~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
~~EGC receiver~~	~~x[1]~~	~~x[1]~~		~~x~~	~~x~~
~~Float-free satellite EPIRB~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x[4]~~
~~Radar transponder (SART)~~	~~x[2]~~	~~x[2]~~	~~x[2]~~	~~x[2]~~	~~x[2]~~
~~Hand held GMDSS VHF transceivers~~	~~x[3]~~	~~x[3]~~	~~x[3]~~	~~x[3]~~	~~x[3]~~
~~For passenger ships the following applies from 01.07.97~~					
~~"Distress panel" (SOLAS regulations IV/6.4 and 6.6)~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~
~~Automatic updating of position to all relevant radiocommunication equipment regulation IV/6.5. This also applies for cargo ships from 01.07.02 (chapter IV, new regulation 18)~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~

~~Two-way-on-scene radiocommunication on 121,5 and 123,1 MHz from the navigating bridge.~~ ~~(SOLAS regulation IV/7.5)~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~

Equipment	A1	A2	A3	A4
VHF telephony installation with DSC capable of:	x	x	x	x
DSC watch on channel 70	x	x	x	x
Radiotelephony watch on channel 16	x	x	x	x
Watch on other appropriate frequency or frequencies for urgency and safety communications for the area in which the ship is navigating	x	x	x	x
MF telephony installation with MF DSC capable of:		x	x	
DSC watch on 2 187.5 kHz		x	x	
Watch on other appropriate frequency or frequencies for urgency and safety communications for the area in which the ship is navigating		x	x	
Ship earth station providing RMSS			x	
MF/HF telephony installation with DSC capable of:				x
DSC watch on 2 187.5 kHz and 8 414.5 kHz				x
Depending on time of day and geographical position, DSC watch on at least one of the frequencies 4 207.5 kHz, 6 312 kHz, 12 577 kHz or 16 804.5 kHz				x
Watch on other appropriate frequency or frequencies for urgency and safety communications for the area in which the ship is navigating				x
Duplicated VHF with DSC including watch keeping capability			x	x
Duplicated SES providing RMSS including watch keeping capability			x[4]	
Duplicated MF/HF telephony with DSC including watch keeping capability			x[4]	x
Receiver(s) for MSI and SAR-related information[4]	x	x	x	x[3]
Float-free EPIRB	x	x	x	x
Radar SART or AIS SART	x[1]	x[1]	x[1]	x[1]
Portable GMDSS VHF transceivers	x[2]	x[2]	x[2]	x[2]
Automatic updating of position to all relevant radiocommunication equipment	x	x	x	x
The following additional requirements apply to passenger ships				
“Distress panel” and “distress alarm panel” (SOLAS regulations IV/6.4 and 6.6)	x	x	x	x
Two-way-on-scene radiocommunication on 121.5 and 123.1 MHz from the navigating bridge. (SOLAS regulation IV/7.6)	x	x	x	x

~~1) Outside NAVTEX coverage area.~~

1) Cargo ships between 300 and 500 gt.: 1 set. Cargo ships of 500 gt. and upwards and passenger ships: 2 sets.

2) Cargo ships between 300 and 500 gt.: 2 sets. Cargo ships of 500 gt. and upwards and passenger ships: 3 sets.

3 This may be either a combined ship earth station and EGC receiver or separate pieces of equipment.

~~4) Inmarsat E-EPIRB cannot be utilized in sea area A4.~~

4 Ships in sea areas A3 may choose between duplication with either complete MF/HF transceiver or ship earth station providing a recognized mobile satellite service (See Section 1.6.3).

3 BASIC EQUIPMENT – SUPPLEMENTARY REQUIREMENTS

3.1 General requirements

Every radio installation should:

.1 be ~~so~~ located in such a way that no harmful interference of mechanical, electrical or other origin affects its proper use;

.2 be ~~so~~ located in such a way that ~~as to ensure~~ electromagnetic compatibility (EMC) is ensured and ~~avoid~~ harmful interference avoided to other equipment and systems;

.3 be so located as to ensure the greatest possible degree of safety and operational availability, with warning notice when appropriate;

.4 be protected against the harmful effects of water, extremes of temperature and other adverse environmental conditions;

.5 ~~be provided with emergency lighting, which is independent of the main and emergency sources of electrical power for the illumination of the radio controls~~ 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; and

~~.6 be clearly marked with the ship's call sign, MMSI number and other identities as appropriate; and~~

.~~7~~6 be so located that no magnetic compass lies within the stated Compass Safe Distance of the equipment.

(SOLAS 1974~~, as amended~~, regulation IV/6.2)

Note: Ancillary equipment such as scramblers and automatic telephone equipment, etc., may be connected to the required GMDSS equipment, provided that any such connection is made in such a way that the prescribed GMDSS functions will be fully restored immediately at the normal or abnormal termination of the connected ancillary equipment.

3.2 Use of VHF for navigational safety

Control of the VHF used for navigational safety should 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~~, as amended~~, regulation IV.6.3)*

3.3 Marking of radio equipment and notices

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

.2 The radio installation should 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.

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

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

3.4 Emergency lights

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

.2 Means should 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, should ~~by~~ 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~~ work station, providing it is not dazzling the navigator on watch.

(IMO resolution A.694(17), annex, paragraph 3.3.)

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

.6 Switches for emergency lights should 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 "communication office" outside the navigation bridge with remote controls on the bridge. It must be emphasized, however, that the suggestions in subsections 3.5 - 3.7 below are to be considered as guidelines only. Other solutions and combinations are equally acceptable as long as the general requirements and recommendations outlined are fulfilled.

(SOLAS 1974~~, as amended~~, chapter IV, COM/Circ.105 and ISO 8468~~: 1990(E)~~2007)

3.5.1 ~~Radio~~ Communication work station

.1 The work station should be located in the aft of the navigation bridge so that the navigator 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 should be made of glass or fitted with windows. There should 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 should be provided in order to avoid dazzling effect from the lights.

.3 All mandatory radio equipment installed on the navigation bridge (except mandatory VHF, see subsection 4.1.1.) should be located in the ~~radio~~ communication work station. Watch receivers 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 or MF/HF and ~~Inmarsat~~ recognized mobile satellite service equipment, including EGC printer, should be located outside this work station.

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

.4 MF/HF RF power amplifiers should be located in a separate and screened cabinet or room. Antenna tuners should, as a general rule, be located outdoors below the antenna.

3.5.2 Communication office

.1 The communication office may be located as required by the shipping company, e.g. in connection to the captain’s office. It should be possible to make public calls and perform general radiocommunications on MF or HF and/or through satellite from the 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 ~~Inmarsat~~ recognized mobile satellite services, should be located in the communication office.

.3 The remote operation panels for the mandatory equipment should 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 should also be given to the requirements for navigational safety communication and subsequent distress communications on MF or HF. When MF/HF DSC is included in the mandatory basic or duplicated radio equipment, it should be possible to conduct distress and safety communications from the navigating position, and the MF/HF DSC controller should be installed in this position.

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

.4 Watch receivers and ~~NAVTEX/EGC~~ MSI and SAR related information receivers should be located on the navigation bridge.

.5 VHF transceivers with DSC used for navigational safety should 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 should 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 should be placed close to the other GMDSS equipment near the ~~conning position~~ communication work station.

.3 It ~~should~~ may be possible also to operate printed communications (data communications via radio and/or ~~Inmarsat~~ recognized mobile satellite services) from other areas of the ship.

3.7 Ships with integrated ~~radio~~communication systems (I~~R~~CS)

.1 The I~~R~~CS 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 I~~R~~CS workstation should 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 I~~R~~CS should comprise at least two GMDSS workstations each connected to each GMDSS radiocommunication sensor over a network or connection system. At least two printers should be installed. All requirements laid down in SOLAS 1974~~, as amended~~, chapter IV, should be fulfilled.

(IMO resolution A.811(19))

4 GMDSS RADIO EQUIPMENT

4.1 Location of VHF transceivers and VHF DSC controllers

.1 ~~VHF with DSC forming part of the mandatory VHF communication equipment for safety of navigation should be located in the conning position. This equipment may be connected to several remote control units, i.e. on the wings of the navigation bridge, provided that the navigating bridge has priority~~ Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigation bridge convenient to

the conning position and, where necessary, facilities should be available to permit radiocommunications from the wings of the navigation bridge. Portable VHF equipment or remote control units, i.e. on the wings of the navigation bridge may be used to meet the latter provision. If remote control units are used, controls at the navigating bridge should has have priority. If such "combined" equipment is chosen, it should be possible to transmit DSC distress alert from the conning position.

.2 If the ship is equipped with extra VHF transceiver (without DSC) with channels required for navigational safety, located in the conning position, another central location of the mandatory DSC VHF equipment on the navigation bridge (in navigating position) can be accepted.

(SOLAS 1974~~, as amended~~, 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, however, be located in the "navigating position" instead of in the conning position.

~~*(IMO resolution A.702(17), Annex, item 2.1.)*~~

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

(SOLAS 1974~~, as amended~~, 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 should not be muted or interrupted when using other radio equipment, or

.2 a dedicated watch receiver combined with the VHF transceiver. It should 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 should 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 equipment is main or duplicated equipment, it should 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 should 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 with alert activated from the navigation bridge.

Note: **-** DSC on MF is required in sea areas A2, A3 and A4~~, irrespective of selected radio equipment solution~~. It should 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 should 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 on a ship for sea area A3, there is no requirement for an extra DSC watch receiver.

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

.3 RF power amplifiers should, 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 should, as a general rule, be located in an outdoor position below and close to the antenna.

(IMO resolution A.813(19))

.4 The MF or MF/HF transmitter should be equipped with an instrument or other provisions indicating antenna current or power delivered to the antenna.

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

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

4.4 Watchkeeping receivers for DSC

.1 Depending on the trade area and mandatory radio equipment of the ship, continuous watch is required via separate receivers for DSC channel 70, MF DSC 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~~, as amended~~, regulation IV/12)

.2 The watch receiver for VHF DSC channel 70, MF DSC 2187.5 kHz and HF DSC scanning receiver should 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 should be possible to read the DSC alert messages on the navigation bridge. The printer (if any) 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), as amended, and A.806(19), as amended)

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

Note: **-** 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), Annex, item 2.1.)*~~

4.5 Watchkeeping on MF or MF/HF DSC

4.5.1 Continuous watch on the MF DSC distress frequency 2187.5 kHz to be kept by:

.1 a separate DSC watch receiver locked on 2 187.5 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 should be provided. Other frequencies than those used for distress and safety should 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 to 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 should 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 scanning receiver and the additional scanning receiver only if continuous watch for distress and safety calls can be maintained.

(SOLAS 1974~~, as amended~~, regulations IV/2.1.3, 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 should be provided.

Note: - According to SOLAS regulation ~~IV/4.1.8,~~ IV/4.1.2, there is a general requirement for transmitting and receiving "~~Urgency and safety~~ general radio communications". Ships in sea area~~s~~ A2 should, according to this requirement and according to SOLAS regulation IV/9.~~3~~4, be able to transmit and receive general radiocommunications on MF or MF/HF telephony or NBDP or ~~Inmarsat~~ a ship earth station providing a recognized mobile satellite service. Ships in sea area A2, which is equipped in accordance with the minimum SOLAS requirements (i.e. VHF and MF with DSC), should be provided with equipment for listening and calling on ~~national and international~~ MF DSC ~~calling~~ frequencies. Alternatively, they may be provided with ~~Inmarsat~~ recognized mobile satellite service equipment in order to fulfil the general radio communications.

According to IMO's performance standards, resolutions A.804(19) and A.806(19), as amended, it is required that the DSC equipment should 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 ~~Inmarsat~~ recognized mobile satellite service) should also be used for general radio communications. In these sea areas the general radio communications are normally fulfilled either by using the HF or ~~Inmarsat~~ recognized mobile satellite service equipment.

(SOLAS 1974~~, as amended~~, regulations IV/10 and 11)

4.6 Recognized Mobile Satellite Service ~~ship earth station~~ (~~SES~~ RMSS)

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

(SOLAS 1974~~, as amended~~, regulation IV/10.~~3~~2)

.2 The terminal and the radiotelephone equipment, if any, may be placed in a "~~radio~~ communication work station" in connection with the navigation bridge or in a separate communication office.

.3 Taking into account the guidelines in section 3.5, the satellite terminal and/or external printers may also be located elsewhere in the ship.

Note: Attention should be made to IMO resolution ~~A.807(19)~~MSC.434(98), ~~as amended,~~ annex, paragraph 3.3.2 regarding ~~Inmarsat-C~~ new installations, which has the following text:

~~*"It should 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".*~~
"It should be possible to initiate and make distress alerts/calls from the position at which the ship is normally navigated. The equipment should include an option making it possible to initiate transmission of distress alerts/calls at a position remote from the primary human machine interface (HMI) of the equipment."

The words "~~one other position designated for distress alerting~~ at a position remote from the primary HMI of the equipment" only apply to ships which have defined an additional place/room on board to be such "other position". Normally it will be accepted that ~~Inmarsat-C~~ recognized mobile satellite service equipment is installed in the "~~radio~~ communication work station" if it is provided with facilities for conducting distress alerts from the navigation bridge. It is, however, recommended that the ~~Inmarsat-C~~ recognized mobile satellite service terminal, including additional equipment, should 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 should 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 ~~Inmarsat-C~~ ship earth station providing a recognized mobile satellite service in the GMDSS

If the licensee/shipowner wants to connect the mandatory ~~Inmarsat-C~~ recognized mobile satellite service terminal i.e. to the ship's PC-network or to an outside located data terminal, all mandatory GMDSS requirements in accordance with SOLAS 1974~~, as amended~~, should always be fulfilled.

In that case, the dedicated printer should be connected permanently to the output of the mandatory ~~Inmarsat~~ recognized mobile satellite service terminal's printer output. A manually operated and duly marked switch, located near the ~~Inmarsat~~ recognized mobile satellite service terminal, should be installed to disconnect the ~~Inmarsat~~ recognized mobile satellite service terminal from the external equipment.

4.8 Extra requirements for passenger ships

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

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

~~.3 One button for each individual radio installation which are installed.~~

~~.4~~3 Means should be provided to prevent inadvertent activation of the button or buttons.

Note: **-** The alert button or buttons should be protected against inadvertent activation by use of a spring loaded lid or cover permanently attached by e.g. hinges in order to fulfil the requirement of carrying out "at least two independent actions" when transmitting distress alert~~; IMO requirements in force from 23 November 1996~~. (The button or buttons should be pressed for at least 3 seconds before the alarm is activated.)

~~.5~~4 If the installed ~~satellite~~ EPIRB is used as the secondary (mandatory) means of distress alerting and is not remotely activated, it should be acceptable to have an additional EPIRB (~~406 MHz or Inmarsat-E~~ float-free or manual) installed on the navigation bridge near the conning position.

.~~6~~5 Information on the ship's position should 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 ~~GNSS~~EPFS receiver should be provided, where ~~GNSS~~EPFS is not integrated).

(SOLAS 1974~~, as amended~~, regulation IV/6.4)

.~~7~~6 The **distress alarm panel** is normally included in the distress panel and should provide visual and aural indication of any distress alert or alerts received on board and should also indicate through which radiocommunication service the distress alerts have been received.

