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### **GMDSS COAST STATION OPERATOR'S CERTIFICATE (CSOC) MODEL COURSE**

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its eighth session (16 to 20 February 2004), finalized the GMDSS Coast Station Operator's Certificate course for Coast Station Operators to ensure that staff on duty in coast stations and in coast earth stations are adequately qualified and trained to operate the stations effectively.

2 The Sub-Committee also agreed that this course should be made available as an IMO model course.

3 The Sub-Committee further agreed that, pending validation and in view of an urgent need for immediate provision of training of coast station and RCC Operators, the course as set out in the annexes to the current circular, should be made available to Member Governments as soon as possible.

4 Member Governments are invited to bring this circular to the attention of all parties concerned and use the course in the interim to train the coast station and RCC operators until the IMO model course has been finalized and validated.

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## ANNEX 1

**GMDSS (CSOC) COURSE AIMS AND OBJECTIVES****1 AIMS**

1.1 The GMDSS course is designed to revise well known radio communication practices and to enhance procedures within RCC and Coast Radio Station operations rooms.

1.2 It will raise awareness of GMDSS systems and procedures amongst RCC and Coast Radio Station personnel, promote best practice and efficient use of radio communication equipment.

1.3 The 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 Coast Radio Station personnel.

**2 OBJECTIVES**

2.1 By the end of the course the participant will have revised all Routine, Distress, Urgency and Safety RT 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 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.

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## ANNEX 2

**SYLLABUS ITEMS****SECTION 1 - Radio wave characteristics and propagation**

- 1.1 Concept of radio frequency, wavelength and velocity
- 1.2 Relationship between wavelength and aerial height/length
- 1.3 Units of radio frequency and the frequency spectrum
- 1.4 Propagation mechanisms
- 1.5 Types of modulation
- 1.6 Classes of emission
- 1.7 Simplex & duplex

**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 & 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 - EPIRB**

- 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 Information gathering
- 12.2 Search planning
- 12.3 Effort allocation
- 12.4 Search instructions
- 12.5 Probability of detection
- 12.6 Decoding MMSIs, serial numbers & alert messages

**SECTION 13 - Practical use of RCC and Coast Station communication equipment**

**SECTION 14 - Telephone, fax and RT calls to ships**

- 14.1 Methods of making calls

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## ANNEX 3

## 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.*

## SECTION 1 - RADIO WAVE CHARACTERISTICS AND PROPAGATION

**1.1 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.*

**1.2 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.*

**1.3 Units of radio frequency and the frequency spectrum**

*Aims:* To introduce the participant to the 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.*

#### **1.4 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 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 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.*

#### **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 main forms of modulation used in RT 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.*

## 1.6 Classes of emission

*Aims:* To introduce the participant to the ITU classifications of emission and examine those of particular relevance to maritime RT 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 letter acronym designating the class of emission used with 2182 kHz distress communication channel and discuss accurately from memory the meaning;*

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

*State correctly from memory the three letter acronym designating the class of emission for use in VHF RT communications and discuss accurately from memory the meaning.*

## 1.7 Simplex & duplex

*Aims:* To introduce the participant to the basic concept of simplex and duplex RT 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 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 3 - RT COMMUNICATIONS**

## **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 RT;*

*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 RT frequency;*

*State the correct proword which should precede every communication related to a distress incident.*

### **3.2 Urgency**

*Aims: To enable the participant to revise RT 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.*

### **3.3 Small craft safety information 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.*

### **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 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 RT, 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.*

### **3.5 Routine communications and Radio regulations**

***Aims:** To revise well established National and ITU routine radio procedure and clarify some of the more important basic international radio regulations.*

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

***Describe accurately from memory and demonstrate competent use of the RSVP principles during RT 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 RT transmission on the distress frequencies;***

***State correctly from memory the maximum length of an RT 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 RT 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 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 Radio 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 and Coast Radio Stations are licensed to operate; and*

*List correctly with the aid of a handout the MF frequencies Rescue Centres and Coast Radio Stations are licensed to operate.*

### **3.6 RT communications integrity**

*Aim: To revise the role of Rescue Centres and Coast Radio Stations in policing the integrity of distress and working frequencies of RT 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 or Coast Radio Station in relation to misuse of RT radio frequencies;*

*Discuss accurately from memory the Rescue Centre or Coast Radio Station guidelines as to when action should be taken against a rogue RT station;*

*State correctly from memory where guidelines as to appropriate warning messages to stations misusing RT can be located, and where you would find the appropriate report form should further action be required.*

## **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 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 - 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 10 - EMERGENCY PORTABLE VHF RADIOS

### 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 of ships of differing size;*

*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*

*Discuss accurately from memory the purpose of emergency portable VHF radios.*

## **10.2 Mandatory channels**

*Aims: To introduce the participants to the VHF channels which are mandatory under GMDSS legislation's 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; and*

*Discuss accurately from memory the correct designation of VHF channels 16, 06 and 13.*

## **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 12 - IMPLICATIONS OF THE GMDSS FOR RCC'S

### 12.1 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 and previous legislation by which Rescue Co-ordination Centres can achieve broadcast action;*

*Discuss accurately, and from memory, in terms of target audience, the frequencies and/or channels available for broadcast action;*

*Discuss 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;*

*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 Inmarsat systems, telephone connection is available;*  
*State correctly from memory on which of the Inmarsat systems, telex connection is available;*  
*List accurately from memory all 3 methods of achieving a telephone call to a ship by Inmarsat;*  
*and*  
*Discuss accurately from memory the procedure which should be followed to achieve a NAVTEX broadcast in the SRR.*

## **12.2 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;*

*Discuss accurately from memory reasons why no survivors may be in the vicinity of an EPIRB located at sea;*

*Discuss accurately from memory difficulties which may hinder the deployment of SARTs by survivors, and why location of the SART will not always succeed in locating all survivors;*

*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 a Rescue Co-ordination Centre, and state correctly what implication this may have for a valid search plan;*

*Discuss accurately from memory the implications for initial position error to a position derived from Inmarsat alert messages; and*

*State correctly from memory what guidelines, in terms of time, would be considered when terminating a search for EPIRBs and SARTs.*

## **12.3 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:

*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 a SART and a target known to have a portable handheld VHF radio.*

#### **12.4 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 accurately from memory the need to furnish complete and specific instructions in terms of equipment such as SART and Portable VHF radio.

#### **12.5 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 accurately from memory the implications for PoD when searching an area for targets such as VHF Radio, 121.5 MHz homer and SARTs.

#### **12.6 Decoding MMSI's, serial numbers & alert messages**

***Aims:** To ensure participants have a comprehensive understanding of all identification numbers and message formats relevant to the GMDSS system, 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 406 MHz and 121.5 MHz beacons;***

***Demonstrate decoding of a 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.***

### **SECTION 13 - PRACTICAL USE OF RESCUE CO-ORDINATION CENTRE AND COAST RADIO STATION 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;*

*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.*

## **SECTION 14 - TELEPHONE, FAX AND RT 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 from 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:

*Discuss accurately how to place a telephone, fax and telex call directly from the operation room to a ship station by the Inmarsat system.*

*Discuss accurately from notes the concept ICCS conference call, and list correctly from memory the details which will be required when attempting to place calls by such means;*

*Discuss accurately from memory the advantages and disadvantages of using mobile cellular telephones for communications with vessels; and*

*Discuss accurately from memory the potential usage of such telephone, telex and fax calls from Rescue Co-ordination Centre operation rooms to ships.*

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