(SOLAS 1974~~, as amended~~, regulation IV/6.6)

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

~~*Sea areas*~~	~~*Equipment*~~
~~*A1*~~	~~*VHF DSC, VHF DSC EPIRB or satellite EPIRB*~~
~~*A1+A2*~~	~~*VHF DSC, MF DSC, satellite EPIRB*~~
~~*A1+A2+A3 (alternative 1)*~~	~~*VHF DSC, MF DSC, Inmarsat, satellite EPIRB*~~
~~*A1+A2+A3 (alternative 2)*~~	~~*VHF DSC, MF/HF DSC, satellite EPIRB*~~
~~*A1+A2+A3+A4*~~	~~*VHF DSC, MF/HF DSC, Inmarsat, satellite EPIRB*~~

Sea areas	Equipment
All ships	VHF DSC
A1	EPIRB
A2	MF DSC and EPIRB or RMSS
A3	MF DSC, RMSS and one of HF DSC or EPIRB or second RMSS
A4	MF/HF DSC and EPIRB

Note: - Only radio equipment according to SOLAS 1974~~, as amended~~, chapter IV are required to be connected to this 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 for ships in sea areas A3 and A4, are, therefore, 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 installed distress panel.

4.9 ~~NAVTEX and EGC (Enhanced Group Call)~~ MSI and SAR related information receiver(s)

.1 The printer or display for an MSI and SAR related information receiver should be located on the navigation bridge. As mandatory equipment in the GMDSS, these receivers should also, as a general rule and in the same way as required for other permanent installed equipment, have their own permanent installed power supplies with fuse circuits/fuses, cf. ~~sub~~section 7~~.19~~. Antenna and antenna cable should also be permanently installed.

.2 The mandatory requirement for an MSI and SAR related information receiver may be combined with ~~Inmarsat~~ recognized mobile satellite service

equipment. It is recommended that a dedicated MSI and SAR related information receiver is used, enabling continuous reception of MSI messages independent of whether the ~~Inmarsat~~ recognized mobile satellite service equipment is being used or not. ~~"Class 3 EGC" is included in the Inmarsat-C, but only shares the antenna with this equipment and functions in parallel with and separate of the Inmarsat-C equipment.~~

(SOLAS 1974~~, as amended~~, regulation IV/7.1.4 ~~and 7.1.5~~ and IMO resolution A.701(17))

4.10 ~~Satellite float~~ Float-free EPIRB

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

.1 The EPIRB should, with greatest possible probability, float-free and avoid being caught in railings, superstructure, etc., if the ship sinks.

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

(SOLAS 1974~~, as amended~~, regulations IV/7.1.5, 8.1.1, 9.1.~~2~~3.1, 10.1.~~3~~4.1 and IMO resolutions A.763(18) and MSC.471(101).

Note: **-** A float-free EPIRB may also be used to fulfil the requirements for one piece of equipment (of two), which is capable of transmitting distress alert to shore from or near the navigating bridge of the ship. Under such conditions the float-free EPIRB should fulfil the following **additional requirements** with regards to location/installation:

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

(SOLAS 1974~~, as amended~~, regulation *IV/7.1.5 and COM/Circ.105)*

.4 It may be possible to activate the EPIRB remotely from the bridge. If remote activation is used, the EPIRB should be installed so that it has unobstructed hemispherical line of sight to the satellites.

(COM/Circ.105)

Note: **-** It should 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 should be given to this requirement. Alternatively, two float-free EPIRBs should be installed or a float-free EPIRB and manual EPIRB.

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

(IMO resolution MSC.471(101))

.6 The EPIRB should be marked with the ship's call sign, serial number of EPIRB, MMSI number (if applicable),~~15~~ Hex ID, and battery expiry date.

4.11 ~~Search and rescue radar transponders (SART)~~ Radar SARTs and AIS-SARTs

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

Alternatively, one radar ~~transponder~~ SART or AIS-SART should be placed in bracket in each survival craft (normally covered lifeboats) if such location permits rapidly replacing of the radar SART or AIS-SART into any survival crafts which may be used in emergency situations.

The radar SART or AIS-SART should 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 ~~transponders~~ SARTs or AIS-SARTs and equipped with free-fall lifeboats one of them should 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~~, as amended~~, regulation IV/7.5 and IMO resolution A.802(19))

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

4.12 ~~Hand held (Two-way) GMDSS VHF transceivers~~ Portable two-way VHF radio-telephone apparatus

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

.2 Primary batteries should be sealed for use only in emergency situations and marked by the ~~manufacturer~~ supplier with battery expiry date. The battery should be considered as exhausted, if its seal is broken, and a new battery will be requested during radio survey, cf. the IMO requirement for 8-hours operation in emergency situations. Use of a new battery should not be required for operational tests or surveys.

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

(SOLAS 1974~~, as amended~~, ~~regulation IV/7.6.2.1~~ regulations IV/7.2, 7.3 and 7.4 and IMO resolutions A.762(18), A.809(19), as revised by ~~and~~ MSC.149(77))

.4 Portable two-way VHF radio-telephone apparatus should have waterproof marking with the ship's name and call sign. The primary battery should be marked with ~~expire~~ expiry date. Channel numbers should be stated on the equipment.

4.13 ~~Hand held~~ 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 (see subsection 4.12). Alternatively a simplex VHF transceiver (single frequency only) or remote controlled units with channel selector, loudspeaker and microphone may be installed in these positions. These remote controlled units should be controlled by a VHF installed at the conning position. See also section 4.1.1.

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

4.14 On scene (Aeronautical) ~~mobile emergency radiocommunication equipment~~ two way VHF radiotelephone apparatus

.1 All passenger ships should 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 should be marked with the ships name and call sign. The primary battery should be marked with expiry date.

(SOLAS 1974~~, as amended~~, regulation IV/7.6)

.2 Approved equipment may be of a fixed type or a portable type. The equipment should be provided with the frequencies 121.5 MHz and 123.1 MHz only.

(IMO resolution MSC.80(70))

4.15 ~~GNSS – global navigational satellite system~~ EPFS – Electronic Position Fixing System

.1 ~~In passenger ships irrespective of size, information~~ Information on the ship's position should 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~~, as amended~~, regulations IV/18.1 and V/19)

.2 ~~In cargo ships, where~~ When an ~~GNSS~~ EPFS is installed in accordance with regulation V/19, automatic updating of the ship's position into the DSC equipment and ~~Inmarsat~~ recognized mobile satellite service equipment should be possible. 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~~, as amended~~, regulation IV/18)

If the ~~GNSS~~ EPFS is connected to the GMDSS equipment, it should (similar to the mandatory GMDSS equipment) be supplied with energy from the reserve source of energy/batteries.

(SOLAS 1974~~, as amended~~, regulation IV/13.8)

4.16 Connections of navigational sensors

4.16.1 ~~GNSS~~ EPFS - Receiver

A ~~GNSS~~ EPFS receiver should be connected to the relevant radio communication equipment (DSC controller, GMDSS satellite equipment) in order to provide information on the ship's position continuously and automatically to the radio equipment.

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

4.16.2 Heading sensor

If the GMDSS satellite equipment requires automatic antenna adjustment according to ship's heading, the required heading sensor should be connected.

In this case the heading sensor should also be supplied with energy from the reserve source of energy/batteries.

5 ANTENNA INSTALLATION

5.1 General

Special attention should 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.

5.2 Location of VHF antennas

.1 VHF antennas should 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 should 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.

.2 VHF antennas should have a vertical polarisation.

.3 Ideally there should not be more than one antenna on the same level.

.4 The location of mandatory VHF antennas should be given priority compared with mobile telephone antennas. If they are located on the same level, the distance between them should 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 should be watertight by design in order to give protection against water penetration into the antenna cable.

.7 AIS VHF antenna should 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 should 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 should 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 should be at least 5 metres.

5.3 Location and choice of MF/HF antennas

.1 The mounting arrangement of the antenna or pedestal should be constructed in order to withstand the strain from swaying and vibration.

The transmitting whip antenna should be installed as vertical as possible.

.2 Wire antennas should be protected against breakage by having a weak link installed.

.3 Whip antennas should be installed as vertical as possible and located in an elevated position on the ship at least 1 metre away from conductive structures.

.4 Attention should 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 should be insulated and run as vertically as possible and not less than 45° towards the horizontal plane.

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

5.5 Receiving antennas

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

.2 Antennas for watchkeeping receivers should 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 antenna should be installed such as to ensure electromagnetic compatibility. (IMO resolution MSC.434(98)).

~~**5.6.1 General**~~

~~.1 In general, satellite antennas should 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 It is recommended for Inmarsat-A, B and F-77 antennas (stabilized directional antennas) that communication should be maintained with the satellite down to an elevation of minus 5°. For Inmarsat-C (omni-directional antenna) it is recommended that communication should 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.~~

~~**5.6.2 Satellite communication antenna installation**~~

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

~~.1 The antenna should be located at the top of the radar mast; or~~

~~.2 On a pedestal, in the radar mast, or on the top deck so that:~~

~~- for directive antennae; shadows from constructions, especially within a distance of 10 metres, is maximum 6°;~~

~~- for omnidirectional antennas; shadows from constructions, especially within a distance of 1 metre, is maximum 2°.~~

~~.3 Antennae should be installed in a readily accessible location.~~

~~.4 Satellite antennae should not be located in an area where they can be damaged by heat and smoke.~~

.5 The satellite antenna should not be located on the same plane as the ships' radar antenna.

.6 GNSS antennae should not be located close to or on the same plane as the Inmarsat antenna.

.7 Consideration should 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 should be constructed so that vibrations are reduced as much as possible.

5.6.3 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 should be more than 5 metres.

.2 Distance to VHF antennas should be more than 4 metres.

.3 Distance to the magnetic compass should be more than 3 metres.

(The installation manual for the equipment and Inmarsat guidelines)

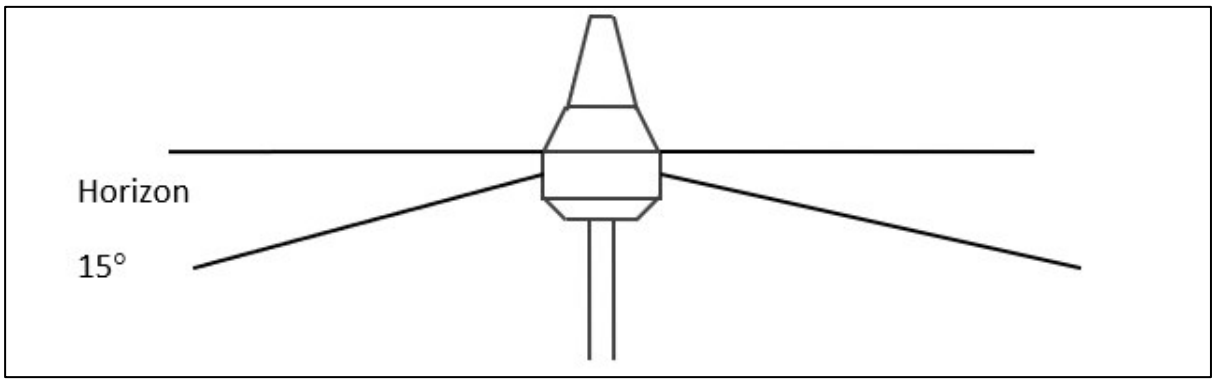
5.6.4 Inmarsat-C antenna

The antenna should be constructed so as to function up to 15° pitch and roll. In order to obtain this result, the antenna should 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 A663(16) and A.807(19), as amended)

Zenith

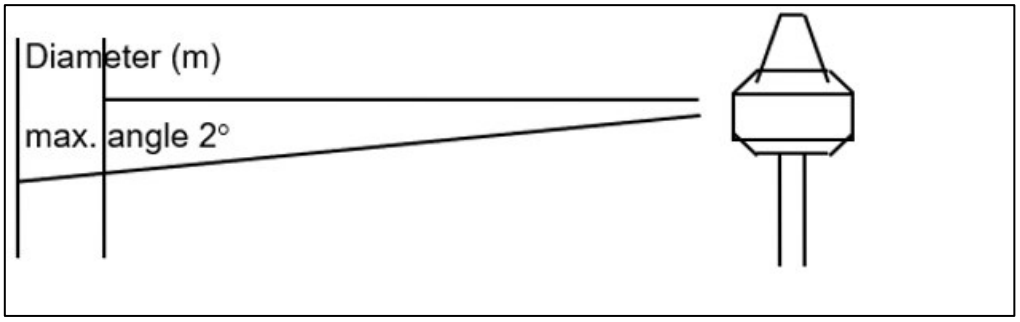


~~**5.6.5 Calculation of distance to obstructions:**~~

~~If obstructions such as i.e. mast, funnel etc. is unavoidable, the following guidelines should apply:~~

~~The distance to the obstruction should be so that the obstruction only covers a 2° sector.~~

~~Note: - In such case the safe distance will be the following: 20 x the diameter of the obstruction (in metres).~~



~~If two Inmarsat-C antennae are installed the vertical distance between them should be at least 1 metre to eliminate interference.~~

~~**5.6.6 Antenna cable**~~

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

5.6.~~7~~1 Antennas for voluntary radio equipment

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

5.7 Installation of coaxial cables

Coaxial cables should 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 should not be greater than 10% of the measured output power.

The following guidelines should be applied when bending coaxial cables:

.1 Cables should be crossed at right angles.

.2 Where there is one bend in a permanent fixture the bending radius should be 5 times the cables' outside diameter.

.3 Where there are several bends, the bending radius should be 10 times the outside diameter of the cable.

.4 When using flexible cable the bending radius should be 20 times the outside diameter of the cable.

6 EMC, EARTHING AND SCREENING

6.1 Electromagnetic compatibility (EMC)

6.1.1 General

All reasonable and practical steps should 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, as amended. In order to avoid interference the following rules applies:

.1 Radio installations should not cause harmful interference to other electronic, electrical or navigational systems on board ships.

.2 However, other systems should 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~~, as amended~~, regulations IV/6.2.1 and V/17 and IMO resolutions 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 or flag-in of the ship, or after any electrical or other installation modifications or changes that may have an impact, the following procedure should 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. The result of this evaluation including the findings and measures taken are to be documented and provided to the radio surveyor for the final survey. The radio surveyor should take this report as an annex to the Ship Safety Radio Certificate to be kept on board for future use.

To perform the following procedure, 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 victim 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 should 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 should 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 should 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.~~2~~3 Voluntary radio equipment

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

.1 mobile telephone, smartphone or tablet;

.2 radio amateur stations; ~~and~~

.3 Wi-Fi, bluetooth or similar networks; and

.~~3~~4 satellite stations.

Operation of such equipment is at the discretion of the master. It may be installed on the bridge provided that the EMC requirements are fulfilled and navigation and radio communication is not degraded.

6.2 Screening of cables

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

.1 Coaxial down leads should be used for all receiving antennas and the coax screen should be connected to ground on at least one end.

.2 All cables within a distance of 2 metres from a transmitting antenna should be screened and the screen properly earthed in a metal tube or duct.

6.3 Earthing

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

.1 Each unit of radio equipment should have a separated earth connection.

.2 MF/HF antenna tuners should be earthed with either a copper bar or copper band.

.3 The earthing bar or strap should be as short as possible, should not be more than one metre in length, and should be at least 60 mm in width.

.4 For earthing straps up to 5 metres in length the width should be at least 100 mm (May be relevant on board vessels made of wood or synthetic materials).

.5 It should be noted that a long earthing strap or bar will act as an antenna and radiate energy.

.6 Copper bars and straps should be brazed to the steel bulkhead in order to eliminate corrosion and vibration and make a good earth connection.

.7 Great care should be taken when earthing radio equipment on ships with aluminium superstructures in order to avoid galvanic corrosion. An approved and acceptable method of earthing should be used on such ships.

Note: Insufficient earthing of the power amplifier may lead to capacitive and inductive connections between power cables etc. 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 should have an independent power supply from the ships mains. The battery charging arrangement used to charge any batteries associated with the reserve source of energy should also have an independent supply from the ships 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 should 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 should not be possible to disable this alarm and indication. It should only be possible to acknowledge and silence the alarm manually. Both the alarm condition and indication should reset automatically when the ship's supply main source of electrical power has been restored.

(SOLAS 1974~~, as amended~~, chapter II ~~and IMO resolution A.702(17), annex, 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 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 should 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 should 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~~, as amended~~, regulations II-1/42 and 43)

7.3 Reserve source of energy

.1 The radio reserve source or sources of energy should meet the requirements set out in regulation IV/13 of SOLAS 1974~~, as amended~~, and in IMO resolution A.694(17), as applicable. 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 ships covered by SOLAS chapter IV should 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, should 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 should be applied:

½ of the current consumption necessary for transmission

+ the current consumption for reception

+ the current consumption of any additional loads.

.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 ships supply of electrical energy or of batteries used in an uninterruptable power supply (UPS) configuration.

.~~2~~6 The changeover from the ship's mains or emergency supply to the reserve source of energy should 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 should be readily accessible to the radio operator, clearly labelled and located on the navigation bridge. Such changeover should not require any of the equipment connected to it to be re-initialized manually and should not result in the loss of data stored in memories.

.~~3~~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 should also be sufficient to operate the heading sensor (if applicable), EPFS and emergency light.

.~~4~~8 Any fault in the radio batteries or the battery charger should not affect both the basic and duplicated radio equipment and should not prevent the operation of the radio equipment from the ship's mains or emergency supply.

.~~5~~9 The reserve source of energy should be capable of operating the radio installation for at least:

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

(SOLAS 1974~~, as amended~~, regulations IV/13.2, 13.4, 13.5, 13.8; IMO resolution A.694(17) ~~and COMSAR/Circ.16~~)

7.4 Radio battery capacity

When defining the minimum required battery capacity, consideration should 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 should be wider than the expected temperature range of the location where the battery is to be installed.

.1 The batteries should have enough capacity to operate all the GMDSS radio equipment for the specific times outlined in subsection 7.3.~~5~~9 above. The total load for the entire radio installation should be calculated prior to the installation of any radio batteries for the reserve supply.

.2 Where the basic and duplicated radio equipment cannot be operated simultaneously, the battery capacity should 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 should 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 should 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.

Note: an example of calculation should be included

.6 The capacity of the radio batteries should 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 normal operation current over a period of 10 hours. Assessment of the charge condition can be made at any time, but it should 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 a radio survey.

(SOLAS 1974~~, as amended~~, regulation IV/13,) ~~and COMSAR/Circ. 16~~)

Note: When determining the battery capacity the following should 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 Radio batteries

The batteries should 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 should be visible when the batteries have been installed and during their lifetime. A label warning of explosion danger should 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 should maintain its rated capacity when inclined at any angle up to 22 ½° in any orientation.

.3 All battery units should 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 should be available on board. The information should 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. These should include 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 according with the battery manufacturer's specifications;

.6 requirement for ventilation; and

.7 requirement for maintenance.

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

.6 The batteries should be installed in the upper part of the ship, in an elevated position and as close to the radio equipment as possible.

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

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

The location should 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 should not be mixed in a battery bank.

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

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

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

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

.13 The cabling from the batteries should 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 should have sufficient dimensions to prevent voltage reduction at peak current consumption.

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

7.6 Uninterruptable power supplies (UPSs)

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, should comply with the load determined in paragraph 7.4 and meet the general requirements set out in regulation IV/13 of the SOLAS 1974~~, as amended,~~ and in resolution A.694(17), as applicable, and should 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 should 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 should be operational within 5 seconds of switching on.

.5 The UPS should 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 should 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 should 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. This change-over should not require any of the equipment connected to it to be re-initialized manually and should not result in the loss of data stored in memory.

~~*(COMSAR/Circ.16)*~~

Note: **-** If the UPS does not fulfil the requirements in accordance with SOLAS regulation IV/13, two separate UPS systems should 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 radio batteries should meet the general requirements set out in regulation IV/13 of SOLAS 1974~~, as amended,~~ and IMO resolution A.694(17) and should also comply with the following requirements:

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

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

.3 The supplied voltage and current should 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 should be provided against overcharging or discharging of batteries from a possible fault in the charger.

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

.5 Provisions should 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 should not be possible to disable this alarm and indication and it should only be possible to acknowledge and silence the alarm manually. Both the alarm condition and indication should reset automatically when normal charging condition has been restored. Failure of the alarm system should not interrupt the charging or discharging of batteries.

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

.7 The automatic charger should 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 should automatically reset following removal of the open or short-circuit conditions.

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

Note: **-** As said in subsection 7.1 above, it is not advisable to provide the main source of energy to the GMDSS 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 should be dimensioned for simultaneous supply of connected equipment and maintaining a sufficient charging of the batteries in accordance with SOLAS 1974~~, as amended~~, regulation IV/13.2.

7.8 Protection of circuits for accumulator batteries

.1 Battery circuits (i.e. the cables from battery case/room) should be protected against short-circuit and overload. The protection device is to 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.

Note: **-** 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 should 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 should 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 should be designed so as to prevent electrical interference to radio and navigational equipment.

.2 Cables should 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 x length (m) x 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 should be of a type approved and suitable for use on board ships.

8.1 Battery circuits – fuses and breakers

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

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

.3 All fuses and breakers should 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 should be independent and fused separately.

Note: A VHF with DSC, a MF/HF DSC transceiver, a NBDP with printer and ~~Inmarsat~~ recognized mobile satellite service equipment with a display and printer are each considered as a “radio system”.

9 INSTALLATION OF GMDSS RADIO EQUIPMENT ON BOARD MOBILE OFFSHORE DRILLING UNITS (MODUs)

Mobile offshore drilling units should, fulfil the GMDSS requirements laid down IMO’s MODU Code, as ~~revised in 1991~~ amended. ~~This revision introduced provisions based on the GMDSS requirements.~~ All GMDSS requirements should, as a general rule, be fulfilled. However, for drilling units the requirement for duplication may be considered as fulfilled if the radio installation complies with regulation 11.5 of the MODU Code as follows:

.1 Each unit, while stationary at the site, including when engaged in drilling operations, should comply with all requirements prescribed in SOLAS chapter IV ~~of the SOLAS Convention, 1974, as amended,~~ that are applicable to a ship sailing through the same area. Each unit should also report its position to the relevant World-Wide Navigational Warning Service (WWNWS) NAVAREA Coordinator when arriving on-site, in order for a

Navigational Warning to be broadcast‡. Additionally, units should inform the NAVAREA Coordinator when departing from that site, in order for the broadcast to be cancelled.

~~.2 Taking into account the different types of accident which may occur on the MODU, additional radio equipment should be installed in a room or position, which could be the bridge or emergency control room, situated as far as practical from the radio equipment fitted in compliance with section 11.5.1, so that a single accident in any part of the MODU could deprive the MODU of all facilities for radiocommunications.~~

~~.3 The additional radio equipment should comply with the following regulations of the 1988 SOLAS amendment for MODUs drilling in:~~

~~.1 sea area A1, the equipment prescribed in regulation IV/7.1.1;~~

~~.2 sea area A2, the equipment prescribed by regulations IV/7.1.1 and IV/9.1.1;~~

~~.3 sea area A3, the equipment prescribed by regulations IV/7.1.1 and IV/10.1.1, plus 10.2; or alternatively, as required by regulations IV/7.1.1 and 10.2.1; and~~

~~.4 sea area A4, the equipment prescribed by regulations IV/7.1.1 and IV/10.2.1.~~

.2 On units which do not have a navigation bridge, it should be possible to initiate transmission of the distress alerts by the radio installation specified in SOLAS regulations IV/10.1.1, IV/10.1.2, IV/10.1.3 as applicable, from a position in an accessible and protected area which is acceptable to the Administration.

(Note : Check MODU Code versions self and non self-propelled)

.43 If the acoustic noise level in a room fitted with operating controls for radio equipment is so high or could be so high, during particular operating conditions, that it may disturb or prevent proper use of the radio equipment, then adequate noise protection should be provided by mechanical or other means, in association with the operating controls for the radio equipment.

Note: - All requirements of chapter IV ~~of the 1988 SOLAS amendments~~ referring to "from the position the ship is normally navigated" should be applied as meaning "from a position (or from the positions), which is continuously manned and which is controlling the MODU~~.~~ while stationary at the site including its drilling operations (i.e. normally the control room)". Watchkeeping on DSC and other emergency and calling channels should be kept from a position which is continuously manned. Watchkeeping and the operation of all radio equipment which are required on board should be carried out by a person holding a GOC/GMDSS or ROC/GMDSS (if only A1 installation) radio operator certificate.

‡ Refer to the *World-wide navigational warning service*, adopted by the Organization by resolution A.706(17), as amended.

10 DISPOSAL/END OF LIFE

Old electrical and electronic equipment can contain substances hazardous to human beings and the environment. Never dispose these items together with unsorted municipal waste (household waste). In order to protect the environment and ensure the correct recycling of old equipment as well as the re-utilization of individual components, use either public collection or private collection by the local distributor of old electrical and electronic equipment. Contact the local distributor or dealer for information about what type of return system to use.

Appendix 1

Inmarsat Recognized Mobile Satellite Services

1 Satellite communication antennas

1.1 General

.1 In general, satellite antennas should 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 should 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 should be observed in order to fulfil the above recommendations:

.1 The antenna should 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, should be maximum 6°;

- for omnidirectional antennas; shadows from constructions, especially within a distance of 1 metre, should be maximum 2°.

.2 Antennas should be installed in a readily accessible location.

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

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

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

.6 Consideration should 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 should 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 should be more than 5 metres.

.2 Distance to VHF antennas should be more than 4 metres.

.3 Distance to the magnetic compass should be more than 3 metres.

(The installation manual for the equipment and Inmarsat guidelines)

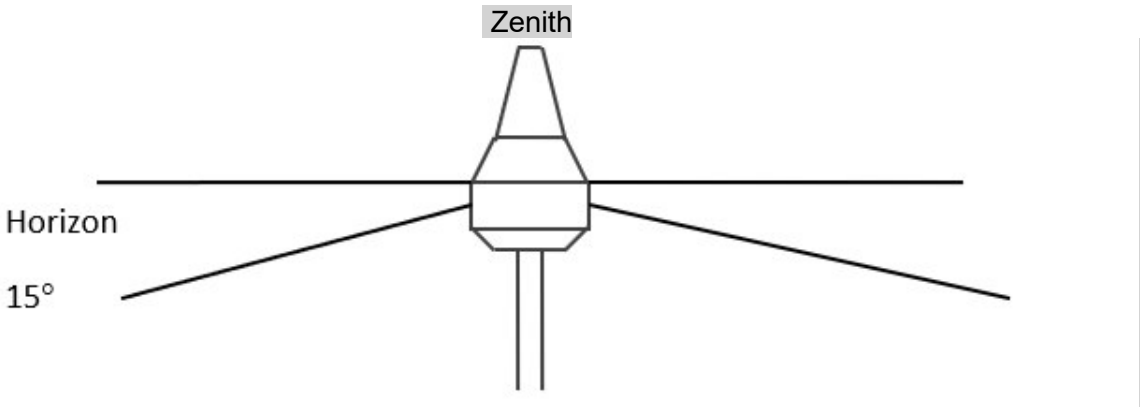
1.4 Inmarsat-C

1.4.1 Antenna

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

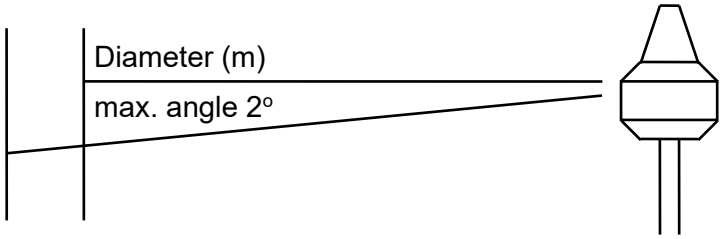
Note: As it may be difficult to fulfil this recommendation in fore-and-aft, the free area in this direction may be reduced to 5° below the horizon.

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



1.4.2 Calculation of distance to obstructions

The Antenna Unit should 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 should be at least 1 metre to eliminate interference. The antennas should 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) should be complied with. Only double-screened cable should be used.

1.5 Fleet Safety

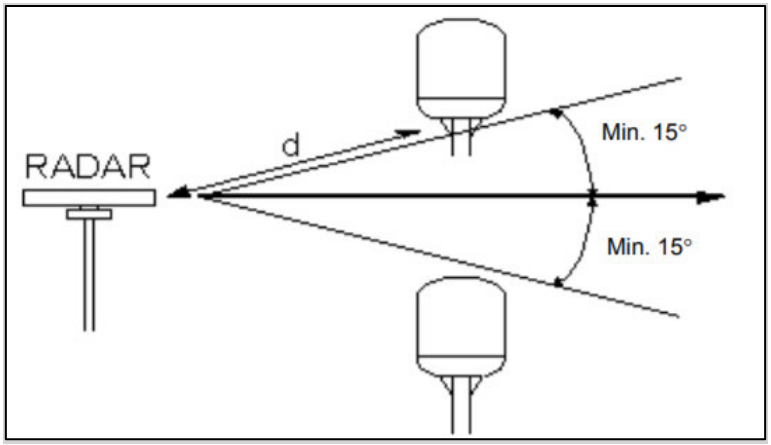
1.5.1 Antenna

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° and down to –25° for the FleetBroadband 500 and -60° 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 should be mounted as far away as possible from the ship's radar 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) should be complied with. The maximum allowed RF-loss in the antenna cable is 20 dB at 1 660 MHz. This is to ensure the performance of the system

Appendix 2

Iridium Recognized Mobile Satellite Services

System-Specific Guidelines - Omnidirectional Antenna

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

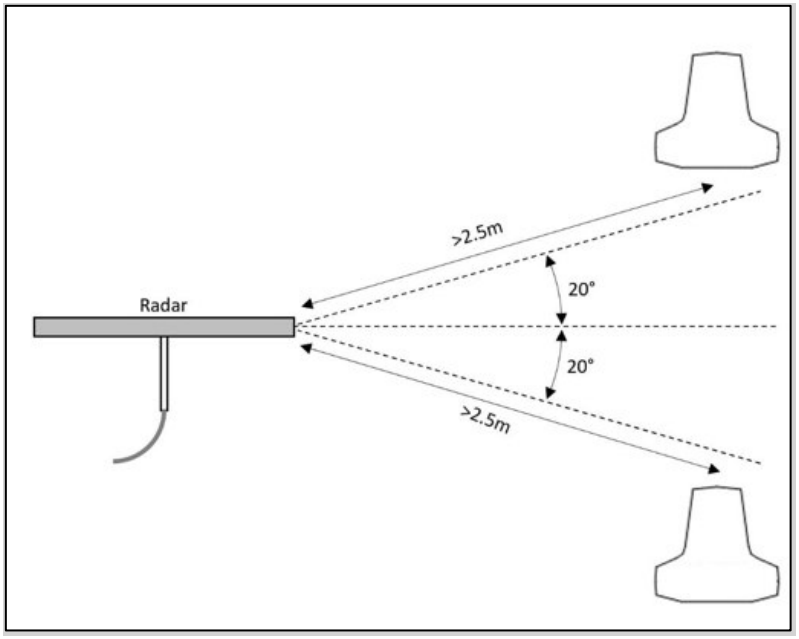
1 Antenna Unit

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.

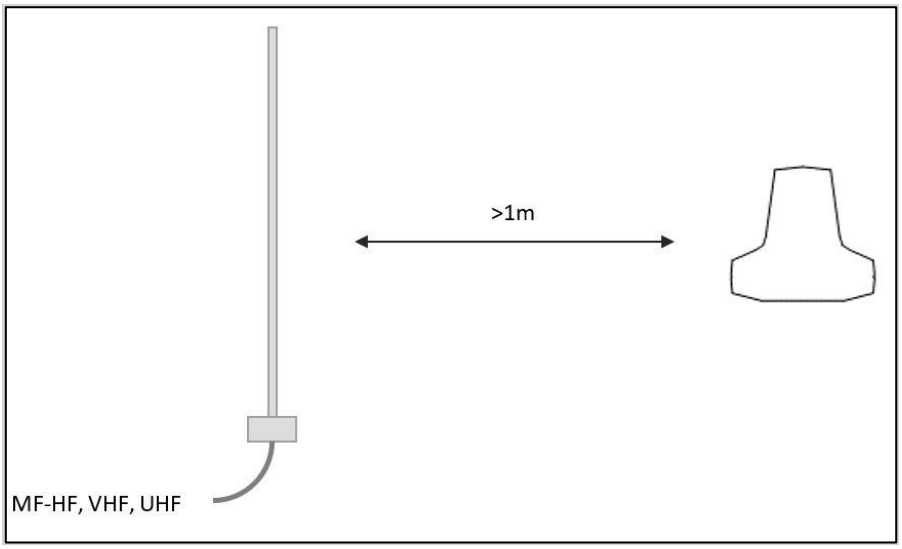
1.1 Mounting and installation considerations

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.

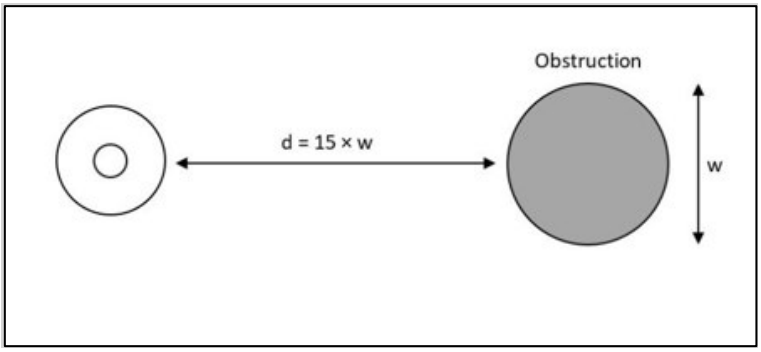
The Antenna Unit should be installed outside the radar main beam. Typically, this is in the order of 20 degrees. To avoid near field antenna coupling, a minimum distance of 2.5 m (8 ft) between the radar antenna and the Antenna Unit should be obeyed. The figure below ~~is~~ illustrates how the Antenna Unit should 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 should be validated when the system is installed.



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



The Antenna Unit should 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.



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

ANNEX 4

DRAFT REVISION OF COMSAR/CIRC.33

GMDSS COAST STATION OPERATOR'S CERTIFICATE (CSOC)
~~MODEL COURSE~~ SYLLABUS

1 The Sub-Committee on Navigation, Communications and Search and Rescue (NCSR), at its […] session (…), noted the amendments to the Safety of Life at Sea (SOLAS) Convention adopted by the Maritime Safety Committee (MSC), at its […] session (…), in resolution MSC.[…].

2 The Sub-Committee finalized the GMDSS Coast Station Operator's Certificate (CSOC) ~~course~~ syllabus ~~for Coast Stations Operators~~ to ensure that staff on duty in ~~coast stations and in coast earth stations~~ rescue coordination centres (RCC) and in any GMDSS shore-based facilities for the mobile satellite service and maritime mobile service are adequately qualified and trained to operate the stations effectively in accordance with to the SOLAS Convention as amended. This syllabus is not intended for engineers, technicians and operators of a Recognized Mobile Satellite Service network. The syllabus may be adapted to the different shore-based facilities for radiocommunications as appropriate, in particular for operators in coast stations using only one frequency band of the maritime mobile service for a dedicated purpose.

3 The Sub-Committee also agreed that this syllabus ~~course~~ should be made available ~~as an~~ to elaborate IMO model courses in conformity to MSC-MEPC.2/Circ.15/Rev.1 on *Revised guidelines for the development, review and validation of model courses*.

4 The Sub-Committee further agreed that, pending validation and in view of an urgent need for immediate provision of training of ~~coast station~~ GMDSS shore-based facilities for the mobile satellite service and maritime mobile service and RCC operators, the syllabus~~ course~~ as set out in the annexes to the current circular, should be made available to Member ~~Governments~~ States as soon as possible.

5 Member ~~Governments~~ States are invited to bring this circular to the attention of all parties concerned and use the syllabus~~ course~~ in the interim to train the ~~coast station~~ GMDSS shore-based facilities for the mobile satellite service and maritime mobile service and RCC operators until ~~the~~ IMO model courses ~~has~~ have been finalized and validated.

6 This circular revokes COMSAR.1/Circ.33.

Annex 1

GMDSS (CSOC) SYLLABUS ~~COURSE~~ AIMS AND OBJECTIVES

1 AIMS

1.1 The Global Maritime Distress and Safety System (GMDSS) syllabus ~~course~~ is designed to prepare a course to revise well-known radio communication practices and to enhance procedures within rescue coordination centres (RCC) and GMDSS shore-based facilities for the mobile satellite service and maritime mobile service ~~Coast Radio Station operations rooms~~.

1.2 It will raise awareness of GMDSS systems and procedures among RCC and GMDSS shore-based facilities for the mobile satellite service and maritime mobile service ~~Coast Radio Station~~ personnel, promote best practice and efficient use of radio communication equipment.

1.3 The syllabus ~~course~~ will aim to achieve standards common to those required of professional mariners (GMDSS General Operator's Certificate) and, as such, promote the certification of RCC and GMDSS shore-based facilities for the mobile satellite service and maritime mobile service ~~Coast Radio Station~~ personnel.

1.4 The syllabus may be adapted to the different shore-based facilities for radiocommunications as appropriate, in particular for operators in coast stations using only one frequency band of the maritime mobile service for a dedicated purpose.

2 OBJECTIVES

By the end of the course based on this syllabus the participant will have:

2.1 ~~By the end of the course the participant will have revised~~ understood all Routine, Distress, Urgency and Safety radiotelephony (RTP) procedures to a common standard of expertise.

2.2 ~~By the end of the course the participant will have~~ a comprehensive knowledge of the GMDSS ~~system~~, including all component parts and procedures.

2.3 ~~By the end of the course the participant will have~~ considered all the implications of the GMDSS for the search planner and how to apply the knowledge to real-life situations.

2.4 ~~By the end of the course the participant will have~~ consolidated knowledge and expertise in the use of all RCC and GMDSS shore-based facilities for the mobile satellite service and maritime mobile service ~~Coast Radio Station~~ communication equipment.

2.5 ~~By the end of the course the participant will have~~ his/her knowledge and competence measured by a series of three examinations which be at least equivalent to the standards set by the GMDSS General Operator's Certificate.

Annex 2

SYLLABUS ITEMS

SECTION 1 – GMDSS overview

1.1 Origins and implementation
1.2 Objective, concept and functions of the GMDSS
1.3 Application
1.4 Sea areas defined
1.5 General equipment types
1.6 Equipment requirements by sea area

SECTION ~~21~~ – Radio wave characteristics and propagation

~~21~~.1 Concept of radio frequency, wavelength and velocity
~~21~~.2 Relationship between wavelength and aerial height/length
~~21~~.3 Units of radio frequency and the frequency spectrum
~~21~~.4 Propagation mechanisms
~~21~~.5 Types of modulation
~~21~~.6 Classes of emission
~~21~~.7 Simplex and duplex

SECTION 3 – Types of station in the mobile service

3.1 Maritime mobile service
3.2 Aeronautical mobile service
3.3 Land mobile service

SECTION 4 – Digital selective calling

4.1 General overview
4.2 DSC frequencies
4.3 National DSC coast station arrangements
4.4 DSC action by ship and CRS
4.5 Overview of HF DSC

SECTION 5 – RTP communications

5.1 Distress
5.2 Urgency
5.3 Small craft safety information (SCSI) broadcasts where applicable
5.4 Safety
5.5 Routine communications and ITU Radio Regulations
5.6 RTP communications integrity

SECTION 6 – SATCOMS/Recognized mobile satellite service

6.1 General overview
6.2 Component parts of the systems
6.3 Variety of communications
6.4 System equipment
6.5 Enhanced group call (EGC)

SECTION 7 – NAVTEX services

7.1 General overview
7.2 Ship equipment and message priorities
7.3 Message categories
7.4 National NAVTEX system

SECTION 8 – EPIRBs

8.1 General overview
8.2 The COSPAS-SARSAT system
8.3 Approved EPIRBs and EPIRB databases

SECTION 9 – Emergency portable VHF radios

9.1 General requirements
9.2 Mandatory channels

SECTION 10 – Devices for locating

10.1 General overview
10.2 Positioning aboard ship
10.3 Technical specification
10.4 Range of signals for locating

SECTION 11 – Concept of RCC and SAR operations

11.1 Equipment types
11.2 Workstations
11.3 Log keeping
11.4 Publications
11.5 Codes, signals and standard phrases
11.6 Communications for SAR operations
11.7 Authority and responsibility for national RCC and GMDSS shore-based facilities communication
11.8 Advice to the public on efficient radio procedure and use of radio communication equipment
11.9 Equipment user manuals and guides
11.10 Equipment power delivery

~~**SECTION 2 – Concept of RCC and Coast Radio Station operations**~~

~~2.1 Equipment types~~
~~2.2 Workstations~~
~~2.3 Log keeping~~
~~2.4 Publications~~
~~2.5 Authority and responsibility for national RCC and Coast Radio Station communication~~
~~2.6 Advice to the public on efficient radio procedure and use of radio communication equipment~~
~~2.7 Equipment user manuals and guides~~
~~2.8 Function, use and characteristics of back up power supplies for communication equipment~~

~~**SECTION 3 - RT communications**~~

~~3.1 Distress~~
~~3.2 Urgency~~
~~3.3 Small craft safety information broadcasts (SCSI) where applicable~~
~~3.4 Safety~~
~~3.5 Routine communication and Radio regulations~~
~~3.6 RT communication integrity~~

~~**SECTION 4 - Types of station in the maritime mobile service**~~

~~**SECTION 5 - GMDSS overview**~~
~~5.1 Origins and implementation~~
~~5.2 Objective, concept and functions of the GMDSS~~
~~5.3 Application~~
~~5.4 Sea areas defined~~
~~5.5 General equipment types~~
~~5.6 Equipment requirements by sea area~~

~~**SECTION 6 - EPIRBs**~~

~~6.1 General overview~~
~~6.2 The COSPAS-SARSAT system~~
~~6.3 Approved EPIRBs and EPIRB databases~~

~~**SECTION 7 - NAVTEX services**~~

~~7.1 General overview~~
~~7.2 Ship equipment and message priorities~~
~~7.3 Message categories~~
~~7.4 National NAVTEX system and broadcast procedure~~

~~**SECTION 8 - SATCOMS/Inmarsat**~~

~~8.1 General overview~~
~~8.2 Component parts of the system~~
~~8.3 Variety of communications~~
~~8.4 System equipment~~
~~8.5 Enhanced Group calling~~
~~8.6 Distress alerts~~
~~8.7 SafetyNet, FleetNet, SARNet~~
~~8.8 False alerts~~
~~8.9 Databases~~

~~**SECTION 9 - SART**~~

~~9.1 General overview~~
~~9.2 Positioning aboard ship~~
~~9.3 Technical specification~~
~~9.4 Range of SART signals~~

~~**SECTION 10 - Emergency portable VHF radios**~~

~~10.1 General requirements~~

~~10.2 Mandatory channels~~

~~**SECTION 11 - Digital selective calling**~~

~~11.1 General overview~~
~~11.2 DSC frequencies in VHF, MF and HF bands~~
~~11.3 National DSC coast station arrangements~~
~~11.4 DSC action by ship and coast stations~~
~~11.5 Overview of HFDSC~~

SECTION 12 – Implications of the GMDSS for RCCs

12.1 Distress alerts
12.2 False alerts
12.3 Interference problems
12.4~~1~~ Information gathering
12.5~~2~~ Search planning
12.6~~3~~ Effort allocation
12.7~~4~~ Search instructions
12.8~~5~~ Probability of detection (PoD)
12.9~~6~~ Decoding MMSIs, serial numbers and alert messages, and databases

SECTION 13 – Practical use of RCC and GMDSS shore-based facilities ~~Coast Station~~ communication equipment

13.1 Communication equipment
13.2 Other types of SATCOMS message broadcast
13.3 Testing and maintenance of GMDSS equipment

SECTION 14 – Telephone, fax and RTP calls to ships

14.1 Methods of making calls
14.2 Methods of charging calls

Annex 3

DETAILLED SYLLABUS AIMS AND OBJECTIVES

NOTE: ***It is recommended that the syllabus objectives highlighted in bold italics may not be required if an individual has previously qualified in the GMDSS general operator's certificate. The syllabus should be adapted to the different GMDSS shore-based facilities for radiocommunications, in particular for operators in coast stations using only one frequency band of the maritime mobile service for a dedicated purpose.***

SECTION 1 – GMDSS OVERVIEW

1.1 Origins and implementation

Aim: *To ensure that participants gain ~~a~~ knowledge of how the GMDSS developed and an overview of previous legislation governing maritime communications.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory the organizations responsible for the administration of the GMDSS, both international and domestic;

State correctly from memory the international agreement which enables the GMDSS and state correctly from memory the domestic legislation which has ratified the system within national legislation;

State correctly from memory, 3 out of 4 types of equipment on which communication legislation prior to the GMDSS was based; and

Discuss accurately from memory 4 relevant advantages of GMDSS communication regulations.

1.2 Objective, concept and functions of the GMDSS

Aim: *To consider and discuss the concept, objectives and function of the GMDSS system.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory 2 out of 3 main objectives desired of the GMDSS system; and

List correctly, with the aid of a mnemonic if necessary, all 9 functions of the GMDSS.

1.3 Application

Aim: *To consider what vessels must comply with GMDSS regulations and what provision there is for exemption from compliance.*

Objectives: By the end of the session the participant will be able to:

Decide correctly from memory on every occasion, given the size, type, nature of passage and means of propulsion of any vessel, whether that vessel must comply with GMDSS provisions or not; and

List correctly from memory exemptions from GMDSS provisions.

1.4 Sea areas defined

Aim: *To examine the designation of sea areas as laid down in GMDSS provisions compared both to the world's coastline and to the declarations of particular Governments.*

Objectives: By the end of the session the participant will be able to:

Define correctly on every occasion from memory the 4 sea area designations under GMDSS regulations;

Decide correctly on every occasion from memory which GMDSS sea area a position would relate to;

State correctly from memory how to validate the answers above in terms of declarations by a particular Government; and

State correctly from memory which sea area(s) are within own SRR.

1.5 General equipment types

Aim: *To develop an overview of the types of ships equipment and communication systems which make up the GMDSS.*

Objective: By the end of the session the participant will be able to list from memory 9 systems of communication equipment which contribute to the GMDSS system.

1.6 Equipment requirements by sea area

Aim: *To develop an understanding of the GMDSS requirements for ships equipment dependeant upon sea area of navigation.*

Objective: By the end of the session the participant will be able to:

Correctly list from memory all types of communication equipment which must be carried by a ship navigating exclusively in GMDSS sea area A1;

Correctly list from memory all equipment, in addition to those for sea area A1, which must be carried by a ship navigating in sea area A2;

Correctly list from memory all equipment, in addition to those for sea areas A1 and A2, which must be carried by a ship navigating sea area A3; and

Correctly list from memory all equipment, in addition to those for sea areas A1, A2 and A3, which must be carried by a ship navigating sea area A4.

SECTION 21 – RADIO WAVE CHARACTERISTICS AND PROPAGATION

21.1 Concept of radio frequency, wavelength and velocity

Aims: *To explore the basic physical science which underpins the theory of radio waves and propagation.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately with the aid of a handout, the concepts of radio wavelength, frequency and velocity; and

State correctly from memory the relationship between radio wavelength, frequency and velocity.

21.2 Relationship between wavelength and aerial height/length

Aims: *To give the participant a basic rule of thumb in understanding how the wavelength of radio signals affects the optimum length of aerial.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory a rule of thumb calculation which can determine the optimum length of antenna required for a given radio wavelength.

21.3 Units of radio frequency and the frequency spectrum

Aims: *To introduce the participant to the International System of Units (SI units) used to measure radio frequency, wavelength and velocity and the correct means of labelling such values.*

Objectives: By the end of the session the participant will be able to:

Quote correctly from memory the SI units used to measure velocity, frequency and wavelength;

State correctly from memory the 3 standard multiples of the basic unit of frequency and the correct labelling for each;

State correctly from memory on every occasion, which part of the frequency spectrum a given radio frequency lies;

State correctly from memory the exact frequency band appropriate to VHF maritime radio communications; and

Discuss accurately with the aid of a handout a practical use for each of the radio bands.

21.4 Propagation mechanisms

Aims: *To examine the means by which radio waves travel in still air.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately with the aid of a handout the physical form of radio waves;

List correctly from memory, ~~three~~ 3 ways in which radio waves are affected by the atmosphere;

Discuss accurately with the aid of a handout, the 3 layers of atmosphere which affect radio wave propagation;

List correctly from memory the 4 types of radio propagation wave and be able to discuss accurately from memory characteristics of each;

State correctly with the aid of a handout, ~~what~~ the meaning of terms skip zone and skip distance ~~mean~~;

Discuss accurately with the aid of a handout, the meaning of the term "fading" of radio reception;

State correctly from memory how to calculate the theoretical radio horizon for any particular antenna;

List correctly from memory 3 properties which will affect the propagation of radio waves over a long distance; and

Discuss accurately from memory 3 properties which will affect the propagation of VHF radio waves.

~~2~~1.5 Types of modulation

Aims: *To introduce the participant to the concepts of amplitude and frequency modulation, carrier and bandwidth.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory the meaning of the term modulation;

State correctly from memory the ~~two~~ 2 main forms of modulation used in radiotelephony (RTP) communications and state correctly which applies to VHF radio and which to MF radio;

Discuss accurately with the aid of a handout, the characteristics of amplitude modulation;

Discuss accurately with the aid of a handout, the characteristics of frequency modulation; and

Discuss accurately with the aid of a handout, the terms bandwidth and carrier frequency.

~~2~~1.6 Classes of emission

Aims: *To introduce the participant to the ITU classifications of emission and examine those of particular relevance to maritime RTP communications.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately with the aid of a handout, the method of designating class of emission used by the ITU;

State correctly from memory the ~~three~~ 3-letter acronym designating the class of emission used with 2182 kHz distress communication channel and discuss the meaning accurately from memory ~~the meaning~~;

State correctly from memory the ~~three~~ 3-letter acronym designating the class of emission for use with MF band working frequencies and discuss the meaning accurately from memory ~~the meaning~~; and

State correctly from memory the ~~three~~ 3-letter acronym designating the class of emission for use in VHF RTP communications and discuss the meaning accurately from memory ~~the meaning~~.

~~2~~1.7 Simplex and duplex

Aims: *To introduce the participant to the basic concept of simplex and duplex RTP communications.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory the characteristics of simplex communications; and

Discuss accurately from memory the characteristics of duplex communications.

SECTION 3 – TYPES OF STATION IN THE MOBILE SERVICE

3.1 Maritime mobile service

Aims: *To determine working definitions for different types of operating station within the maritime communication system.*

Objectives: By the end of the session the participants will be able to:

Define accurately from memory the terms: station, ship and traffic as they are applied to maritime communications;

List correctly from memory 5 out of 6 stations with which a ship is permitted to communicate directly by RTP;

List correctly from memory two facilities provided by a CRS; and

List correctly with the aid of a handout, the 3 methods by which a vessel can achieve commercial communications via a CRS.

3.2 Aeronautical mobile service

Aims: *To determine working definitions for different types of operating station within the aeronautical communication system.*

Objectives: By the end of the session the participants will be able to:

Understand the different frequency bands used for aircraft;

Define accurately from memory frequencies for communication with aircraft on VHF, MF and HF bands; and

Identify and use aircrafts' call signs in Search and Rescue (SAR) operations.

3.3 Land mobile service

Aims: *To determine working definitions for different types of operating station within the land communication system.*

Objectives: By the end of the session the participants will be able to:

Understand the different frequency bands and systems used for land mobile service; and

Define accurately from memory frequencies and systems for communication with land mobiles.

SECTION 4 – DIGITAL SELECTIVE CALLING

4.1 General overview

Aims: *To explore fully the characteristics and principles of the Digital Selective Calling (DSC) system.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, in which sea areas DSC is relevant;

Describe accurately with the aid of a handout, basic technical details of the DSC system, including the duration of a DSC alert on MF and VHF;

State accurately from memory, the term used to describe the error check function of the DSC system and with the aid of a handout discuss how this works;

Describe accurately from memory, the number and frequency of distress alerts transmitted by ships' equipment;

State correctly from memory, the options available when addressing a DSC message;

Discuss accurately from memory, a potential difficulty in terms of range of communications when operating DSC equipment and the subsequent analogue RTP equipment;

Discuss accurately from memory the meaning of the terms designated and undesignated DSC distress alerts;

Demonstrate from memory, correct analysis of a DSC distress alert message on 15 out of 18 occasions;

Discuss accurately from memory, how position information can be derived for DSC systems, and the implications this may have for search area determination;

Distinguish accurately from memory ~~distinguish~~, on every occasion, between MMSI numbers for ship stations, shore stations and groups of ship stations; and

State correctly from memory, the 3 sources of information to enable the decoding of MMSIs.

4.2 DSC frequencies

Aims: *To determine the frequencies in use with the VHF, HF and MF DSC system, and the procedure for subsequent RTP communications.*

Objectives: By the end of the session the participant will be able to:

List accurately from memory, the frequency of MF DSC, the channel appropriate for VHF DSC, and in each case the associated RTP frequency and channel; and

List accurately with the aid of a handout, the 5 frequencies of HF DSC and in each case the associated RTP frequencies.

4.3 National DSC coast stations arrangements

Aims: *To examine the configuration of DSC coast radio stations (CRS) in the national SRR.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, the RCC and CRS in the SRR which are provided with MF DSC.

4.4 DSC action by ship and CRS

Aims: *To explore in greatest possible depth the procedure laid down for operation of the DSC system.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory, when a RCC should acknowledge a distress alert from a vessel at sea under varying circumstances:

1. Position is in the RCC SRR;

2. Position is outside the RCC SRR;

3. No position information is shown on alert;

Discuss accurately from memory, the subsequent action required of a CRS having acknowledged a DSC distress alert;

State correctly from memory, under what circumstances a DSC distress alert would be acknowledged by a ship station;

State correctly from memory, under what circumstances a DSC distress relay would be transmitted by a ship station;

State correctly from memory, under what circumstances a DSC distress relay would normally be transmitted by a CRS;

Discuss accurately from memory, the circumstances under which a DSC distress relay would be transmitted by a CRS;

State correctly from memory, what action is required by a CRS receiving a distress relay from another CRS;

State accurately from memory, what action is required by a CRS receiving a distress acknowledgement from another CRS;

State accurately from memory, what action is required by a CRS in receipt of a distress relay from a ship station; and

State correctly from memory, under what circumstances a DSC acknowledgement is required from a CRS when dealing with urgency, safety and routine alerts.

4.5 Overview of HF DSC

Aims: *To ensure that participants are aware of the HF DSC system, the areas it applies to and which countries are directly involved.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory, the areas of the globe where HF radio can achieve propagation;

State correctly from memory, how HF DSC and associated procedure compares to that of MF DSC;

State correctly from memory, where HF DSC coast radio stations are situated; and

State correctly from memory, the message routing procedure from HF DSC coast radio stations to the appropriate RCC for SAR action.

~~**SECTION 2 - CONCEPT OF RCC AND COAST RADIO STATION OPERATIONS**~~

~~**2.1 Equipment types**~~

Aim: *To introduce participants to the types of communication equipment operated by the Rescue Centre or Coast Radio Station in which they operate.*

Objective: By the end of the session participants will be able to correctly name from memory all types of RCC or Coast Radio Station radio communication equipment used in operation rooms.

2.2 Workstations

Aim: *To raise the awareness of participants as to the correct procedure of handing over a VHF channel 16 watch and associated equipment checks to make.*

Objective: By the end of the session participants will be able to list correctly from memory all key considerations in terms of continuity of watch keeping and equipment checks for the operators attention when taking over the VHF channel 16 watch from a colleague.

2.3 Log keeping

Aim: *To ensure all participants understand and are in a position to apply the correct log keeping procedure at radio watch keeping workstations.*

Objective: By the end of the session the participant will be able to discuss accurately from memory, all key considerations and log entries when maintaining a radio log.

2.4 Publications

Aim: *To raise the awareness of participants to written procedural support material held as standard issue at Rescue Centres.*

Objectives: By the end of the session participants will be able to:

List correctly from memory 5 publications held as standard issue at Rescue Centres; and

State accurately from memory on 7 out of 10 occasions, in which publication to find particular details relating to maritime communications.

2.5 Authority and responsibility for national Rescue Centres and Coast Radio Station communications

Aim: *To ensure participants understand levels of authority and responsibility involved in operating Rescue Centre and Coast Radio Station communication equipment and the responsibility for local training and development.*

Objectives: By the end of the session participants will be able to:

Discuss accurately from memory by whose authority Rescue Centre and Coast Radio Station communication equipment is operated;

Discuss accurately and from memory who is responsible for correct operation and use of Rescue Centre and Coast Radio Station communication equipment; and

Discuss accurately and from memory who is responsible for ensuring the provision of adequate training for individuals in the operation and use of Rescue Centre and Coast Radio Station communication equipment.

~~**2.6 National policy to advise the public on radio procedure and effective use of equipment (if any)**~~

~~***Aims:*** *To raise awareness amongst participants as to National Rescue Centre or Coast Radio Station policy on giving advice to members of the public regarding the installation and operation of communication equipment.*~~

~~**Objectives:** By the end of the session participants will be able to~~

~~***State correctly from memory where to find details of official advice as to GMDSS equipment carriage recommendations for pleasure craft;***~~

~~***State correctly from memory where to find details of official advice as to GMDSS equipment carriage regulations and recommendations for fishing vessels;***~~

~~***Discuss accurately from memory the significance of the 1998 IMO resolution regarding equipment installations on ALL vessels by 1/2/05; and***~~

~~***List accurately from memory 5 reasons why mobile telephone equipment is not the preferred choice for communications equipment at sea.***~~

~~**2.7 Equipment user manuals & guides**~~

~~***Aims:*** *To remind participants of the importance of maintaining user manuals and guides in good condition and their shared availability between all members of operations room staff.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***Identify accurately, with the aid of student notes, all user manuals available to support equipment currently installed at Rescue Centres; and***~~

~~***State from memory where these manuals are located, or make a verbal report as to how he/she would arrange for these manuals to be stored and made available to all staff.***~~

~~**2.8 Equipment power delivery**~~

~~***Aims:*** *To raise the awareness of participants of his/her stations provisions for backup power supplies and standby batteries.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***Describe accurately, with the aid of study notes, the provision for UPS and standby generator or battery power at his/her site.***~~

SECTION ~~5~~3 – RT~~S~~P COMMUNICATIONS

~~5~~3.1 Distress

Aims: *To revise correct radio procedure for all communications relating to Distress situations.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, under what circumstances a vessel is permitted to use the distress call;

State correctly from memory, the meaning of the terms distress signal, distress call and distress message;

Demonstrate from memory, complete and accurate understanding of the correct format and content of a standard distress message;

Demonstrate from memory, accurate understanding of the correct format for a distress acknowledgement;

Discuss accurately from memory, an effective choice of timing for a distress acknowledgement in two situations of varying gravity and urgency;

Demonstrate from memory, complete and accurate understanding of the correct format and content of a distress relay message, given different sets of circumstances – Distress by RTP;

State correctly from memory, 2 formats permitted for position information in a distress relay message;

Discuss accurately from memory, when the prowords "seelonce distress" and "seelonce mayday" would be used;

Discuss accurately from memory, the correct procedure for terminating a distress situation;

Discuss accurately from memory, the correct procedure for lifting silence, but retaining restricted working on an RTP frequency; and

State the correct proword which should precede every communication related to a distress incident.

~~5~~3.2 Urgency

Aims: *To enable the participant to revise RTP communications procedure relevant to urgency situations.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the circumstances in which a vessel is permitted to use the urgency signal;

State correctly from memory, the meaning of the terms urgency signal, urgency call and urgency message;

Demonstrate from memory, an accurate knowledge of the correct format for a standard urgency message from a vessel;

Demonstrate from memory, an accurate knowledge of the correct format for an urgency acknowledgement message;

Demonstrate from memory, an accurate knowledge of the correct format for a standard urgency relay broadcast;

State correctly from memory, when an urgency broadcast for a red flare report will normally become a distress relay;

State correctly from memory, the type of message you would expect to receive from a vessel which has sighted a red flare from an unknown source; and

State correctly from memory, the type of broadcast which would be made for a medical situation on board ship.

~~5~~3.3 Small craft safety information (SCSI) broadcasts ~~(SCSI)~~ where applicable

Aims: *To revise the format and procedure relevant to the uncertainty phase of SAR operations.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the meaning of the term uncertainty phase and the associated key word(s);

Demonstrate correctly from memory, how the SCSI broadcast should be announced;

Demonstrate correctly from memory, a professional and efficient format for the SCSI broadcast;

State correctly from memory, the frequencies/channels which should be used to announce and broadcast a SCSI broadcast;

State correctly from memory, how a SCSI broadcast is repeated;

State correctly from memory, what action should be considered having broadcast a SCSI twice, but no positive information is forthcoming; and

Demonstrate accurately from memory, how a SCSI broadcast should be cancelled.

~~5~~3.4 Safety

Aims: *To revise the format and procedure relevant to safety communications and broadcasts.*

Objectives: By the end of the session the participants will be able to:

State correctly from memory, the meaning of the term safety signal;

State correctly from memory, what is the correct usage of the safety signal and message;

State correctly from memory, in what circumstances ~~Rescue Centres~~ RCC should make a local navigation warning;

State correctly from memory, under what circumstances broadcasts warning of drifting hazards should be repeated;

State correctly from memory, the frequency with which warnings relating to navigation buoys off station should be repeated;

State correctly from memory, the frequency with which warnings relating to defective or extinguished navigation lights should be repeated;

State correctly from memory, what frequencies and medium should be used for safety broadcasts, both in terms of RTP, satellite and DSC communications; and

Demonstrate from memory, a satisfactory format for safety broadcasts which closely resembles those for distress and urgency situations and which indicates an efficient and professional approach.

~~5~~3.5 Routine communications and ITU Radio ~~r~~Regulations

Aims: *To revise well-established national and ITU routine radio procedure and clarify some of the ~~more important basic international~~ relevant ITU ~~r~~Radio ~~r~~Regulations.*

Objectives: By the end of the session the participant will be able to:

Describe accurately from memory and demonstrate competent use of the rhythm-speed-volume-pitch (RSVP) principles during RTP communications;

Demonstrate from memory, the use of 10 out of 15 commonly used prowords, in the correct format and context;

State correctly from memory, the maximum length of an RTP transmission on the distress frequencies;

State correctly from memory, the maximum length of an RTP test transmission on the distress frequencies and state correctly from memory 1 item of information which must be included in this transmission;

Describe accurately from memory, the full call, abbreviated call and call serving as address, procedures as they apply to RTP transmissions;

List correctly and be able to describe accurately from memory, 4 responses to a radio check which indicates the signal strength;

List correctly and be able to describe accurately from memory, 4 responses to a radio check which indicates the readability of the modulated signal;

State correctly from memory, the appropriate time zone used to identify all radio transmissions and log entries;

State correctly from memory, what frequencies vessels must monitor continuously ~~after full implementation of the~~ in GMDSS ~~in 1999~~;

Describe accurately from memory, the regulations which direct vessels VHF radio distress watchkeeping;

Describe accurately from memory, the procedure to be adopted when a calling station has difficulty in raising another station;

State correctly from memory, who is designated as the controlling station during communications between a ship and shore station;

Describe accurately from memory, the action to be taken when station hears a call, but is not certain that the call was intended for it;

Discuss accurately from memory, the content of ITU Radio ~~r~~Regulations in respect of radio secrecy;

Discuss accurately with the aid of study notes, guidelines designed to help avoid radio interference;

Discuss accurately with the aid of study notes, guidelines designed to regulate preliminary radio operations;

List correctly from memory, the VHF channels ~~Rescue Centres~~ RCCs and ~~Coast Radio Stations~~ CRSs are licensed to operate; and

List correctly with the aid of a handout, the MF frequencies ~~Rescue Centres~~ RCCs and ~~Coast Radio Stations~~ CRSs are licensed to operate.

~~53~~.6 RTP communications integrity

Aim: *To revise the role of ~~Rescue Centres~~ RCCs, ~~and~~ ~~Coast Radio Stations~~ CRSs and CESs in policing the integrity of distress and working frequencies of RTP communications where appropriate.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory, the responsibility of ~~Rescue Centre~~ RCC, ~~or Coast Radio Station~~ CRS or GMDSS shore-based facilities for the mobile satellite service in relation to misuse of RTP radio frequencies;

Discuss accurately from memory, the ~~Rescue Centre~~ RCC, ~~or Coast Radio Station~~ CRS or GMDSS shore-based facilities for the mobile satellite service guidelines as to when action should be taken against a rogue RTP station; and

State correctly from memory, where guidelines as to appropriate warning messages to stations misusing RTP can be located, and where you would find the appropriate report form should further action be required.

SECTION 6 – SATCOMS/RECOGNIZED MOBILE SATELLITE SERVICES

6.1 General overview

Aims: *To investigate the background and characteristics of the different recognized mobile satellite services (RMSS).*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, how many satellites are involved in the different RMSS;

State correctly from memory, the orbit characteristics of different satellites of RMSS;

With the aid of a handout, discuss briefly but accurately the history of the different RMSS;

List correctly from memory, the different RMSS areas for operations, and state correctly from memory which areas are applicable to your SRR;

State correctly from memory, what the nominal coverage of the different RMSS are, as designated under the GMDSS, and state correctly from memory the coverage which has been achieved in practice; and

With the aid of a handout, list correctly the radio frequencies utilised by the different RMSS, and with the aid of a handout, state correctly the purpose of each frequency.

6.2 Component parts of the systems

Aims: *To examine the component parts of the different RMSS data routing systems, and the role played by each part.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, the contributing parts of the different RMSS data routing systems;

State correctly from memory, the meaning of the acronyms;

State accurately from memory, the concept for provision of the different GMDSS shore-based facilities in the mobile satellite service throughout the world in terms of the operating authority;

State correctly from memory, the location of different RMSS headquarters; and

State accurately from memory, the role of the key components of different RMSS.

6.3 Variety of communications

Aims: *To discuss the types of communication method and types of message which can be processed using the different RMSS.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, the different types of communication method provided for by each RMSS; and

List correctly from memory, 4 categories of message which can be processed using each RMSS.

6.4 System equipment

Aims: *To examine the various standards of equipment available now and proposed for the future by mobile satellite services. Such examination will categorize each system as GMDSS acceptable or not and which types of communications are achievable through each system.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, the different standards of equipment, including those currently in use and those planned for the future;

Distinguish correctly from memory, between the two acronyms ADE and BDE;

List correctly from memory, all 3 types of communications available through RMSS;

List correctly with the aid of a handout, all the types of communications available through different RMSS; and

State correctly from memory, how distress messages can be processed using different RMSS SES.

6.5 Enhanced group call (EGC)

Aims: *To examine the purpose and usage of the different RMSS EGC system.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the correct meaning of the acronym EGC;

State accurately from memory, the concept of the EGC system;

State correctly from memory, the different sub-systems which operate within the EGC system;

List correctly from memory, all types of messages handled by EGC;

List correctly from memory, all ways of addressing an EGC message; and

State correctly with reference to a handout, the meaning of the term "information provider" where necessary.

~~**SECTION 4 - TYPES OF STATION IN THE MARITIME MOBILE SERVICE**~~

~~***Aims:*** *To determine working definitions for different types of operating station within the maritime communication system.*~~

Objectives: By the end of the session the participants will be able to:

Define accurately from memory the terms: station, ship and traffic as they are applied to maritime communications;

List correctly from memory 5 out of 6 stations with which a ship is permitted to communicate directly by radio telephone;

List correctly from memory two facilities provided by a coast station; and

List correctly with the aid of a handout, the 3 methods by which a vessel can achieve commercial communications via a Coast Station.

SECTION 5 - GMDSS OVERVIEW

5.1 Origins and implementation

Aim: *To ensure that participants gain a knowledge of how the GMDSS developed and an overview of previous legislation governing maritime communications.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory the organizations responsible for the administration of the GMDSS, both international and domestic;

State correctly from memory the international agreement which enables the GMDSS, and state correctly from memory the domestic legislation which has ratified the system within National legislation;

State correctly from memory, 3 out of 4 types of equipment on which communication legislation prior to the GMDSS was based; and

Discuss accurately from memory 4 relevant advantages of GMDSS communication regulations.

5.2 Objective, concept and functions of the GMDSS

Aim: *To consider and discuss the concept, objectives and function of the GMDSS system.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory two out of three main objectives desired of the GMDSS system; and

List correctly, with the aid of a mnemonic if necessary, all 9 functions of the GMDSS.

5.3 Application

Aim: *To consider what vessels must comply with GMDSS regulations and what provision there is for exemption from compliance.*

Objectives: By the end of the session the participant will be able to:

Decide correctly from memory on every occasion, given the size, type, nature of passage and means of propulsion of any vessel, whether that vessel must comply with GMDSS legislation or not;

List correctly from memory 3 out of 6 official exemptions from GMDSS legislation; and

~~***Discuss accurately from memory the significance of a) 1/2/99 and b) 1/2/05 to the GMDSS master plan.***~~

~~**5.4 Sea areas defined**~~

~~***Aim:*** *To examine the designation of sea areas as laid down in GMDSS legislation compared both to the world's coastline and to the declarations of particular Governments.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***Define correctly on every occasion from memory the 4 sea area designations under GMDSS regulations;***~~

~~***Decide correctly on every occasion from memory, given the lat & long of a position and/or (as appropriate), the distance from the shore, which GMDSS sea area a position would relate to;***~~

~~***State correctly from memory how to validate the answers above in terms of declarations by a particular Government; and***~~

~~***State correctly from memory, which sea area(s) are within own SRR.***~~

~~**5.5 General equipment types**~~

~~***Aim:*** *To develop an overview of the types of ships equipment and communication systems which make up the GMDSS.*~~
~~**Objective:** By the end of the session the participant will be able to list from memory 9 systems of communication equipment which contribute to the GMDSS system.~~

~~**5.6 Equipment requirements by sea area**~~

~~***Aim:*** *To develop an understanding of the GMDSS requirements for ships equipment dependant upon sea area of navigation.*~~

~~**Objective:** By the end of the session the participant will be able to:~~

~~***Correctly list from memory all 8 types of communication equipment which must be carried by a ship navigating exclusively in GMDSS sea area A1;***~~

~~***Correctly list from memory all equipment, in addition to those for sea area A1, which must be carried by a ship navigating in sea area A2;***~~

~~***Correctly list from memory all equipment, in addition to those for sea areas A1 and A2, which must be carried by a ship navigating sea area A3; and***~~

~~***Correctly list from memory all equipment, in addition to those for sea areas A1, A2 and A3, which must be carried by a ship navigating sea area A4.***~~

~~**SECTION 6 - EPIRBs**~~

~~**6.1 General overview**~~

~~***Aims:*** *To investigate all the EPIRB systems available to the mariner and to discuss which are acceptable under the GMDSS. The session will identify which of the beacons is considered acceptable equipment for each of the four GMDSS sea areas.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

List correctly from memory all types of EPIRBs available to the mariner;

State correctly from memory which EPIRBs are acceptable to GMDSS regulations;

State correctly on every occasion which type of EPIRB is acceptable to any given sea area in the GMDSS system; and

Discuss accurately, with the aid of handouts where necessary, basic characteristics of the types of EPIRBs not acceptable to the GMDSS, and where each might be used.

6.2 The COSPAS-SARSAT system

Aims: *To examine in details the COSPAS-SARSAT satellite system, revealing the more important characteristics and component parts.*

Objectives: By the end of the session the participant will be able to:

Describe accurately with the aid of a handout, the origins of the COSPAS-SARSAT system, and be able to discuss those countries involved;

Describe accurately, with the aid of a handout, characteristics of both SARSAT and COSPAS satellites in the COSPAS-SARSAT LEOSAR system;

List correctly from memory ground elements which together make up the ground processing of COSPAS-SARSAT maritime distress alerting messages;

Discuss with the aid of a handout, the system of routing COSPAS-SARSAT distress alert messages on a global basis;

Discuss accurately with the aid of a handout the meaning of the Doppler effect and how it applies to the COSPAS-SARSAT system;

State correctly from memory, the location accuracy to be applied to both 406 MHz and 121.5 MHz beacon derived distress positions;

List correctly with the aid of a handout, two power and battery life characteristics of both 406 MHz and 121.5 MHz EPIRBs;

Accurately compare and contrast from memory the global and real-time modes of operation in the COSPAS-SARSAT system;

Discuss accurately from memory the meaning of the term "merged solution" in terms of COSPAS-SARSAT system distress alerts, and discuss how this affects information on a distress alert message;

Describe with the aid of a handout in very basic terms, the area of the earth where the real time mode of COSPAS-SARSAT operation cannot be achieved;

Demonstrate accurately on every occasion, analysis of COSPAS-SARSAT system distress alert messages; and

Describe accurately from memory the differences between GEOSAR and LEOSAR EPIRB systems.

6.3 Approved EPIRBs and EPIRB databases

Aims: *To develop understanding of characteristics of EPIRBs used in the GMDSS system.*

Objectives: By the end of the session participants will be able to:

With the aid of a handout, accurately describe the pertinent details of all EPIRB systems approved for use in the GMDSS;

~~***Demonstrate knowledge about national EPIRB databases and 406 MHz beacon protocols; and***~~

~~***Understand the use of 121.5 MHz as a homing frequency***~~.

SECTION 7 – NAVTEX SERVICES

7.1 General overview

Aims: *To examine in detail the concept and role of the NAVTEX system within the GMDSS.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, 2 main functions of the NAVTEX system;

State correctly from memory, the voice communication frequency associated with NAVTEX;

State correctly with the aid of a handout, the alternative frequency ~~which will be~~ made available for national (non-English) language broadcasts ~~after February 1999~~;

List correctly from memory, 6 out of 9 main system characteristics for NAVTEX as laid down in the GMDSS regulations; and

With reference to a handout, describe accurately the structure of the NAVTEX system.

7.2 Ship equipment and message priorities

Aims: *To examine the role of ship NAVTEX equipment and identify it as receive only equipment, and to identify levels of priority for message handling in the NAVTEX service.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the capabilities of ship NAVTEX equipment in terms of transmission and reception; and

State correctly from memory, the 3 message priorities which can be assigned by NAVTEX CRSs ~~coast stations~~.

7.3 Message categories

Aim: *To examine the various categories of message relevant to the NAVTEX system.*

Objectives: By the end of the session the participant will be able to:

With reference to a handout, list correctly the 17 message categories of the NAVTEX system; and

State correctly from memory, the 3 message categories when cannot be de-programmed from ship equipment and which message category should not be de-programmed from ship equipment.

7.4 National NAVTEX system

Aims: *To examine the National NAVTEX broadcast system in detail and gain an understanding of how a broadcast can be achieved by this means.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, which area of the WWNWS the national SRR falls into;

State correctly from memory, the nominal range of NAVTEX signals, and state correctly from memory, the likely maximum range of signals, and state correctly from memory, the designated range of the National NAVTEX broadcasts; and

List correctly from memory, the National NAVTEX broadcast remote aerial sites, and state correctly from memory, where the NAVTEX system is controlled from.

SECTION 8 – EPIRBs

8.1 General overview

Aims: *To investigate all distress beacons which use 406 MHz through the COSPAS-SARSAT system and to discuss which are acceptable under the GMDSS carriage requirements. The session will, identify what is recognised under the GMDSS but also cover 406 MHz beacons that may be activated in the maritime domain.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, all types of EPIRBs available to a mariner;

State correctly from memory, which EPIRBs are acceptable to the GMDSS regulations;

State correctly on every occasion, which type of EPIRB is acceptable to any given sea area in the GMDSS system; and

Discuss accurately with the aid of handouts, where necessary, basic characteristics of the types of EPIRBs not acceptable to the GMDSS, and where each of them might be used.

8.2 The COSPAS-SARSAT system

Aims: *To examine in detail the COSPAS-SARSAT satellite system, revealing the more important characteristics and component parts.*

Objectives: By the end of the session the participant will be able to:

Describe accurately with the aid of a handout, the origins of the COSPAS-SARSAT system, and be able to discuss those countries involved;

Describe accurately with the aid of a handout, characteristics of the different satellites used in the COSPAS-SARSAT system;

List correctly from memory, ground elements which together make up the ground processing of COSPAS-SARSAT maritime distress alerting messages;

Describe with the aid of a handout, the system of routing COSPAS-SARSAT distress alert messages on a global basis;

Describe accurately with the aid of a handout, the meaning of the Doppler effect and how it applies to the COSPAS-SARSAT system;

State correctly from memory, the location accuracy to be applied to 406 MHz beacon derived distress positions;

List correctly with the aid of a handout, power and battery life characteristics of 406 MHz EPIRB;

Accurately compare and contrast from memory, the global and real-time modes of operation in the COSPAS-SARSAT system;

Describe accurately from memory the meaning of the term "merged solution" in terms of COSPAS-SARSAT system distress alerts, and discuss how this affects information on a distress alert message;

Demonstrate accurately on every occasion, analysis of COSPAS-SARSAT system distress alert messages; and

Describe accurately from memory, the differences between MEOSAR, GEOSAR and LEOSAR EPIRB systems.

8.3 Approved EPIRBs and EPIRB databases

Aims: *To develop understanding of characteristics of EPIRBs used in the GMDSS system.*

Objectives: By the end of the session participants will be able to:

With the aid of a handout, accurately describe the pertinent details of all EPIRB systems approved for use in the GMDSS;

Demonstrate knowledge about national and international EPIRB databases and 406 MHz beacon protocols; and

Understand the use of 121.5 MHz as a homing frequency.

~~**SECTION 8 - SATCOMS**~~

~~**8.1 General overview**~~

~~***Aims:*** *To investigate the background and characteristics of the Inmarsat system.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***State correctly from memory how many satellites are involved in the Inmarsat system;***~~

~~***State correctly from memory the orbit characteristics of Inmarsat satellites and how they differ from those of the COSPAS-SARSAT system;***~~

~~***With the aid of a handout, discuss briefly but accurately the history of the Inmarsat system;***~~

~~***State correctly from memory what the acronym Inmarsat stands for;***~~

~~***List correctly from memory the four ocean areas for operations, and state correctly from memory which ocean areas are applicable to your SRR;***~~

~~***State correctly from memory what the nominal coverage of the Inmarsat system is, as designated under the GMDSS, and state correctly from memory the coverage which has been achieved in practice; and***~~

~~***With the aid of a handout list correctly the 4 radio frequencies utilised by the Inmarsat system, and with the aid of a handout, state correctly the purpose of each frequency.***~~

~~**8.2 Component parts of the system**~~

~~***Aims:*** *To examine the component parts of the Inmarsat data routing system, and the role played by each part.*~~

Objectives: By the end of the session the participant will be able to:

List correctly from memory, the 4 contributing parts of the Inmarsat data routing system;

State correctly from memory the meaning of the acronyms; SES, MES, CES, LES, NOC and NCC;

Discuss accurately from memory the concept for provision of CES/LES throughout the world in terms of the operating authority;

State correctly from memory the location of Inmarsat Headquarters; and

Discuss accurately from memory the role of the NCC, and state accurately from memory the location of the associated LES.

8.3 Variety of communications

Aims: *To discuss the types of communication method and types of message which can be processed using the Inmarsat system.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory four types of communication method provided for by the system; and

List correctly from memory four categories of message which can be processed using the system.

8.4 System equipment

Aims: *To examine the various standards of equipment available now and proposed for the future by Inmarsat Ltd. Such examination will categorize each system as GMDSS acceptable or not and which types of communications are achievable through each system.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory the 7 standards of equipment, including those currently in use and those planned for the future;

Distinguish correctly from memory between the two acronyms ADE and BDE;

List correctly from memory all 5 types of communications available through Inmarsat-A;

List correctly from memory all 5 types of communications available through Inmarsat-B;

List correctly from memory all 3 types of communications available through Inmarsat-C;

List correctly with the aid of a handout, all the types of communications available through Inmarsat-E, M, F and Fleet 77;

Discuss accurately from memory why Standard – M is, so far, not acceptable equipment under the GMDSS; and

State correctly from memory how distress messages can be processed using Inmarsat-A, B and C.

8.5 Enhanced Group calling

Aims: *To examine the purpose and usage of the Inmarsat Enhanced group calling system.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory the correct meaning of the acronym EGC;

Discuss accurately from memory the concept of the EGC system;

State correctly from memory the two sub systems which operate within the EGC system;

Discuss accurately from memory the purpose of both SafetyNET and FleetNET;

List correctly from memory all 5 types of message handled by the SafetyNET system;

List correctly from memory all 7 ways of addressing an EGC message; and

State correctly with reference to a handout where necessary the meaning of the term "information provider".

8.6 Distress alert

Aims: *To explore in depth the procedure laid down for operation of distress alerts received in the Inmarsat system.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory when a Rescue Co-ordination Centre acknowledge a Distress alert from a vessel at sea under varying circumstances:

1. Position is within own Search and Rescue Region (SRR);

2. Position is outside own Search and Rescue Region (SRR);

3. When no position information is given in the alert;

Discuss accurately from memory the subsequent action required of a RCC having acknowledged an Inmarsat distress alert;

State correctly from memory under which circumstances an Inmarsat distress alert would normally be relayed to another RCC;

Discuss accurately from memory the circumstances under which an Inmarsat distress relay alert would be transmitted by a RCC;

State correctly from memory which actions are required by a RCC receiving a distress relay alert from another shore station;

State accurately from memory which actions are required by a shore station receiving a distress acknowledgement from another shore station; and

State accurately from memory which actions are required by a RCC in receipt of an Inmarsat distress relay from another ship station.

8.7 SafetyNET and SARNet broadcasts

Aims: *To examine the procedures laid down to send broadcasts via SafetyNET and SARNet.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory all types of broadcast and areas to which a RCC or Coast Radio Station can broadcast to.

8.8 False alerts (re. Guidelines to Administrations on reporting false alerts)

Aims: *To examine the procedures laid down on how to handle false Inmarsat alerts.*

Objectives: By the end of the session the participant will be able to:
Discuss accurately procedures for RCCs on receipt of false alerts.

8.9 Databases

Aims: *To introduce the participant to the relevant databases used in the GMDSS.*

Objectives: By the end of the session the participant will be able to:

List National and International databases relevant to the GMDSS.

SECTION 9 - SART

9.1 General overview

Aims: *To examine the concept and purpose of the SART transponder, the frequency band of operations, the equipment required to detect SART signals and the nature of such signals as they appear on a radar screen.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory what the primary purpose of the SART is;

State correctly from memory what type of radar is required to detect SART signals;

State correctly from memory the recommended choice of radar range setting in order to detect SART signals;

Describe accurately from memory the radar image expected from a SART from first detection to that experienced when well within 1nm from the transponder; and

State correctly from memory how a survivor in the presence of an operating SART would know the transponder was being interrogated by approaching radar.

9.2 Positioning aboard ship

Aims: *To describe how many SARTs must be carried and where they may be located on board GMDSS ships.*
Objectives: By the end of the session the participant will be able to:

State correctly from memory, how many SARTs must be carried by ships of less than 500grt, ships greater than 500grt, and passenger ships; and

State correctly from memory, where on board a ship the required complement of SART should be stowed.

9.3 Technical specification

Aims: *To determine and understand the specifications of a SART as designated by GMDSS regulations.*

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***State correctly from memory the frequency band designated for SART transmissions;***~~

~~***State correctly from memory the required minimum operating life of SART batteries, including standby and operating time; and***~~

~~***State correctly with the aid of a handout, the operating temperature range for a SART.***~~

~~**9.4 Range of SART signals**~~

~~***Aims:*** *To explore the issue of detection range for SARTs both from theoretical specification and practical application.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***State correctly from memory the IMO specified performance criteria relating to the range of detection of SART signals;***~~

~~***State correctly from memory the 2 examples of SART signal detection range as experienced by surface and airborne SAR units;***~~

~~***State correctly from memory any SAR facility has no capability to detect SARTs; and***~~

~~***Discuss accurately from memory, and with reference to 3 out of 5 guidelines factors which may affect the detection range of SART.***~~

SECTION ~~9~~10 – EMERGENCY PORTABLE VHF RADIOS

~~9~~10.1 General requirements

Aims: *To explore the requirements under the GMDSS for the carriage of emergency portable VHF radio units.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the number of such radios required for ~~of~~ ships of ~~differing~~ different sizes;

Describe ~~Discuss~~ accurately from memory, where the radios should be stowed on board ship;

State correctly from memory, what additional provision must be made if the radios are to be used in conjunction with the day-to-day business of the ship; and

State ~~Discuss~~ accurately from memory, the purpose of emergency portable VHF radios.

~~9~~10.2 Mandatory channels

Aims: *To introduce the participants to the VHF channels which are mandatory under GMDSS ~~legislation's~~ provisions and the purposes of each.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory, all 3 VHF radio channels mandatory under GMDSS~~legislation~~ provisions; and

State ~~Discuss~~ accurately from memory, the correct designation of VHF channels 16, 06 and 13.

SECTION 10 – DEVICES FOR LOCATING

10.1 General overview

Aims: *To examine the concept and purpose of the different devices for locating, the frequency band of operations, the equipment required to detect the different signals for locating and the nature of such signals.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, what the primary purpose of the devices for locating is;

State correctly from memory, what type of equipment is required to detect the different signals for locating;

State correctly from memory the recommended choice of radar range setting in order to detect SART signals;

Describe accurately from memory, the radar image expected from a SART from first detection to that experienced when well within 1nm from the transponder; and

State correctly from memory, how a survivor in the presence of an operating SART would know the transponder was being interrogated by approaching radar.

10.2 Positioning aboard ship

Aims: *To describe how many devices for locating must be carried and where they may be located on board GMDSS ships.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, how many devices for locating must be carried by ships of less than 500grt, ships greater than 500grt and passenger ships; and

State correctly from memory, where on board a ship the required complement of device for locating should be stowed.

10.3 Technical specification

Aims: *To determine and understand the specifications of a device for locating as designated by GMDSS regulations.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the frequency band designated for SART and AIS-SART transmissions;

State correctly from memory, the required minimum operating life of SART and AIS-SART batteries, including standby and operating time;

State correctly with the aid of a handout, the operating temperature range for a SART and AIS-SART; and

Describe accurately from memory, the display expected from an AIS-SART on the equipment on board the ship receiving the AIS-SART signal.

10.4 Range of signals for locating

Aims: *To explore the issue of detection range for different signal for locating both from theoretical specification and practical application.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory, the IMO specified performance criteria relating to the range of detection of different signal for locating;

State correctly from memory, the 2 examples of SART signal detection range as experienced by surface and airborne SAR units;

State correctly from memory, any SAR facility has no capability to detect SARTs;

State accurately from memory, with reference to 3 out of 5 guidelines factors which may affect the detection range of SART; and

Describe accurately the difference between SART and AIS-SART signals.

~~**SECTION 11 - DIGITAL SELECTIVE CALLING**~~

~~**11.1 General overview**~~

~~***Aims:*** *To explore fully the characteristics and principles of the Digital Selective Calling (DSC) system.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***List correctly from memory in which sea areas DSC is relevant;***~~

~~***Describe accurately with the aid of a handout, basic technical details of the DSC system, including the duration of a DSC alert on MF and VHF;***~~

~~***State accurately from memory the term used to describe the error check function of the DSC system and with the aid of a handout discuss how this works;***~~

~~***Describe accurately from memory, the number and frequency of distress alerts transmitted by ships' equipment;***~~

~~***State correctly from memory the options available when addressing a DSC message;***~~

~~***Discuss accurately from memory a potential difficulty in terms of range of communications when operating DSC equipment and the subsequent analogue RT equipment;***~~

~~***Discuss accurately from memory the meaning of the terms designated and undesignated DSC distress alerts;***~~

~~***Demonstrate from memory, correct analysis of a DSC distress alert message on 15 out of 18 occasions;***~~

~~***Discuss accurately from memory how position information can be derived for DSC systems, and the implications this may have for search area determination;***~~

~~***Accurately from memory distinguish, on every occasion, between MMSI numbers for ship stations, shore stations and groups of ship stations; and***~~

~~***State correctly from memory the 3 sources of information to enable the decoding of MMSI's.***~~

~~**11.2 DSC frequencies**~~

Aims: *To determine the frequencies in use with the VHF, HF and MF DSC system, and the procedure for subsequent RT communications.*

Objectives: By the end of the session the participant will be able to:

List accurately from memory the frequency of MF DSC, the channel appropriate for VHF DSC, and in each case the associated RT frequency and channel; and

List accurately with the aid of a handout the 5 frequencies of HF DSC and in each case the associated RT frequencies.

11.3 DSC coast stations

Aims: *To examine the configuration of DSC coast stations in the national SRR.*

Objectives: By the end of the session the participant will be able to:

List correctly from memory the Rescue Co-ordination Centres and Coast Radio Stations in the SRR which are provided with MF DSC.

11.4 DSC action by ship and coast stations

Aims: *To explore in greatest possible depth the procedure laid down for operation of the DSC system.*

Objectives: By the end of the session the participant will be able to:

Discuss accurately from memory when a Rescue Co-ordination Centre should acknowledge a Distress alert from a vessel at sea under varying circumstances:

1. Position is in the Rescue Co-ordination Centres SRR;

2. Position is outside the Rescue Co-ordination Centres SRR;

3. No position information is shown on alert;

Discuss accurately from memory the subsequent action required of a coast station having acknowledged a DSC distress alert;

State correctly from memory under what circumstances a DSC distress alert would be acknowledged by a ship station;

State correctly from memory under what circumstances a DSC distress relay would be transmitted by a ship station;

State correctly from memory under what circumstances a DSC distress relay would normally be transmitted by a coast station;

Discuss accurately from memory the circumstances under which a DSC distress relay would be transmitted by a coast station;

State correctly from memory what action is required by a coast station receiving a distress relay from another coast station;

State accurately from memory what action is required by a coast station receiving a distress acknowledgement from another coast station;

State accurately from memory what action is required by a coast station in receipt of a distress relay from a ship station; and

~~***State correctly from memory under what circumstances a DSC acknowledgement is required from a coast station when dealing with urgency, safety and routine alerts.***~~

~~**11.5 Overview of HF DSC**~~

~~***Aims:*** *To ensure that participants are aware of the HF DSC system, the areas it applies to and which countries are directly involved.*~~

~~**Objectives:** By the end of the session the participant will be able to:~~

~~***Discuss accurately from memory the areas of the globe where HF radio can achieve propagation;***~~

~~***State correctly from memory how HF DSC and associated procedure compares to that of MF DSC;***~~

~~***State correctly from memory where HF DSC coast radio stations are situated; and***~~

~~***State correctly from memory the message routing procedure from HF DSC stations to the appropriate Rescue Co-ordination Centres for SAR action.***~~

SECTION 11 – Concept of RCC and SAR operations

11.1 Equipment types

Aim: *To introduce participants to the types of communication equipment operated by the RCC or CRS in which they operate.*

Objective: By the end of the session participants will be able to ***correctly name from memory all types of RCC or CRS radio communication equipment used in operation rooms.***

11.2 Workstations

Aim: *To raise the awareness of participants as to the correct procedure of handing over a VHF channel 16 watch and associated equipment checks to make.*

Objective: By the end of the session participants will be able to ***list correctly from memory, all key considerations in terms of continuity of watch keeping and equipment checks for the operator's attention when taking over the VHF channel 16 watch from a colleague.***

11.3 Log keeping

Aim: *To ensure all participants understand and are in a position to apply the correct log keeping procedure at radio watch keeping workstations.*
Objective: By the end of the session the participant will be able to ***describe accurately from memory, all key considerations and log entries when maintaining a radio log.***

11.4 Publications

Aim: *To raise the awareness of participants to written procedural support material held as standard issue at RCC.*

Objectives: By the end of the session participants will be able to:

List correctly from memory, 5 publications held as standard issue at RCC; and

State accurately from memory, in which publication to find particular details relating to maritime communications on 7 out of 10 occasions.

11.5 Codes, signals and standard phrases

Aim: *To ensure all participants understand and can practice international codes, signals and standard phrases.*

Objective: By the end of the session the participant will be able to:

Use the International Code of Signals (ICS), as appropriate;

Use spoken emergency signals and procedural words; and

Communicate in RTP and in written message by using the IMO Standard Marine Communication Phrases (SMCP).

11.6 Communications for SAR operations

Aim: *To ensure all participants can select SAR-dedicated frequencies and communicate with all SAR components of a SAR operation.*

Objective: By the end of the session the participant will be able to:

Select SAR-dedicated frequencies;

Format distress and safety messages;

Communicate with all participants of a SAR operation;

Draft SAR operation messages including situation report (SITREP), search action messages, rescue action messages and other SAR messages;

Understand distress alert information from CRS, GMDSS shore-based facilities of mobile satellite services and COSPAS-SARSAT; and

Relay distress alert information to others RCC and communicate with them.

11.7 Authority and responsibility for national RCC and *GMDSS shore-based facilities* communications

Aim: *To ensure participants understand levels of authority and responsibility involved in operating RCC and CRS communication equipment and the responsibility for local training and development.*

Objectives: By the end of the session participants will be able to:
State accurately from memory, by whose authority RCC, CRS and GMDSS shore-based facilities of mobile satellite services communication equipment is operated;

State accurately and from memory, who is responsible for correct operation and use of RCC, CRS and GMDSS shore-based facilities of mobile satellite services communication equipment; and

State accurately and from memory, who is responsible for ensuring the provision of adequate training for individuals in the operation and use of RCC, CRS and GMDSS shore-based facilities of mobile satellite services communication equipment.

11.8 Advice to the public on efficient radio procedure and use of radio communication equipment

Aims: *To raise awareness among participants as to National RCC, CRS or GMDSS shore-based facilities of mobile satellite services policy on giving advice to members of the public regarding the installation and operation of communication equipment.*

Objectives: By the end of the session participants will be able to:

State correctly from memory, where to find details of official advice as to GMDSS equipment carriage recommendations for pleasure craft;

State correctly from memory, where to find details of official advice as to GMDSS equipment carriage regulations and recommendations for fishing vessels;

List accurately from memory, the radiocommunication carriage requirements for all vessels; and

List accurately from memory, 5 reasons why mobile telephone equipment is not the preferred choice for communications equipment at sea.

11.9 Equipment user manuals and guides

Aims: *To remind participants of the importance of maintaining user manuals and guides in good condition and their shared availability between all members of operations room staff.*

Objectives: By the end of the session the participant will be able to:

Identify accurately with the aid of student notes, all user manuals available to support equipment currently installed at RCC; and

State from memory, where these manuals are located, or make a verbal report as to how he/she would arrange for these manuals to be stored and made available to all staff.

11.10 Equipment power delivery

Aims: *To raise the awareness of participants of his/her stations provisions for backup power supplies and standby batteries.*

Objectives: By the end of the session the participant will be able to:

Describe accurately with the aid of study notes, the provision for uninterruptible power supply (UPS) and standby generator or battery power at his/her site.

SECTION 12 – IMPLICATIONS OF THE GMDSS FOR RCC'S

12.1 Distress alert

Aims: *To explore in depth the procedure laid down for operation of distress alerts received in the different radiocommunication systems.*

Objectives: By the end of the session the participant will be able to:

State accurately from memory, when an RCC acknowledges a Distress alert from a vessel at sea under varying circumstances:

1. Position is within own SRR;

2. Position is outside own SRR; and

3. When no position information is given in the alert;

Elaborate accurately from memory, the subsequent action required of an RCC having acknowledged an alert the different radiocommunication systems;

State correctly from memory, under which circumstances an alert the different radiocommunication systems would normally be relayed to another RCC;

Elaborate accurately from memory, the circumstances under which distress relay alert would be transmitted by an RCC, and explain by what means this distress alert relay can be performed;

State correctly from memory, which actions are required by an RCC receiving a distress relay alert from another RCC;

State accurately from memory, which actions are required by a CRS receiving a distress acknowledgement from another CRS; and

State accurately from memory which actions are required by an RCC in receipt of a distress relay from another ship station.

12.2 False alerts

Aims: *To examine the procedures laid down on how to handle false alerts.*

Objectives: By the end of the session, the participant will be able to:

Describe accurately procedures for RCCs on receipt of false alerts.

12.3 Interference problems

Aims: *To manage radiocommunications in case of interference.*

Objective: By the end of the session, the participant will be able to:

Use reserve frequencies in case of interference; and

Use the appropriate commands to make silence on the frequency.

12.~~4~~1 Information gathering

Aims: *To revisit the subject of information gathering, and examine the implications of the GMDSS and other radio equipment in this area.*
Objective: By the end of the session the participant will be able to:

List accurately from memory, all ~~9 of~~ the means available under GMDSS ~~legislation~~ provisions ~~and previous legislation~~ by which ~~Rescue Co-ordination Centres~~ RCCs can achieve broadcast action;

~~Discuss~~ Describe accurately~~, and~~ from memory, in terms of target audience, the frequencies and/or channels available for broadcast action;

~~Discuss~~ Describe accurately~~, and~~ from memory, in terms of target area, the choice of communications medium for broadcast action;

List correctly from memory, the 4 potential means of holding reasonably secure telephone communications with the Master of a ship;

Describe ~~Discuss~~ accurately~~,~~ with the aid of a handout, the concept of any radio link system calls through CRS facilities;

State correctly from memory, on which of the different RMSSs ~~Inmarsat systems~~, telephone connection is available;

State correctly from memory, on which of the different RMSSs ~~Inmarsat systems~~, telex connection is available;

List accurately from memory, all ~~3~~ methods of achieving a telephone call to a ship by RMSS ~~Inmarsat~~; and

~~Discuss~~ Describe accurately from memory, the procedure which should be followed to achieve a NAVTEX broadcast in the SRR.

12.~~52~~ Search planning

Aims: *To examine the implications of GMDSS equipment for day-to-day decision making in search planning problems.*

Objectives: By the end of the session the participant will be able to:

~~Discuss accurately from memory the target populations for marketing of 121.5 MHz ELT's/PLB's, and state correctly from memory what assistance this may be to an SMC during search planning;~~

Describe accurately the remaining possibility nowadays to receive a distress alert by 121.5 MHz ELTs/PLBs, and state correctly from memory what implication this may be to a search and rescue mission coordinator (SMC) during search planning;

Describe ~~Discuss~~ accurately from memory, reasons why no survivors may be in the vicinity of an EPIRB located at sea;

Describe ~~Discuss~~ accurately from memory, difficulties which may hinder the deployment of SARTs or AIS-SART by survivors, and why location of the SART or AIS-SART will not always succeed in locating all survivors;

Describe the different types of EPIRBs in use and purchase on the market;

Describe ~~Discuss~~ accurately from memory, the time delay which may be experienced between the fixing of a Doppler position and receipt of the COSPAS-SARSAT alert message at an ~~Rescue Co-ordination Centre~~ RCC, and state correctly what implication this may have for a valid search plan;

Describe ~~Discuss~~ accurately from memory, the implications for initial position error to a position derived from RMSS alert messages; and

State correctly from memory what guidelines, in terms of time, would be considered when terminating a search for EPIRBs, ~~and~~ radar SARTs, AIS-SARTs or any other devices for locating.

12.~~63~~ Effort allocation

Aims: *To examine the implications of GMDSS equipment on day-to-day decision making in terms of effort allocation to a search.*

Objectives: By the end of the session the participant will be able to:

State ~~Discuss~~ accurately with the aid of a handout, the nominal range of VHF radio signals in all 6 situations with regard to craft type and antenna height; and

State correctly from memory, the implications for track spacing during a search for EPIRBs with a 121.5 MHz homer, or an SART, AIS-SART or any other devices for locating and a target known to have a portable handheld VHF radio.

12.~~7~~4 Search instructions

Aims: *To revise the concept of complete and unambiguous search instructions and how requirements for contents might change as a result of GMDSS equipment.*

Objectives: By the end of the session the participant will be able to ***~~discuss~~ state accurately from memory, the need to furnish complete and specific instructions in terms of equipment such as radar SART, AIS-SART and Portable VHF radio or any other devices for* locating.**

12.~~8~~5 Probability of detection (PoD)

Aims: *To examine the potential effect of GMDSS equipment on choice of track spacing compared with choices relevant to more traditional search targets.*

Objectives: By the end of the session the participant will be able to ***~~discuss~~ describe accurately from memory, the implications for PoD when searching an area for targets such as VHF Radio, 121.5 MHz homer, ~~and~~ radar SARTs, AIS-SART or any other devices for locating.***

12.~~9~~6 Decoding MMSIs, serial numbers and alert messages, and databases

Aims: *To ensure participants have a comprehensive understanding of all identification numbers and message formats relevant to the GMDSS system~~,~~ and know how to decode them, and which publications and databases are available.*

Objectives: By the end of the session the participant will be able to:

Demonstrate from memory, correct analysis of distress alert messages related to EPIRBs ~~406 MHz and 121.5 MHz beacons~~;

Demonstrate decoding of an MMSI number;

Discuss accurately from memory, the usage of serial identification numbers, MMSI and call sign identification for EPIRBs;

State correctly from memory, what is meant by the term SPOC and where you would find related contact information; and

~~State correctly from memory the format of IMN's in the Inmarsat-A, B, C, E, F and M standards.~~

List national and international databases relevant to the GMDSS.

SECTION 13 – PRACTICAL USE OF ~~RESCUE CO-ORDINATION CENTRE~~ RCC AND GMDSS SHORE-BASED FACILITIES ~~COAST RADIO STATION~~ COMMUNICATION EQUIPMENT

13.1 Communication equipment

Aims: *To ensure participants are familiar with all items of communication equipment and understand all the user functions and fault recognition with each.*

Objectives: By the end of the session the participants will be able to:

Demonstrate accurately from memory, adequate knowledge about, and how to operate all types of communication equipment at own RCC or ~~Coast Radio Station~~ CRS;

Describe accurately from memory, the correct basic fault reporting procedure for radio equipment, and state accurately from memory to whom the signals are forwarded; and

State correctly from memory, where to find the correct format for radio fault reporting and the designation of fault priorities.

13.2 Other types of SATCOMS message broadcast

Aims: *To examine the procedures laid down to send broadcasts via other types of RMSS message broadcast.*

Objectives: By the end of the session the participant will be able to:

State correctly from memory all types of broadcast and areas to which an RCC can broadcast to on RMSS.

13.3 Testing and maintenance of GMDSS equipment

Aims: *To examine the procedures to test and maintain GMDSS equipment.*

Objectives: By the end of the session the participant will be able to:

Test the different GMDSS equipment of the RCC, CRS and GMDSS shore-based facilities of mobile satellite services; and

Identify the main issues of maintenance of the GMDSS equipment in use.

SECTION 14 – TELEPHONE, FAX AND RTP CALLS TO SHIPS

14.1 Methods of making calls

Aims: *To increase the awareness of participants to the various means of placing calls, by telephone, ~~and~~ fax, telex and any other format message from shore ~~operation rooms~~ to ships, and to offer information on the appropriate charge bands for such calls.*

Objectives: By the end of the session the participant will be able to:

Describe ~~Discuss~~ accurately how to place a telephone, fax, ~~and~~ telex and any other format message call directly from the operation room to a ship station by ~~the~~ RMSS ~~Inmarsat system~~;

Describe ~~Discuss~~ accurately from notes, the concept integrated command and control system (ICCS) conference call, and list correctly from memory, the details which will be required when attempting to place calls by such means;

List ~~Discuss~~ accurately from memory, the advantages and disadvantages of using mobile cellular telephones for communications with vessels; and

Describe ~~Discuss~~ accurately from memory the potential usage of such telephone, telex, ~~and~~ fax and any other format message calls from ~~Rescue Co-ordination Centre~~ RCC ~~operation rooms~~ to ships.

14.2 Methods of charging calls

Aims: *To increase the awareness of participants to the different means of charging calls, by telephone, fax, telex and any other format message from shore to ships.*

Objectives: By the end of the session the participant will be able to:

Understand the method to charge telephone, fax and any other format message calls to ships.

ANNEX 5

DRAFT MSC CIRCULAR

GMDSS OPERATING GUIDANCE FOR ~~MASTERS OF~~ SHIPS IN DISTRESS SITUATIONS

1 The Maritime Safety Committee, at its […] session ([…]), having considered a proposal by the Sub-Committee on Navigation, Radiocommunications, and Search and Rescue (NCSR), at its […] session ([…]), approved the revised *GMDSS operating guidance for ~~masters of~~ ships in distress situations,* as set out in the annex.

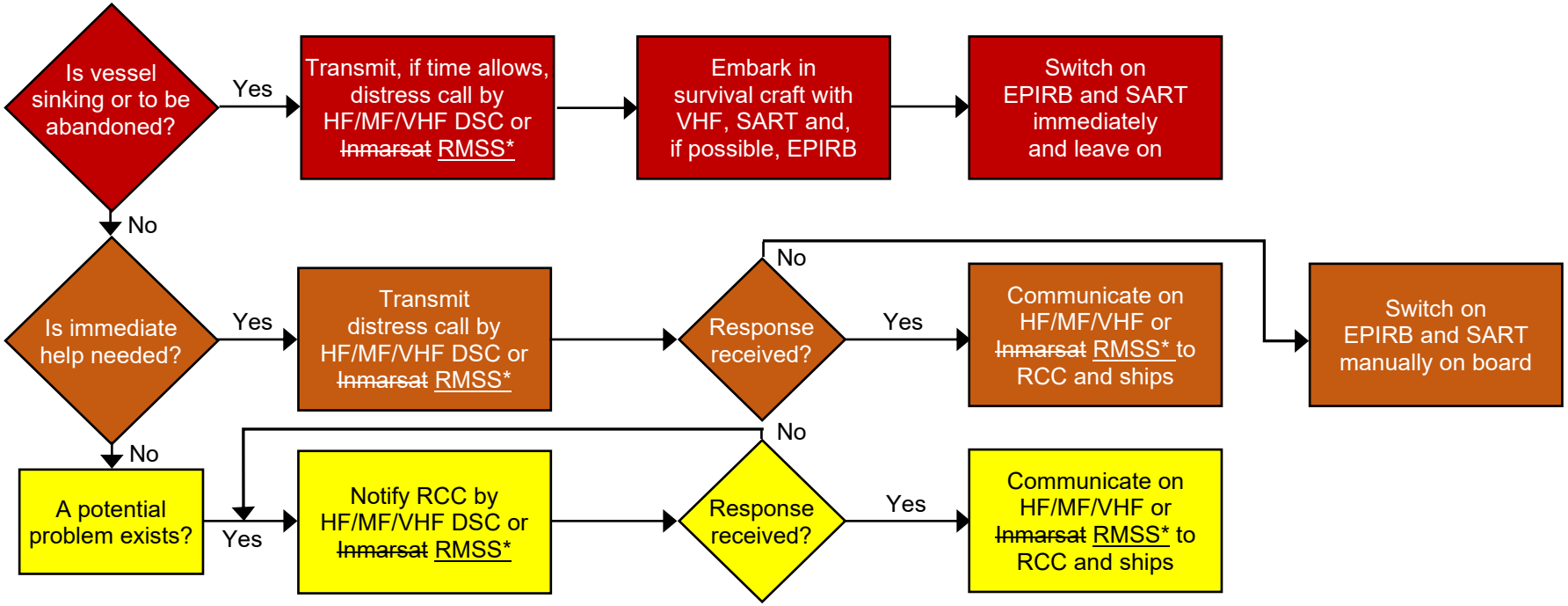
2 This circular provides guidance concerning the use of appropriate radiocommunication equipment in distress situations, in accordance with chapter IV of the International Convention for the Safety of Life at Sea, 1974. The Guidance in the annex is recommended to be displayed on ships' bridges as a A4 size poster.

3 Member Governments are invited to bring the annexed Guidance to the attention of seafarers and all other parties concerned.

4 This circular supersedes COM/Circ.108 as from 1 January 2024.

Annex

GMDSS OPERATING GUIDANCE FOR ~~MASTERS OF~~ SHIPS IN DISTRESS SITUATIONS



1. EPIRB should float free and activate automatically if it cannot be taken into survival craft.
2. Where necessary, ships should use any appropriate means to alert other ships.
3. Nothing above is intended to preclude the use of any and all available means of distress alerting, including those listed in COLREG 72, annex IV.

Frequencies for Distress Communications

	Digital selective calling (DSC)	Radiotelephone	~~Radiotelex~~
VHF	Channel 70	Channel 16	
MF	2 187.5 kHz	2 182 kHz	~~2 174.5 kHz~~
HF4	4 207.5 kHz	4 125 kHz	~~4 177.5 kHz~~
HF6	6 312 kHz	6 215 kHz	~~6 268 kHz~~
HF8	8 414.5 kHz	8 291 kHz	~~8 376.5 kHz~~
HF12	12 577 kHz	12 290 kHz	~~12 520 kHz~~
HF16	16 804.5 kHz	16 420 kHz	~~16 695 kHz~~

* Recognized mobile satellite service